

THE EROSION OF STRATEGIC STABILITY AND THE FUTURE OF ARMS CONTROL IN EUROPE

Corentin BRUSTLEIN

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Ifri

27 rue de la Procession 75740 Paris Cedex 15 – FRANCE

Tel.: +33 (0)1 40 61 60 00 – Fax: +33 (0)1 40 61 60 60

Email: accueil@ifri.org

Website: ifri.org

Author

Dr. Corentin Brustlein is the Director of the Security Studies Center at the French Institute of International Relations. His work focuses on nuclear and conventional deterrence, arms control, military balances, and U.S. and French defense policies. Before assuming his current position, he had been a research fellow at Ifri since 2008 and the head of Ifri's Deterrence and Proliferation Program since 2010. He has been the lead editor of *Ifri Proliferation Papers* since 2014 and currently serves on the United Nations Secretary-General's Advisory Board on Disarmament Matters. He holds a Ph.D. in political science from the Jean Moulin University of Lyon.

His most recent publications include *Entry Operations and the Future of Strategic Autonomy* (Ifri, December 2017) and a monograph in French on the renewed U.S. debate on limited nuclear war (*La guerre nucléaire limitée: un renouveau stratégique américain*, Ifri, November 2017). He also co-authored a book on the growing erosion of Western air supremacy (*La suprématie aérienne en péril. Menaces et contre-stratégies à l'horizon 2030*, La Documentation Française, 2014, with E. de Durand and E. Tenenbaum).

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Translator: Aérotraduction

Abstract

The instruments of cooperative security created during and since the Cold War to foster mutual confidence and reduce the risks of war, inadvertent escalation, and arms races, in and around Europe, have come under increasing strain. The European security architecture has been – and is being – weakened by renewed geopolitical competition, technological and military developments, and states violating or bypassing international law, or walking away from previous commitments. Against this backdrop, it is crucial to reassess the meaning and requirements of crisis and strategic stability in Europe. This report looks at some current and future sources of strategic instability, and focuses in particular on how the Russian way of waging modern conflict could, through the importance given to strategic ambiguity and operational opacity, fuel escalatory dynamics in Europe. It argues that strengthening strategic stability in Europe requires a two-pronged approach, combining a sustained effort to reinforce deterrence and defense in Europe with new confidence- and security-building and arms control measures to reduce reciprocal fears, incentives to escalate rapidly during a crisis, and risks of conventional and nuclear war in Europe.

Résumé

Les instruments de sécurité coopérative créés pendant et depuis la guerre froide afin de promouvoir la confiance mutuelle et de réduire les risques de guerre, d'escalade accidentelle, ou de course aux armements en Europe, se trouvent de plus en plus menacés. L'architecture de sécurité européenne a été – et demeure – affaiblie par la compétition géopolitique renouvelée, les évolutions technologiques et militaires, et par des États contournant les règles internationales ou tournant le dos aux engagements qu'ils avaient contractés. Dans ce contexte, les conditions de la stabilité stratégique en Europe doivent être réévaluées. Cette étude présente les sources d'instabilité stratégique actuelles et futures, et accorde une attention spécifique à la pratique russe de la guerre moderne. Misan sur l'ambiguïté stratégique et l'opacité opérationnelle, celle-ci apparaît particulièrement susceptible d'alimenter des dynamiques d'escalade déjà transformées par le nouveau contexte stratégique et opérationnel. L'étude préconise une double approche afin de renforcer la stabilité stratégique en Europe. Un effort durable de renforcement des capacités de dissuasion et de défense devrait être combiné avec des mesures de sécurité et de maîtrise des armements permettant de réduire la méfiance réciproque, les facteurs de pression en faveur de l'escalade en temps de crise, et les risques de guerre conventionnelle ou nucléaire en Europe.

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Acronyms

A2/AD	Anti-Access/Area Denial
ABM	Anti-Ballistic Missile (Treaty)
AESA	Active Electronically Scanned Array
AEW&C	Airborne Early Warning & Control
ALCM	Air-Launched Cruise Missile
ASW	Anti Submarine Warfare
AWACS	Airborne Warning and Control System
BMD	Ballistic Missile Defense
C2	Command & Control
C3I	Command, Control, Communications, Intelligence
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance & Reconnaissance
CFE	Conventional Forces in Europe (Treaty)
CSBM	Confidence- and Security-Building Measure
eFP	Enhanced Forward Presence
EW	Electronic Warfare
ICBM	Intercontinental Ballistic Missile
IMINT	Imagery Intelligence
INF	Intermediate-range Nuclear Forces (Treaty)
ISR	Intelligence, Surveillance, Reconnaissance
JSTARS	Joint Surveillance and Target Attack Radar System
RCS	Radar Cross Section
SALT	Strategic Arms Limitation Talks (Treaty)

SAM	Surface-to-Air Missile
SEAD	Suppression of Enemy Air Defense
SIGINT	Signals Intelligence
SLCM	Sea-Launched Cruise Missile
SSBN	Strategic Submarine, Ballistic, Nuclear
VHF	Very High Frequency

Introduction

Europe has been spared by major war throughout the Cold War thanks to a combination of alliance relationships, deterrence, and cooperative security. The end of the Cold War led many in Europe to lower their guard and embrace the view that major power conflict belonged to the past. While many continued to attach a critical value to arms control agreements and confidence- and security-building measures (CSBMs), those very instruments became increasingly at odds with the perceptions and strategic priorities of major stakeholders, in Europe and outside Europe. In recent years, Russia's contestation of the European security order, the modernization of its conventional and nuclear forces, its failure to respect international commitments and several arms control agreements and its activism in external theaters have become a source of concern for multiple European countries. Recent Russian behavior raises the question of long-term coexistence in Europe with a potentially revisionist power modernizing its armed forces and wielding the nuclear threat for coercive, as well as dissuasive, purposes. The re-emergence of power politics at the frontiers of Europe reminds us of the precariousness of peace. At the same time, the United States government seems to be preparing for long-term strategic competition with Russia and China and, in this context, views existing arms control treaties as being increasingly at odds with its priorities, core interests, and with the current balance of military power. President Trump's intention to withdraw the U.S. from the Intermediate-range Nuclear Forces (INF) Treaty, stated in October 2018,¹ only confirms a long-established skepticism among the U.S. political and military elites about the relevance of most Cold War bilateral arms control treaties. It thus appears of the utmost importance to think about the future of the European security architecture – not only about the value and relevance of existing mechanisms and treaties, but also about the new and/or outstanding security concerns and the prospects of future additions to this architecture.²

During the Cold War, because of the fear of nuclear war, avoiding crises and reducing escalation dynamics became critical national security

1. J. Borger and M. Pengelly, "Trump Says US Will Withdraw from Nuclear Arms Treaty with Russia", *The Guardian*, October 21, 2018, accessible at: www.theguardian.com.

2. For two recent examples of Western European political leaders endorsing this type of endeavour, see F.-W. Steinmeier, "Reviving Arms Control in Europe", *Project Syndicate*, August 26, 2016, accessible at: www.project-syndicate.org ; E. Macron, "Discours du Président de la République à la Conférence des Ambassadeurs", Paris, August 27, 2018, accessible at: www.elysee.fr/declarations.

concerns. Theories were developed to understand the conditions for strategic stability between the superpowers. Progressively, both their behavior and capability developments were channeled by a series of arms control agreements, and confidence- and security-building measures. During the two decades that followed the Cold War, the edifice that had been constructed grew fragile and was partly dismantled due to the growing imbalance between the two former superpowers, now on diverging paths.³

Changes in the European security order, downsizing of the armed forces and the emergence of new military practices and capabilities have weakened stability on the continent by uncovering new vulnerabilities and new opportunities for surprise attack. Progress in conventional long-range strike, electronic warfare and antiaccess/area denial (A2/AD) capabilities are likely to modify crisis and escalation dynamics. Thus, in the event of a future crisis between Western and Russian forces, the interactions between modern militaries could be very different from what was anticipated during the Cold War.

These changes make it crucial to identify forthwith the risks of misunderstanding and escalation which Europe faces in order to propose options to reinforce strategic stability. It is, first, necessary to offer a contemporary vision of the concept of strategic stability. Though the concept has been less present in the contemporary strategic debate and less well-understood by the defense and foreign affairs communities than it was two or three decades ago, it remains pertinent to understanding the risks associated with escalation dynamics, mutual misperceptions, and incentives to strike first and to resort to nuclear weapons.

The purpose of this study is to evaluate some of the requirements and options in terms of arms control and confidence- and security-building measures (CSBMs) affecting military capabilities deployed in Europe or close to the European theater and which are most critical to crisis dynamics and strategic stability in Europe. These capabilities may be already existing and deployed – general purpose forces, precision-guided weapons, cruise missiles, missile and air defenses, etc. – or still under development (conventional prompt strike, unmanned combat air systems, etc.). Though it does not set a specific timeline, this study adopts a forward-looking approach, analyzes the impact of new and future technologies and practices on operational and strategic dynamics, and, on that basis, offers suggestions to feed into discussions and future negotiations between

3. On the fate of the CFE Treaty, see for instance M. Chillaud, *Désarmement classique et sécurité en Europe. Les fortunes du traité sur les Forces armées conventionnelles en Europe*, Québec: Presses de l'Université du Québec, 2011.

European countries, between the latter and the United States, and between the West and Russia.⁴

The European security architecture does not need to be rebuilt from scratch: the edifice of arms control agreements and CSBMs in Europe (CFE Treaty, Open Skies, Vienna Document, etc.) still exists but has been partly emptied of its substance for multiples reasons. This study does not seek to provide specific recommendations to allow the existing architecture to find a new way forward, but it aims to contribute to reflections either meant to back up efforts to update the existing architecture or to support future new arms control and CSBM initiatives.

4. Other examples include G. G. Govan, "Conventional Arms Control in Europe, Overcome by Events or New Perspectives", *Security and Human Rights*, No. 26, 2015, pp. 78-87; L. Kleinjan, "Conventional Arms Control in Europe: Decline, Disarray, and the Need for Reinvention", *Arms Control Today*, June 2016, pp. 22-25 ; T. Koivula and K. Simonen (eds.), *Arms Control in Europe: Regimes, Trends and Threats*, Helsinki: National Defence University, 2017 ; L. Kulesa, "The Future of Conventional Arms Control in Europe", *Survival*, Vol. 60, No. 4, August-September 2018, pp. 75-90.

Strategic stability in Europe, from one century to another

Europe was at the heart of the confrontation between the United States and the Soviet Union. It benefited from the strategic stability progressively established between the two superpowers. This section takes a new look at the sources of this stability and the changes that have occurred since the Cold War which are likely to put it under pressure, whether related to strategic dynamics, new military capabilities or the Russian strategy and practices.

The original concept and its contemporary validity

There have been many definitions and understandings of the concept of strategic stability over the past 50 years. The initial purpose of the concept remains, however: to think in peacetime about the conditions that, irrespective of strategic objectives, limit the incentives to escalate in conflicts opposing nuclear-armed adversaries.

Foundations and relevance of the concept

The concept of strategic stability is closely linked to the nuclear revolution and to the changes the latter introduced to the use of armed force. The unique destructive capacity of the atomic weapon made it possible to annihilate whole cities and armies. Until that time, the history of warfare had been a succession of periods in which dominant military practice and technology alternately gave the advantage to the attacker or the defender.⁵ A dialectic of shock and recovery echoed this offense-defense dynamic, driven by military innovations introduced on both sides and by the possibility for the defender to trade space for time, adapt, draw on the energy of despair to resist by wearing down the adversary's resolve, or to defeat him after a buildup made it possible.⁶

5. The international effects of these changes have been the subject of intense debate in the U.S. academic literature. See M. E. Brown *et al.* (eds.), *Offense, Defense, and War: An International Security Reader*, Cambridge, MA: MIT Press, 2004.

6. L. Freedman, "Strategic Defense in the Nuclear Age", *Adelphi Papers*, No. 224, 1987, chapters 6 and 7.

In the nuclear age, the instantaneous nature of the destruction caused by an atomic reaction and the size of the affected area eliminate all hopes of recovery.⁷ There can be no question of withstanding a nuclear attack as it had previously been possible to withstand the most massive conventional offensive campaigns as well as those with the boldest and most effective operational plans.⁸ The ballistic missile, which appeared during World War II and could reach intercontinental range by the end of the 1950s, further reduced the warning and reaction time available to the defender and thus put the final touches to a new era in which destruction would be worldwide, massive and almost instantaneous.

On the basis of this new situation, a growing preoccupation with the risk of surprise attack emerged in the 1950s, and rapidly became a defining element of the American strategic posture and thinking, as doctrines defining the role of nuclear weapons were being invented. The overpowering potential offered by a surprise attack in the nuclear age was profoundly destabilizing, particularly at a time when multiple crises were opposing the interests of the West with those of the Communist bloc.⁹ As it became a critical element of U.S. defense policy, the fear of surprise attack was central to the emergence of the concept of strategic stability.¹⁰

Strategic stability has been defined in various ways, with varying degrees of precision, from the absence of major war between great powers to the inability to conduct a disarming nuclear first strike. The concept has been broken down into several notions:

- *Crisis stability* which, for the purposes of this study, refers to a situation in which, during a crisis, “emotions, uncertainty, miscalculation, misperception, or the posture of forces” do not incentivize leaders to strike first, in particular with nuclear weapons, to avoid suffering the consequences of an enemy’s first move.¹¹ *First strike stability*, which is sometimes assimilated with the former, is the situation in which the

7. B. Brodie (ed.), *The Absolute Weapon: Atomic Power and World Order*, New York: Harcourt Brace, 1946; R. Jervis, *The Meaning of the Nuclear Revolution*, Ithaca: Cornell University Press, 1989.

8. Naturally, the fact that recovery has been possible even in the event of the most spectacular surprise attacks does not mean that recovery is systematic. For studies of historical cases, see for example R. K. Betts, *Surprise Attack: Lessons for Defense Planning*, Washington D.C.: The Brookings Institution, 1982; K. Knorr and P. Morgan, *Strategic Military Surprise. Incentives and Opportunities*, New Brunswick: Transaction Publishers, 1983; E. Kam, *Surprise Attack: The Victim's Perspective*, Cambridge: Harvard University Press, 2004 (1988).

9. T. C. Schelling, *Stratégie du conflit*, Paris: Presses Universitaires de France, 1986 (1960), Chapters 9 and 10; A. Wohlstetter, “The Delicate Balance of Terror”, *Foreign Affairs*, Vol. 37, No. 2, January 1959, pp. 211-212.

10. M. S. Gerson, “The Origins of Strategic Stability: The United States and the Threat of Surprise Attack”, in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, Carlisle: Strategic Studies Institute and U.S. Army War College Press, 2013, pp. 1-46.

11. G. A. Kent and D. E. Thaler, *First-Strike Stability: A Methodology for Evaluating Strategic Forces*, Santa Monica: RAND Corporation, 1989, p. XVII.

“technical characteristics of each side’s strategic forces” do not incentivize leaders to strike first to avoid suffering the consequences of an enemy’s first move. First strike stability, therefore, is a subset of crisis stability, as the two notions do not have the same scope.

- *Arms race stability* is defined as “the absence of perceived or actual incentives to augment a nuclear force – qualitatively or quantitatively – out of the fear that in a crisis an opponent would gain a meaningful advantage by using nuclear weapons first”.¹²

Although those definitions focus explicitly on nuclear capabilities, non-nuclear offensive, defensive, and supporting C3I capabilities exert a substantial, and growing, influence on the fear of surprise attack with, or targeting, nuclear forces, and are thus more closely connected with incentives to strengthen the latter.

As technology, doctrines and postures have evolved, non-nuclear capabilities have thus exerted a greater influence on the degree of strategic (in)stability among nuclear-armed states, influencing both crisis stability and arms race stability. The growing role and number of dual-capable delivery vehicles in force postures, the increasing emphasis of conventional strategic strike options, the diffusion of longer-range, modern offensive and defensive systems might shape crisis and escalation dynamics in new ways and alter the incentives to strike first and the vulnerability of nuclear forces. Thus, since it focuses first and foremost on incentives to resort to nuclear use out of the fear of surprise attack, strategic stability is increasingly influenced by the characteristics of conventional force postures (patterns of deployments, numbers, distances, etc.).

There is an intrinsic link between strategic stability and arms control.¹³ First, both share a common aim: reducing the risk of a first strike which, in the nuclear age, could rapidly escalate out of political control and lead to unbearable destruction. They also reflect the view that international relations necessarily comprise a combination of cooperation and confrontation.¹⁴ Both also require that the parties involved, though they are in conflict, recognize that they have a shared interest in preventing nuclear war – an interest that is greater than the motives leading to tensions and

12. J. M. Acton, “Reclaiming Strategic Stability”, in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., p. 121.

13. S. Croft, *Strategies of Arms Control: A History and Typology*, Manchester: Manchester University Press, 1996, pp. 44-46. For a more skeptical view, see C. A. Ford, “Anything but Simple: Arms Control and Strategic Stability”, in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., pp. 201-269.

14. P. Hassner, “Entre la stratégie et le désarmement : l’« arms control ». Étiquette passe-partout, thème contestable ou discipline nouvelle ?”, *Revue française de science politique*, No. 4, 1963, pp. 1019-1049; T. C. Schelling, *Stratégie du conflit*, op. cit.

crises.¹⁵ While strategic stability defines the principles of the type of relation between potential adversaries that is desirable in the nuclear age, arms control comprises the concrete measures by which this can be achieved by channeling each party's behavior.

As they were assimilated into the East-West strategic debate, during the Cold War, these concepts had visible implications for doctrines and capabilities, although they never were the unique factor driving the changes in the superpowers' nuclear postures. From the 1960s onwards, based particularly on modeling work performed by civilian strategists from RAND Corporation working with Robert McNamara,¹⁶ the idea emerged that certain orientations in terms of force structures and targeting would be intrinsically more stabilizing than others. Emphasis on counter-force strikes relying on vast arsenals with an emphasis on yield, increased precision and short response time, risked fueling fear of a surprise attack and, at a time of crisis, providing incentives to escalate. On the other hand, reinforcing the resilience of force structures in the face of a first strike by emphasizing survivable platforms (SSBNs or mobile ICBMs) or adopting a policy based on counter-city targeting, appeared as a trend that would reduce crisis instability. This line of reasoning culminated in the concept of "mutually assured destruction" where the continued mutual vulnerability of the superpowers was seen as the only possible guarantee of restraint. The best reflection of this vision was the ABM Treaty, signed in 1972, in which the United States and the USSR accepted drastic limits on research and development efforts, production, and deployment of ballistic missile defenses.¹⁷

However, the preservation of strategic stability has never been the only factor guiding the evolution of the U.S. – or Soviet – nuclear posture. The qualitative and quantitative paths followed by the United States and the evolution of U.S. strike plans over the years reveal a lesser impact on capabilities and actual plans than on public statements.¹⁸ The 1970s and

15. J. Goldblat, *Arms Control: The New Guide to Negotiations and Agreements*, London: SAGE Publications Ltd., 2002, pp. 11-12; T. C. Schelling and M. H. Halperin, *Strategy and Arms Control*, New York: The Twentieth Century Fund, 1961, p. 2.

16. L. Freedman, *The Evolution of Nuclear Strategy*, London: Palgrave, 2003 (3rd edition), Chapters 12 and 13.

17. The ABM Treaty barred deployment of an ABM system providing nationwide defense of a signatory State, limited to two the number of sites (national capital and one ICBM base) that could be protected by an ABM system, limited to a maximum of 100 the number of interceptors that could be deployed at one site, set limitations on the deployment and types of radar integrated into the ABM system, barred deployment of interceptors mounted on mobile launchers and set drastic limitations on missile defense interceptor R&D. See J. Goldblat, *Arms Control: The New Guide to Negotiations and Agreements*, *op. cit.*, pp. 71-72.

18. S. D. Sagan, *Moving Targets: Nuclear Strategy and National Security*, Princeton: Princeton University Press, 1989.

1980s saw a constant increase in nuclear counter-force capabilities.¹⁹ Since the end of the Cold War, the strengthening of U.S. counter-force capabilities comes first from the development of conventional strike systems and supporting C4ISR.²⁰ In practice, however, advances in real-time intelligence gathering, including intelligence relating to mobile targets, could be as useful, if not more, for nuclear counter-force operations as for conventional operations.²¹

The concepts of strategic stability and arms control have been subject to criticism right from the start, due to their supposed unintended effects on the forms of conflict or on U.S. policies – both in terms of investments and diplomatic priorities.

First, a high degree of strategic stability can encourage or fuel instability at lower levels of conflict. This hypothesis was mentioned by Glenn Snyder even before the appearance of survivable retaliatory forces in U.S. and Soviet arsenals.²² According to this “stability-instability” paradox, the stability created at the level of the strategic nuclear arsenals might give a free hand to a potential aggressor, confident in his ability to meet any threat of escalation with a nuclear retaliation made possible by second strike forces. Thus strategic stability would not prevent, but shape the conflict into other forms, conventional or irregular.²³

Similarly, the idea that strategic stability and deterrence credibility could be maintained through modest investments and arms control were rapidly considered too naive. Colin Gray argued that there could be no stability without credible deterrence and no credibility without the capability to conduct and win a nuclear war.²⁴ From this viewpoint, arms control can only function when it is not needed, i.e. when the State with

19. B. Rittenhouse Green and A. Long, “The Geopolitical Origins of U.S. Hard-Target-Kill Counterforce Capabilities and MIRVs”, in: M. Krepon, T. Wheeler and S. Mason (eds.), *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age*, Washington D.C.: Stimson Center, 2016, pp. 19-53; A. Long and B. Rittenhouse Green, “Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy”, *The Journal of Strategic Studies*, Vol. 38, No. 1-2, 2015, pp. 38-73.

20. C. Brustlein, “Conventionalizing Deterrence? U.S. Prompt Strike Programs and Their Limits”, *Proliferation Papers*, No. 52, Ifri, January 2015; D. M. Gormley, “The Paths to Deep Nuclear Reductions. Dealing with American Conventional Superiority”, *Proliferation Papers*, No. 29, Ifri, 2009; B. Gruselle, *Frappes stratégiques rapides*, Paris: Fondation pour la recherche stratégique, December 2012; B. Gruselle, *Nouvelles triades, conventionnalisation des moyens de dissuasion et équilibres stratégiques*, Paris: Fondation pour la recherche stratégique, January 2008.

21. A. Long and B. Rittenhouse Green, “Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy”, *op. cit.*

22. G. Snyder, “The Balance of Power and the Balance of Terror”, in: P. Seabury (ed.), *The Balance of Power*, San Francisco: Chandler, 1965, pp. 184-201.

23. The idea was already present in the writings of General Beaufre, who linked the renewed interest in indirect strategies to the paralyzing effect of nuclear deterrence. Général A. Beaufre, *Introduction à la stratégie*, Paris: Pluriel, 1998 (1963), pp. 146-149.

24. C. S. Gray, *Nuclear Strategy and National Style*, Lanham: Hamilton Press, 1986, pp. 133-136.

which negotiations are being conducted has no real intention of harming its rival. Conversely, if there is an intention to cause harm and if deterrence, therefore, is necessary, arms control will have no effect on the adversary's calculations and, on the contrary, could weaken preparation for war and thus deterrence, for instance if one adheres to the view that mutual vulnerability could be a guarantee of stability.²⁵

Strategic stability and arms control: how relevant today?

Arms control and strategic stability are two concepts that have lost importance in the U.S. post-Cold War strategic debate. In many respects, arms control is seen as a relic from a bygone era. It might have been considered by some as a necessary evil at a time when the presence of a peer posed significant risks to U.S. national security and thus justified the acceptance of constraints on U.S. present and future freedom of action. These constraints started to be seen as making no sense at a time of U.S. hegemony, when Russia was no longer considered as a potential adversary. As skeptics saw even fewer reasons to pursue arms control after the Cold War, many former supporters of arms control now favored more radical options such as disarmament.²⁶ Even among those in the elites and experts' community who might still believe in the value of arms control, an increasing number have come to the conclusion that agreements signed with Russia have become increasingly irrelevant as new military challenges emerged: thus, the threat posed by ballistic missile-armed regional adversaries led the U.S. to withdraw from the ABM Treaty in the early 2000s, while the formidable A2/AD capabilities deployed by China put the INF Treaty under increasing fire until the U.S. willingness to withdraw was announced in October 2018.

At the same time, strategic stability has been readily and increasingly confused with nuclear parity or with mutual assured destruction. The concept, whose definition had always been open to debate,²⁷ has sometimes

25. C. S. Gray, *Weapons Don't Make War: Policy, Strategy, and Military Technology*, Lawrence, KS: University Press of Kansas, 1993, pp. 122-ff.

26. P. Dunay, "What Has Happened to Arms Control?", in: Institute for Peace Research and Security Policy at the University of Hamburg / IFSH (dir.), *OSCE Yearbook 2007: Yearbook on the Organization for Security and Co-operation in Europe (OSCE)*, Berlin: Nomos, 2008, pp. 271-279; M. Hansel, "The Decline of Arms Control: Media Coverage and Elite Opinion in the United States", *Contemporary Security Policy*, Vol. 34, No. 1, 2013, pp. 64-93.

27. D. S. Yost, "Strategic Stability in the Cold War: Lessons for Continuing Challenges", *Proliferation Papers*, No. 36, Ifri, Winter 2011, p. 7.

become distorted to the point of becoming synonymous with peace or defense of the status quo.²⁸

Although deemed by some to be of limited value in the 1990s and 2000s, these notions remain fundamental today, not only because of Russia's strategic resurgence but also because the need for strategic stability extends well beyond the relation between the United States and Russia. Strategic stability seeks above all to avoid conflict situations which structurally encourage escalation between nuclear-armed adversaries. Thus, the increase in the number of nuclear powers, along with capability developments that have opened up new areas of confrontation between countries possessing nuclear weapons, make it essential to refocus attention on strategic stability.²⁹

While there is a need to refocus attention on the overall concept of strategic stability, the various dimensions of the concept do not seem equally critical to European security. For instance, due to the current balance of forces between the U.S. and Russia, the survivability of second strike retaliatory forces is much less an issue seen from Washington than from Moscow. While the latter is in the process of modernizing its nuclear forces, U.S. strategic forces retain a clear advantage in terms of survivability, not only due to the size and characteristics of the U.S. SSBN fleet, but more generally due to the U.S. technological edge that benefits both its conventional and nuclear forces.³⁰ Russian experts, on the other hand, remain concerned about first strike stability. This reflects both the importance given to the risk of surprise attacks in Russian military literature and the unfavorable changes in the political and military balances of power, whether conventional or nuclear, in the post-Cold War period.³¹ While Russian strategic nuclear forces rely on an ever-diminishing number of

28. For recent thinking on the concept of strategic stability, see E. A. Colby, "Defining Strategic Stability: Reconciling Stability and Deterrence", in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., pp. 47-83 and J. M. Acton, "Reclaiming Strategic Stability", in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., pp. 117-145.
29. G. D. Koblentz, "Strategic Stability in the Second Nuclear Age", *Council Special Report*, No. 71, Council on Foreign Relations, November 2014; R. F. Lehman, III, "Future Technology and Strategic Stability", in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., pp. 147-199.

30. See for example D. A. Wilkening, "Strategic Stability between the US and Russia", in: D. Ochmanek and M. Sulmeyer (eds.), *Challenges in U.S. National Security Policy: A festschrift Honoring Edward L. (Ted) Warner*, Santa Monica: RAND Corporation, 2014, pp. 123-140.

31. See in particular A. Kokoshin, *Soviet Strategic Thought, 1917-1991*, Cambridge: The MIT Press, 1999, pp. 122-124; B. Whaley, *Stratagem: Deception and Surprise in War*, Boston: Artech House, 2007 (1969), pp. 32-33.

platforms and launchers, they become more vulnerable to U.S. conventional superiority and virtually unconstrained ballistic missile defenses.³²

Considering the renewed tensions between the West and Russia following the latter's illegal annexation of Crimea, its provocative military posture and its operations in Syria, Europeans should be concerned about the risks of crisis instability and arms race instability on the continent today and in the future.

Crisis stability provides a measure of the risk of political tensions escalating towards the use of conventional strategic systems and, potentially, nuclear weapons. Generally speaking, an escalation process can develop across several dimensions which, far from being exclusive, can actually combine:³³

- “Vertical” escalation – an increase in the *material* intensity of hostilities, e.g. by increasing the number of aircraft sorties or strikes, of units deployed or involved in a given theater, or by using more sophisticated or more powerful weapon systems, etc.;
- “Horizontal” escalation – an increase in the geographical scope of the conflict, e.g. by opening a new front, extending an existing front, by attacking an enemy sanctuary previously unaffected by combat, etc.;
- “Political” escalation – an increase in the *political* intensity of hostilities, e.g. by changing the rules of engagement, by violating previously respected norms of behavior (attacks on civilians, neutrality, taboo on nuclear or chemical weapons use...), setting more ambitious political goals, etc.

In fact, within a European context, crisis stability issues might surface in many significant diplomatic-military crises opposing the West and Russia with respect to major stakes. Taking into account the interaction of non-nuclear capabilities with crisis stability dynamics is all the more crucial today as Russian strategy emphasizes cross-domain coercion, which aims at integrating in a coherent whole political warfare and military operations, kinetic and non-kinetic actions, conventional and nuclear capabilities, offensive and defensive systems.³⁴ The interaction of this strategy and NATO

32. See for example A. Kokoshin, *Ensuring Strategic Stability in the Past and Present: Theoretical and Applied Questions*, Cambridge: Belfer Center for Science and International Affairs, 2011, pp. 20-25, 41-43, 49-50, 56.

33. F. E. Morgan, K. P. Mueller, E. S. Medeiros, K. L. Pollpeter and R. Cliff, *Dangerous Thresholds: Managing Escalation in the 21st Century*, Santa Monica: RAND Corporation, 2008, pp. 18-19. For a closely related vision, see also H. Kahn, *De l'escalade. Métaphores et scénarios*, Paris: Calmann-Lévy, 1965 (1966), pp. 13-17.

34. D. Adamsky, “Cross-Domain Coercion: The Current Russian Art of Strategy”, *Proliferation Papers*, No. 54, Ifri, 2015; G. Gressel, “Russia's Quiet Military Revolution, and What It Means for Europe”, *ECFR*

strategy might lead to complex inter-domain and inter-theater escalation dynamics. If Moscow perceives the threat posed by its conventional and nuclear retaliatory capabilities provides it with enough freedom of action at the lower level of conflict, and thus attempts to create a *fait accompli* by exploiting this perceived advantage, escalation dynamics might quickly transform a local action into a major crisis, and potentially in war. Strategic instability could emerge in Europe even in much less obvious cases of conflict, in which Moscow would not deliberately try to destabilize a NATO member. The traditional – but growing – Russian lack of transparency at the operational and political levels, the geography of the theater, the number and frequency of regular and snap military exercises conducted in the region and their effects on the ability of intelligence services to provide advanced warning,³⁵ and the dangerous behavior adopted by some Russian forces could all play a role in converting a mere local accident into a direct conflict.³⁶

Crisis stability could be all the more complex to maintain in the future as the form of modern conflict has rapidly evolved following the massive introduction of new technologies. Precision-guided munitions, persistent intelligence, surveillance and reconnaissance collection, networked armed forces, directed energy, cyber and electronic warfare or autonomous systems have taken a greater role in modern combat and changed crisis and escalation dynamics.

New types of confrontation have appeared (cyber and electronic warfare), which could interact with the more traditional types of confrontation on which military balance was based.

Policy Brief, October 2015; A. Rácz, *Russia's Hybrid War in Ukraine: Breaking the Enemy's Ability to Resist*, Helsinki: Finnish Institute of International Affairs, 2015.

35. On intelligence and warning dynamics in both past and potential future crises in North-Eastern Europe, and how they have been and would be affected by Russian operational art and policies, see M. R. Cozad, *Strategic Warning on NATO's Eastern Flank: Pitfalls, Prospects, and Limits*, Santa Monica: RAND Corporation, 2018, pp. 35-38.

36. See for example E. A. Colby, *Nuclear Weapons in the Third Offset Strategy: Avoiding a Nuclear Blind Spot in the Pentagon's New Initiative*, Washington D.C.: Center for a New American Security, 2015; B. Perry, "Entering the Bear's Lair: Russia's A2/AD Bubble in the Baltic Sea", *The National Interest*, September 20, 2016, accessible at: <http://nationalinterest.org>; D. A. Shlapak and M. Johnson, *Reinforcing Deterrence on NATO's Eastern Flank: Wargaming the Defense of the Baltics*, Santa Monica: RAND Corporation, 2016.

The erosion of strategic stability in Europe

Paradoxically, the relative easing of tensions between NATO and Russia during the 20 years after the fall of the Berlin Wall did not lead to the establishment of solid and lasting foundations for strategic stability in Europe. Defense spending dropped rapidly, and with it most European countries' ambition to maintain a modern military, albeit smaller. While this trend initially happened in parallel with the collapse of the Russian Army, it turned out to be increasingly out of phase with its security environment from the end of the 2000s onwards. Europe only grew more strategically dependent on U.S. presence and protection. This, in combination with the post-Cold War territorial status quo, modified the strategic geography of Europe and the chances of avoiding strategic instability.

Russia-NATO: intersecting strategic paths

Over the past 25 years, NATO has followed a paradoxical strategic path. It has successfully completed three phases of enlargement, integrating a number of former adversaries and becoming the world's leading military alliance. In parallel, the Alliance has heavily reoriented its missions towards what became the priorities of the time – peacekeeping, stabilization and counter-insurgency – to the detriment of its traditional mission, collective defense. As the territory of NATO member states moved closer to Russia, feeding Moscow's fears of reduced influence and loss of its buffer zone, NATO pulled back from a relation of rivalry with Russia and reduced the salience of nuclear weapons in its policies.

While NATO refused to see in Russia anything other than a partner, starting in 2010 Moscow re-identified NATO as its main external threat.³⁷ In parallel, demonstrations of military prowess by the military forces of NATO members, particularly U.S. forces, in the Gulf in 1991 and in the Balkans in 1995 and 1999, led Russia to place nuclear weapons back at the heart of its strategic posture and to lower the threshold for their use – as it was unable at that time to benefit from the US-led “revolution in military affairs” to modernize its military.³⁸ This orientation, clearly stated in the

37. This was not the case in the military doctrine published in 2000. See *Russia's Military Doctrine* [FBIS translation], armscontrol.org, May 1, 2000, accessible at: www.armscontrol.org; *Military Doctrine of the Russian Federation*, February 5, 2010; *Military Doctrine of the Russian Federation*, December 25, 2014.

38. E. A. Colby, “Russia's Evolving Nuclear Doctrine and Its Implications”, *Notes de la FRS*, January 2016; Rose Gottemoeller, “Nuclear Weapons in Current Russian Policy”, in S. E. Miller and D. Trenin (eds.), *The Russian Military: Power and Policy*, Cambridge: American Academy of Arts and

2000 military doctrine, no longer appears explicitly in doctrinal documents published from 2010 onwards. Russia's current posture plays more on nuclear ambiguity – on the nuclear threshold, on the missions of dual-capable systems and roles assigned to non-strategic nuclear weapons – as illustrated since the Ukraine crisis in 2014.³⁹

These intersecting strategic paths of NATO and Russia with respect to the use of force and the centrality of nuclear weapons could contribute to the risk of surprise and escalation in future potential crises, whether the escalation is accidental, inadvertent or deliberate.

Deliberate escalation occurs when a belligerent consciously crosses an identified adversary threshold. The fact that the escalation is deliberate does not mean that the enemy's reaction has been wished for or perfectly anticipated, but that the risk of escalation triggered by the initiative has been deemed acceptable, e.g. because the probability of the adversary stepping back has been deemed greater.

Inadvertent escalation occurs when a belligerent crosses a poorly identified or unidentified threshold of the adversary. The initiative is deliberate but its political significance to the adversary has been misunderstood.

Accidental escalation occurs when a threshold is crossed due to an unplanned action or an error in the conduct of operations.⁴⁰

Over recent decades, the Russian and Western militaries have only been involved in limited wars against non-nuclear opponents. Some operational practices that would be considered normal as part of a classic military campaign (deploying tactical stealth aircraft in-theater, activating air defense systems, jamming enemy radars, etc.) would become deeply escalatory in a crisis between NATO and Russia. Furthermore, instead of restraining the intensity and reach of conventional operations, nuclear parity between Russia and the U.S. could, on the contrary, be deliberately ignored or consciously exploited by a belligerent who considered the risk of nuclear escalation as extremely unlikely over the interests at stake in the

Sciences/MIT Press, 2004, pp. 194-197; D. Johnson, *Nuclear Weapons in Russia's Approach to Conflict*, Paris: Fondation pour la Recherche Stratégique, 2016, pp. 20-43.

39. D. Adamsky, "Cross-Domain Coercion", *op. cit.*; O. Oliker, *Russia's Nuclear Doctrine: What We Know, What We Don't, and What That Means*, Washington D.C.: Center for Strategic and International Studies, May 2016; B. Roberts, *The Case for U.S. Nuclear Weapons in the 21st Century*, Stanford: Stanford Security Studies, 2016, p. 128-ff; N. N. Sokov, "Why Russia Calls a Limited Nuclear Strike "De-Escalation", *TheBulletin.org*, March 13, 2014, accessible at: <http://thebulletin.org>.

40. F. E. Morgan, *et al.*, *Dangerous Thresholds*, *op. cit.*, pp. 20-28.

ongoing crisis.⁴¹ With little experience since the end of the Cold War of signaling restraint to the adversary, the belligerents could overlook the signals being sent, misunderstand the adversary's critical thresholds, or omit or poorly communicate their own ones.⁴² Thus, the asymmetry of stakes and postures, the surprise potential of modern weapon systems and the risk of over-reaction could, in a situation of extreme tension, transform an isolated incident into the first stage of a destructive process.

The orientations followed by European and Russian armed forces over the past 25 years also have to be taken into account.⁴³ European armed forces have been deeply transformed, often professionalized and modernized to try to remain interoperable with the U.S. This attempt to keep pace with U.S. military transformation, however, took place at a time of sharply falling defense spending across the whole continent. The cutbacks in defense investment, combined with the increasing sophistication of equipment, resulted in a strong, long-term contraction of European armed forces.⁴⁴ Faced with shrinking numbers and budgets, most of these militaries became unable to deal with the full spectrum of security challenges as they focused on stabilization operations. With a few rare exceptions, they became increasingly dependent on the U.S. and neglected whole capability areas (large combined-arms operations, ground fires, suppression of enemy air defenses, operations in contested electromagnetic environments, etc.). While these areas appeared secondary at the time, they are now not only relevant, but among the most critical in boosting the credibility of defense and deterrence at the conventional level.⁴⁵

41. See F. E. Morgan, "Dancing with the Bear: Managing Escalation in a Conflict with Russia", *Proliferation Papers*, No. 40, Ifri, Winter 2012, pp. 35-39.

42. On the link between strategic (in)stability and the lack of understanding of nuclear dynamics among current leaders, see C. S. Chivvis, A. Radin, D. Massicot and C. Reach, *Strengthening Strategic Stability with Russia*, Santa Monica: RAND Corporation, 2017, p. 8.

43. For a recent analysis, see S. Boston, M. Johnson, N. Beauchamp-Mustafaga and Y. K. Crane, *Assessing the Conventional Force Imbalance in Europe: Implications for Countering Russian Local Superiority*, Santa Monica: RAND Corporation, 2018.

44. E. de Durand, "Europe, d'une démilitarisation l'autre", *Politique étrangère*, Ifri, Spring 2014, pp. 103-116.

45. See in particular C. Brustlein, "Entry Operations and the Future of Strategic Autonomy", *Focus stratégique*, No. 70 bis, Ifri, December 2017. Concerning land forces, see for example G. Lasconjarias, "Forces terrestres et réassurance. Quelles options pour l'Alliance?", *Focus stratégique*, No. 65, Ifri, January 2016; G. Lasconjarias, "The North Atlantic Treaty Organization's Land Forces: Losing Ground" in: G. J. Schmitt (ed.), *A Hard Look at Hard Power: Assessing the Defense Capabilities of Key U.S. Allies and Security Partners*, Carlisle: Strategic Studies Institute, 2015, pp. 231-255. In the naval domain, see B. McGrath, "The North Atlantic Treaty Organization at Sea: Trends in Allied Naval Power", in: *ibid.*, pp. 67-94. Finally, concerning air power, see C. Franklin, "North-Atlantic Treaty Organization Air Power: A Self-Reliant Europe?", in: *ibid.*, pp. 350-380.

Table 1. Examples of types of escalation that could occur during a NATO-Russia crisis

Type of escalation	Initiator	Cause	Example of reaction ⁴⁶
Accidental	NATO or Russia	Military units cross an international border during training	Clash with border guards, fatalities
Accidental	NATO or Russia	Firing coordinates input error during exercises leading to conventional strikes on/beyond the border	Deliberate conventional retaliation, leading to fatalities/destruction
Accidental	NATO or Russia	Navigation error by fighter/bomber pilot resulting in airspace violation in neighboring country	Aircraft shot down by air defense, exchanges of fires
Inadvertent	NATO	Major buildup of the NATO forward presence in Baltic countries in the midst of a crisis with Russia	Activation of an A2/AD bubble in Baltic Sea, Black Sea, including clashes with expeditionary or local forces and fatalities
Inadvertent	Russia	Attempt to coerce a NATO member using non-military means	Invocation of Article 5, major NATO build-up in/around targeted country, large cyberattacks against Russian systems
Deliberate	Russia	Attempt to militarily coerce a NATO member, underestimating chances of NATO reaction	Invocation of Article 5, direct military involvement of NATO and beginning of a kinetic and non-kinetic campaign
Deliberate	Russia	In a context of Russian aggression (Article 5) and NATO military buildup, Russia conducts a large conventional strike aimed at logistics depots, sea points of debarkation and airbases located in Europe	Initiation of a NATO air campaign targeting Russian air defenses and dual-capable missile launchers located in Kaliningrad, dispersal of NATO dual-capable aircraft
Deliberate	NATO	In a context of local conflict over Eastern Europe allies, NATO initiates a suppression of enemy air defense campaign against Russian assets in Kaliningrad	Russia conducts massive conventional strikes against critical infrastructures in Europe, combined with a single low-yield nuclear strike for demonstration purpose

After experiencing a major crisis in the mid-1990s, a buildup of the Russian military has been under way since the mid-2000s, backed by significant and overall increasing defense spending (3.6% of GDP in 2005,

46. This column lists the immediate reactions to the enemy initiative. It does not mean that this reaction would halt the escalation process and would not be followed by other reactions.

5.4% in 2015)⁴⁷ and an oil price trend playing often in Moscow's favor. After disappointing operational effectiveness during operations in Georgia in 2008, Russia multiplied military reforms under the leadership of Anatoly Serdyukov, then Sergei Shoigu, and launched a selective but effective modernization of its armed forces.⁴⁸ Combined with a renewed strategic approach, this modernization is affecting both the military balance and the risks of instability during a crisis with NATO, through a doctrinal emphasis on ambiguity and opacity or new niche capabilities (precision strike, air defense, electronic warfare, etc. – see below).

Furthermore, due to the reduced level of U.S. military presence in Europe – a long-term trend interrupted in 2014 – and to the commitment made under the 1997 NATO-Russia Founding Act, the foreseeable geostrategic situation offers little advantage to NATO in the event of a conflict in Eastern Europe. Stability at the conventional level hinges on the balance of forces in the theater of operations and in its immediate vicinity, not at the overall level.⁴⁹ In the event of a severe crisis between NATO and Russia, not only does the initial situation appear unbalanced due to the weak military capabilities of East European allies, but restoring it following a *fait accompli* would be difficult.⁵⁰ The distance that separates the Baltic theater from the support of the U.S., British and French forces – the most credible NATO militaries in high-intensity scenarios – would be all the more difficult to overcome in the presence of major Russian interdiction capabilities.⁵¹

Conventional stability and contemporary capability developments

Assessing the military balance and the level of military stability in a given theater has grown increasingly complex over time, as doctrines and technologies have evolved. Sophisticated methodologies were developed during the Cold War to identify the appropriate conventional force levels

47. S. Oxenstierna, "Russian Military Expenditure", in: G. Persson (ed.), *Russian Military Capability in a Ten-Year Perspective – 2016*, Stockholm: FOI, 2016, p. 138.

48. P. Baev, "Ukraine: A Test for Russian Military Reforms", *Focus stratégique*, No. 56, Ifri, May 2015; B. Renz, "Russian Military Capabilities After 20 Years of Reform", *Survival*, Vol. 56, No. 3, 2014, pp. 61-84.

49. Boston et al., *Assessing the Conventional Force Imbalance in Europe*, op. cit.

50. D. A. Shlapak and M. Johnson, *Reinforcing Deterrence on NATO's Eastern Flank*, op. cit. See also J. W. Nicholson, "NATO's Land Forces: Strength and Speed Matter", *PRISM*, Vol. 6, No. 2, 2016, pp. 29-47.

51. E. S. Edelman and W. Morgan McNamara, *U.S. Strategy for Maintaining a Europe Whole and Free*, Washington D.C.: Center for Strategic and Budgetary Assessments, 2017, pp. 27-31; G. Gressel, "Russia's Quiet Military Revolution, and What It Means for Europe", *ECFR Policy Brief*, October 2015; K. H. Hicks and H. A. Conley, *Evaluating Future U.S. Army Force Posture in Europe: Phase II Report*, Washington D.C.: Center for Strategic and International Studies, 2016, pp. 23-34.

required by McNamara's flexible response,⁵² or later on to take into account the effect of precision-guided munitions on the balance between NATO and the Warsaw Pact.⁵³ The data – whether quantitative (numbers of troops, equipment, bases, etc.), qualitative (technology, doctrine), geographical, political and strategic – have evolved substantially over the past 30 years. While formulating a modern methodology to evaluate military balances is beyond the scope of this study, some enduring principles need to be kept in mind while identifying the long-term military trends that are likely to come into play in the event of a crisis between NATO and Russia.

General principles relating to conventional stability

Stability at the conventional level is generally understood as a situation where a belligerent is unable to gain a significant advantage by taking an offensive initiative. Thus, it reflects the interaction between respective postures, in particular between the force structures, doctrines, equipment and deployments of the belligerents.⁵⁴ Although it conceptually differs from strategic instability, conventional instability naturally influences the latter, as it can increase the vulnerability of nuclear forces and exacerbate the fear of surprise attack. Military history and theory provide multiple insights on the conditions in which conventional balances can be considered to be conducive to stability at higher levels.

In war, the defender enjoys various advantages at the operational and strategic levels, such as the relative proximity of his supply bases (while the attacker is moving away from his bases and stretching his lines of communication); familiarity with the terrain and the possibility of preparing in advance of hostilities; the ability to trade space for time; and support from the local population.⁵⁵

Conversely, the main strength of the attacker resides in the advantages of surprise, at the strategic and operational level. By subjecting the defender to a cognitive and organizational shock, surprise renders him incapable of reacting, leaving the attacker free to pursue his objective and maintain

52. A. C. Enthoven and K. Wayne Smith, *How Much Is Enough? Shaping the Defense Program, 1961-1969*, Santa Monica: RAND Corporation, 2005 (1971).

53. See for example W. W. Kaufmann, "Nonnuclear Deterrence", in: J. D. Steinbruner and L. V. Sigal (eds.), *Alliance Security: NATO and the No-First-Use Question*, Washington D.C.: The Brookings Institution, 1983, pp. 43-90; S. E. Miller (ed.), *Conventional Forces and American Defense Policy*, Princeton: Princeton University Press, 1986.

54. A. Von Müller, "Conventional Arms Control: The Agenda and its Dangers", in: A. Boserup and R. Neild (eds.), *The Foundations of Defensive Defence*, London: MacMillan, 1990, pp. 20-21.

55. C. von Clausewitz, *On War*, Princeton: Princeton University Press, 1976, pp. 363-366; A. Beaufre, "Offensive et défensive", *Stratégie*, April-May-June 1972, pp. 9-10; L. Freedman, "Strategic Defense in the Nuclear Age", *op. cit.*, pp. 45-46, 51-52.

momentum.⁵⁶ Thus, doctrines, equipment and organizations which favor surprise (mobility, velocity, stealth, etc.) and associated techniques (deception, disinformation, concealment) tend to strengthen the attacker more than the defender, and thus to have a destabilizing effect. Conversely, the ability to increase operational transparency would give an advantage to the defender and reinforce stability by enhancing predictability in the theater of operations.

In military terms, there is no correlation between symmetry and stability. Symmetry refers to a situation in which opposed armed forces are more or less comparable in qualitative terms (force structures, skill, equipment, etc.) and from a quantitative point of view. Thus, the balance of forces can be symmetrical without being stable, e.g. if both sides have made doctrinal, organizational and capability choices aimed at rapidly destabilizing the adversary. An asymmetrical balance of power, on the other hand, can be stable if two dissimilar postures mutually compensate each other – the key being that the offensive potential of one side does not exceed the resilience of the other.

Finally, evaluating the degree of stability of a given situation should be based not only on the immediate effects of an attack but also on longer-term effects, and possible defensive reactions. The faster the defender can adapt and fight efficiently, which requires physical and psychological resilience, reserves, rapidly deployable reinforcements (etc.), the greater the stability will be. Conversely, if the initial attack produces lasting effects or domino effects, the situation will be more unstable and will incentivize preventive action and surprise. To put it otherwise, conventional stability needs to be put into perspective – it would not make sense to assess stability at the tactical level without taking into account the operational level, not to mention the strategic level.

The rise of reconnaissance-strike complexes

Over the past two decades, innovations resulting from the 1970s Offset strategy (now dubbed “First Offset”) have become essential components of modern armed forces – first in the U.S., then in the West, before being integrated into the forces of potential adversaries such as Russia. “Reconnaissance-strike complex” was initially a Russian concept designating computerized systems integrating in a single coherent whole, elements such as (1) tactical, operational and strategic intelligence,

56. C. Brustlein, “La surprise stratégique. De la notion aux implications”, *Focus stratégique*, No. 10, Ifri, October 2008, pp. 15-17; J. J. Wirtz, “Theory of Surprise”, in: R. K. Betts and T. G. Mahnken (eds.), *Paradoxes of Strategic Intelligence: Essays in Honor of Michael I. Handel*, London: Frank Cass, 2003, pp. 97-111.

surveillance and reconnaissance (ISR) assets of various types, (2) platforms capable of firing conventional precision-guided munitions and (3) command, control and communications networks to connect the different elements together.⁵⁷ While until then conventional fires had to be massed and concentrated to be effective and could only be unleashed to a depth of a few dozen kilometers, technological progress made it possible to substitute precision for quantity, while massively increasing the size of the area within reach. A reconnaissance-strike complex, now relatively common within networked militaries, is thus designed to detect potential targets (fixed or mobile, on land, in the air or at sea) at the longest possible range, identify, track, target and destroy them.

The widespread introduction of reconnaissance-strike complexes pertains to the information-based “revolution in military affairs” embraced by the U.S. Department of Defense in the 1990s. Armed forces currently invest massively to densify the network of ISR sensors deployable in a theater of operations, combining active (radar) and passive (infrared, optical, signals intelligence) sensors carried by different types of platforms (airborne, manned or remotely piloted, orbital, land-based, naval, dedicated or not) designed to scan the visible and invisible domains in search of targets. The command and control systems, made possible by advances in communication systems with increasing bandwidth, give the whole network greater speed and responsiveness. At the same time, long-range conventional precision strike capabilities no longer are a U.S. monopoly; an increasing number of states can now inflict tailored damage on fixed targets, in particular thanks to ground-attack cruise missiles (mostly air- and sea-launched, although this might change in Russia if the U.S. withdraws from the INF Treaty).⁵⁸

These developments also led to changes in the naval domain. Reconnaissance-strike complexes already extend over vast maritime areas, integrating into a coherent whole long-range, sophisticated (counter-countermeasures, velocity, guidance) ground-, air- and sea-launched anti-ship missiles and beyond-visual-range detection, tracking and targeting systems.⁵⁹

57. On the origins of the “reconnaissance-strike complex” concept, see D. Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*, Stanford: Stanford Security Studies, 2010, pp. 33-37.

58. The variety of precision strike options increases rapidly at shorter ranges. R. Huiss, *Proliferation of Precision Strike: Issues for Congress*, Washington D.C.: Congressional Research Service, 2012; T. G. Mahnken, “Weapons: The Growth and Spread of the Precision-Strike Regime”, *Daedalus*, Vol. 140, No. 3, Summer 2011, pp. 45-57.

59. In the naval domain, see for example A. F. Krepinevich Jr., *Maritime Competition in a Mature Precision-Strike Regime*, Washington D.C.: Center for Strategic and Budgetary Assessments, 2014, pp. 76-87.

In a different but connected domain, since the end of the Cold War active air and missile defense capabilities have matured, the process taking different forms in Russia and the West. The U.S. gave priority to ballistic missile defense (BMD) offering limited protection to U.S. homeland, allies and expeditionary forces. While the National Missile Defense Act, signed into law in 1999, aimed at deploying a system effective against a “limited ballistic missile attack”, Congress updated the language – and thus the ambition – at the end of 2016. The new language states that “the policy of the United States [is] to maintain and improve an effective, robust layered missile defense system capable of defending the territory of the United States and its allies against the developing and increasingly complex ballistic missile threat”.⁶⁰ However, although the advent of operational layered missile defense systems, after decades of efforts and investments, represents an important step forward in the fight against missile proliferation, a deeper breakthrough seems to have taken place in air defense.

The whole spectrum of air defenses – from short-range to very long range air and missile defenses – has been transformed by integrating modern IT and communication systems over the last two to three decades, resulting in a renewed threat to Western air dominance.⁶¹ The short-, medium- and long-range systems that have entered service since the end of the Cold War represent a major threat to Western air forces which have neglected to invest in the capabilities and to preserve the skills and know-how that are of critical importance for suppression of enemy air defense (SEAD) missions. Long-range surface-to-air (SAM) systems (S-300 PMU1/2, S-400) now are the backbone of Russian integrated air defense systems combining (1) air-transportable mobile launchers, (2) faster missiles reaching longer ranges and following complex trajectories, equipped with guidance systems less responsive to countermeasures, (3) more powerful and diversified active and passive ISR assets, and (4) command and control networks that increase the performance, resilience and responsiveness of the whole system.

These advances opened up new fields of confrontation alongside traditional air-land combat covered by the CFE Treaty, which set limits on the types of conventional equipment that were considered to be the most useful in a surprise attack (main battle tanks and other armored vehicles, artillery, helicopters, combat aircraft). Electronic warfare (to jam and spoof ISR sensors, communications and datalinks) is one of the clearest example

60. Section 1681, National Defense Authorization Act for Fiscal Year 2017, Public Law 114-328, 114th Congress, December 23, 2016.

61. On the evolution of air defense systems, see C. Brustlein, E. de Durand and E. Tenenbaum, *La suprématie aérienne en péril. Menaces et contre-stratégies à l'horizon 2030*, Paris: La Documentation française, 2014, pp. 73-89.

of a type of capability not covered by the CFE treaty which plays an increasingly critical role as many militaries adopt the precepts of the information-based “revolution in military affairs”.

Finally, the U.S., China and Russia are currently investing in hypersonic strike systems, the former with a view to reinforcing the already extensive range of available conventional counter-force options and China and Russia to strengthen their ability to penetrate the increasingly thicker missile defenses that the U.S. and its allies are set to field.⁶² Those efforts in the hypersonic strike sector are not confined to hyperglide vehicles technologies but also involve scramjet-powered cruise missile projects and, if the INF treaty collapses, could again include conventionally-armed medium- and intermediate-range ballistic missiles. Though advances in the realm of non-ballistic hypersonic strike may still seem slow, their fielding could add to the risk of escalation, particularly by fueling fears of a surprise U.S. attack aimed at high value targets such as command centers and strategic force units.

What conventional stability in the age of reconnaissance-strike complexes?

The information-based “revolution in military affairs”, the widespread introduction of long-range conventional precision strike capabilities and advances in air defense all rely on the greater transparency of the theater of operations. By reinforcing the ability to conduct precision fires across the full depth of the theater, without being compensated by advances in terms of mobility, protection or stealth, these technologies would appear, at first, to favor the defender rather than the attacker.⁶³

However, the fact that these capabilities tend to reinforce defense does not mean that they only have a stabilizing effect on NATO-Russia military balances. In practice, several characteristics of these trends raise concerns in terms of stability:

62. On the U.S., see J. Acton, *Silver Bullet? Asking the Right Questions about Conventional Prompt Global Strike*, Washington D.C.: Carnegie Endowment for International Peace, 2013; C. Brustlein, “Conventionalizing Deterrence? U.S. Prompt Strike Programs and Their Limits”, *Proliferation Papers*, No. 52, Ifri, January 2015. On Russia, see J. M. Acton, “Russia and Strategic Conventional Weapons: Concerns and Responses”, *The Nonproliferation Review*, Vol. 22, No. 2, 2015, pp. 141-154.

63. This hypothesis, though it was generally forgotten in the 1990s, had been considered from the outset by the first theorists to discuss the RMA. M. J. Mazarr *et al.*, *The Military Technical Revolution: A Structural Framework. Final Report of the CSIS Study Group on the MTR*, Washington D.C.: Center for Strategic and International Studies, 1993, p. 15; A. F. Krepinevich Jr., *The Military-Technical Revolution: A Preliminary Assessment*, Washington D.C.: Center for Strategic and Budgetary Assessments, 2002, p. 15. On the link between lethality, maneuver and offense/defense balance, see C. Bellamy, *The Evolution of Modern Land Warfare: Theory and Practice*, London: Routledge, 1990, pp. 15-16; J. S. Levy, “The Offensive/Defensive Balance of Military Technology: A Theoretical and Historical Analysis”, *International Studies Quarterly*, Vol. 28, No. 2, June 1984, p. 225.

- Strikes aiming at destroying or temporarily neutralizing the adversary's ISR assets or his command and control centers (kinetic strikes, electronic warfare, cyberwarfare), which understandably remain at the core of Western and Russian military preferences, though in different ways, would be intrinsically escalatory.⁶⁴ While blinding the adversary offers a significant operational advantage, it could also be interpreted as the first step of a disarming strike, and signal that the ongoing campaign is much more ambitious than it actually is. Blinding the adversary dramatically reduces its control and situational understanding, thereby constraining his freedom of action and risks leaving him poised at the precipice and could, thus, push him towards rapid escalation.
- Positioning stealthy fighter-bombers like the F-22 and F-35 in theater is likely to increase the incentives for a conventional first strike – since these aircraft are by far the most vulnerable when they are still on the ground. Though their unrefueled combat range is relatively modest (estimated at 900-1,200 km depending on the type and variant), their small radar cross section⁶⁵ and multirole ability would make them a good platform to support a local surprise attack, and could incentivize the adversary to try to neutralize them before take-off.
- The geography of the East European theater is advantageous to Russia, by allowing Moscow to use its long-range interdiction capabilities, exploiting some defensive advantages at the strategic level (by operating from Russian territory) while pursuing actions to change the territorial status quo using its conventional or irregular capabilities at the lower level. Russian forces based in Kaliningrad or at sea could dramatically reduce the operational mobility of NATO naval, air and land forces and increase the difficulty of reinforcing East European allies. Thus, by dissociating the first and second echelons of NATO forces, Moscow could hope to support a *fait accompli* in the Baltics.⁶⁶
- There is a deep dissymmetry between NATO and Russian defensive capabilities. When Russia was investing in air defense with the primary goal of countering the strengths demonstrated by Western forces between 1991 and 2003, NATO countries mostly neglected their own air defenses, while focusing their BMD capabilities on the threats from Iran and North Korea. In the end, due to the different paths taken by

64. See V. A. Manzo, "After the First Shots: Managing Escalation in Northeast Asia", *Joint Force Quarterly*, No. 77, April 2015, pp. 91-100.

65. The radar cross-section (RCS) of an object indicates its radar signature. RCS reduction techniques for air or naval platforms, as well as for cruise missiles and ballistic reentry vehicles, are one of the primary characteristics of stealth (which also relies on reduced thermal signature and emissions control).

66. E. A. Colby, *Nuclear Weapons in the Third Offset Strategy*, *op. cit.*; D. A. Shlapak and M. Johnson, *Reinforcing Deterrence on NATO's Eastern Flank*, *op. cit.*, p. 3-4.

both sides, Russia has strengthened its ability to create a favorable offense-defense balance in air-land operations. First, it can create extended A2/AD bubbles that can only be penetrated by few (B-2, F-22), if any, U.S. aircraft and which are even theoretically capable of intercepting Western cruise missiles. Secondly, Russia invested heavily in conventional long-range cruise missiles (Kh-555/Kh-101) while the U.S. and NATO remained focused on the ballistic threat alone.⁶⁷

- The severe reductions in the numbers of NATO forces and infrastructures have caused a relative loss of resilience. This has not been compensated by efforts to protect the existing infrastructures through hardening or deployment of active defenses, despite the increasing threat of conventional strikes. As the expansion of NATO did not lead to building new hardened infrastructure on the territory of new member countries, the network of facilities in Europe from which NATO forces could operate, particularly air bases, seems to have become less resilient. As their numbers went down and their operational value went up, they became more lucrative targets in the eyes of a potential adversary who might be tempted by a first strike to cripple NATO before its build-up.⁶⁸

Russian Capabilities and Options

Russia has been engaged in a major effort to rebuild its military power since the mid-2000s.⁶⁹ In many respects, the investments and capability efforts undertaken since then appear designed to bypass the strong points of NATO's posture and weaken the political and strategic cohesion of the Alliance. The main elements of this approach to modern warfare can be summarized as follows.

Russia has theorized the implementation of an integrated strategy mostly based on non-military means, aimed at destabilizing an adversary by directly influencing his society through an information-based offensive using manipulation of facts and disinformation. In an initial phase, this can be used to shape the conflict, to alter the balance of forces by modifying dominant perceptions and to sow confusion in order to neutralize the adversary's will and, consequently, his capacity to react. If necessary, a second phase of a military nature – though partly based on clandestine

67. D. M. Gormley, "Cruise Missiles and NATO Missile Defense: Under the Radar?", *Proliferation Papers*, No. 41, Ifri, Spring 2012.

68. On the protection of air bases, see for example C. Brustlein, E. de Durand and E. Tenenbaum, *La suprématie aérienne en péril*, op. cit., pP. 90-94; A. J. Vick, *Air Base Attacks and Defensive Counters: Historical Lessons and Future Challenges*, Santa Monica: RAND Corporation, 2015.

69. On the rebuilding process and its challenges, see G. Garnier, "Les chausse-trapes de la remontée en puissance. Défis et écueils du redressement militaire", *Focus stratégique*, No. 52, Ifri, May 2014.

capabilities – includes infiltrations into the adversary’s territory by special forces and mercenaries, arming of volunteer groups, followed by a kinetic phase establishing air and information dominance on the theater through the combined use of strikes and electronic and cybernetic warfare systems, the final phase in defeating the adversary and breaking his determination.⁷⁰ What is sometimes called the “Gerasimov” doctrine, after the current Russian chief of staff, could be at least partially used against a NATO member state covered by security guarantees.⁷¹

Russia’s Lethal Long-Range Portfolio

Impressed – and shocked – by the success of Western air forces in the Gulf and the Balkans, sometimes to the detriment of Russian interests, Russia made significant investments to counter the “revolution in military affairs”, while at the same time selectively emulating some of its components.⁷²

Building on an advantage whose foundations had been laid during the Cold War, Russia has massively invested in air defense. Today, long range SAM systems like the S-300 PMU1/2 and S-400 (S-500 in the future) have threat envelopes much larger and more dangerous for Western aircraft (presumably up to 400 km for the 40N6 missile variant equipping the S-400 system) and are complemented by modern medium-range (Buk M1/2/3) and short-range systems.⁷³ Russia’s integrated air defense system, a large proportion of which is mobile and can be projected in foreign theater, relies on more sophisticated radars more capable against stealth platforms: the 55Zh5 *Nebo U* VHF radar, the 65V6 *Orion/Vega* passive multistatic radars, perhaps in the near future active electronically scanned array (AESA) radars.⁷⁴

At the same time, electronic warfare has been largely exploited by Russia to counter Western military forces which are increasingly dependent on information systems but also to emulate some key ingredients of the success of Western air power during Desert Storm or Allied Force.⁷⁵

70. D. Adamsky, “Cross-Domain Coercion”, *op. cit.*, pp. 19-30.

71. See in particular A. Lanoszka, “Russian Hybrid Warfare and Extended Deterrence in Eastern Europe”, *International Affairs*, Vol. 92, No. 1, 2016, pp. 175-195.

72. See in particular reflections on the Russian concept of “non-nuclear strategic deterrence”. D. Adamsky, “Cross-Domain Coercion”, *op. cit.*, pp. 31-35; K. Ven Bruusgaard, “Russian Strategic Deterrence”, *Survival*, Vol. 58, No. 4, August-September 2016, pp. 12-14; D. Johnson, *Russia’s Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds*, Livermore: Lawrence Livermore National Laboratory/Center for Global Security Research, February 2018.

73. On the evolution of air defense systems, see C. Brustlein, E. de Durand and E. Tenenbaum, *La suprématie aérienne en péril*, *op. cit.*, pp. 73-89.

74. *Ibid.*, pp. 75-78.

75. M. C. FitzGerald, “Russian Views on IW, EW, and Command and Control: Implications for the 21st Century”, draft, undated (1999?), non-paginated, pp. 27-29.

Pursuing a long military tradition of *maskirovka*, the Russians view as crucial in contemporary warfare to possess the capacity to jam or deceive enemy sensors – whatever the range, platform or type – to intercept, manipulate or jam communications and other data links, or to jam or manipulate GPS signals.⁷⁶ The importance of electronic warfare in Russian eyes was confirmed following operations in Georgia in 2008, and the importance of EW in the Russian art of war was demonstrated by operations supported by Russia in Ukraine or conducted directly by its forces in Syria.⁷⁷ Russia possesses a large number of EW systems and projects, some operational while others still in development phase, whether defensive or offensive, based on land, in the air or at sea and covering frequency bands of varying widths.⁷⁸

Alongside its air defense and electronic warfare capabilities, designed to hold off and disrupt the offensive potential of NATO reconnaissance-strike complex, Russia has built out its own reconnaissance-strike complex. While Western investments in this area have been largely driven by requirements for operations in permissive environments, the Russian effort mainly focused on conventional strategic strike systems and on naval interdiction.

Moscow's weapon of choice for long-range conventional strikes is the cruise missile. As surface-to-surface missiles with a range greater than 500 km have been banned under the INF Treaty since 1987, the effort has focused primarily on air-and sea-launched variants with ranges greater than 1,500 km, several of which entered service between 2007 and 2013.⁷⁹

76. T. L. Thomas, *Russia Military Strategy: Impacting 21st Century Reform and Geopolitics*, Ft. Leavenworth: Foreign Military Studies Office, 2015, p. 145.

77. A. Loukianova, "Moscow's Emerging Electronic Warfare Capabilities: A Dangerous Jammer on U.S./NATO-Russian Relations?", draft, *POSSE: Program on Strategic Stability Evaluation*, January 19, 2016; R. N. McDermott, *Russia's Electronic Warfare Capabilities to 2025*, Tallinn: International Center for Defence and Security, 2017; T. L. Thomas, *Russia Military Strategy: Impacting 21st Century Reform and Geopolitics*, *op. cit.*, pp. 152-153.

78. E. Dilipraj, "Electronic Warfare: Russia's Enhanced Capabilities", *Defence and Diplomacy Journal*, Vol. 5, No. 2, January-March 2016, pp. 29-40; T. L. Thomas, *Russia Military Strategy*, *op. cit.*, pp. 157-164.

79. D. Kornev, "Russian High-Precision Weapons in Syria", *Moscow Defense Brief*, No. 3, 2016.

Table 2. Examples of Russian electronic warfare systems⁸⁰

Designation	Platform	Type of action
Borisoglebsk-2	Land-based	Jamming of mobile satellite communications, GPS (tactical range)
Krasukha-2/4/20	Land-based	Analysis, jamming and manipulation of radar emissions from E-3 AWACS, E-8 JSTARS, SIGINT platforms, and radar imaging and SIGINT satellites in low Earth orbit (range 250-400 km)
Moskva-1	Land-based	Radio intelligence in passive mode, builds an overall picture of electromagnetic spectrum usage and C2 role of electronic warfare capabilities.
Murmansk-BN	Land-based	Monitoring and suppression of short-wave communications (medium and high frequency, 2.3-26MHz) at very long range (3-5,000 km)
Khibina-U	Airborne	Electronic protection for fighters, tactical electronic attack
Leyer-2/3	Airborne	Electronic attack against land targets (100 km)

Long-range aviation plays a key role in Russia's ability to manage escalation and conduct war by the threat of precise conventional strikes.⁸¹ Handicapped by their substantial radar signature, Tu-160s and Tu-95MS6/16s are unable to penetrate non-permissive environments, which would be required to drop precision-guided bombs, but can conduct standoff precision strikes against fixed targets, sometimes without having to leave the Russian airspace and the coverage of Russian air defenses. These conventional strategic strike capabilities involve the Kh-555 (2,500 km range) and Kh-101 (at least 3,000 km assumed range) air-launched cruise missiles (ALCM), the latter apparently featuring a reduced radar and

80. Sources: E. Dilipraj, "Electronic Warfare: Russia's Enhanced Capabilities", *op. cit.*; T. L. Thomas, *Russia Military Strategy*, *op. cit.*

81. On the state of long-range aviation, its role in non-nuclear deterrence and fleet modernization, see "Russian Air Patrols: Long-Range Ambitions", *Strategic Comments*, Vol. 21, No. 4, 2015; A. Mladenov, "The Bear Gains Strength", *Air Forces Monthly*, No. 324, March 2015, pp. 42-49.

thermal signature. Several current Russian ALCM projects seem to be aiming at increased velocity, even at the cost of reduced maximum range. Projects include supersonic (Kh-MT, 1,000 km range) and even hypersonic cruise missiles (see below).⁸² At shorter ranges (between 100 and 300 km), the number of Russian options for a conventional air-launched precision strike increases sharply, including a substantial number of medium- and long-range anti-radiation capabilities (Kh-28, Kh-31P, Kh-58) that could be used in large numbers by tactical aviation, potentially causing heavy disruption of NATO's air defenses.

To diversify its deep strike options, Russia has invested heavily in sea-launched capabilities. Those include two closely related families of sea-launched cruise missiles (SLCM), the SS-N-21/3M10 (*Granat*) and SS-N-27/30A/3M14/54 (*Klub-S/Kalibr*). The *Granat* is an older design, derived from the Kh-55 and with a reported range of more than 2,000 km. The *Klub/Kalibr* family is derived from the *Granat* but is smaller and faster in the terminal phase as it closes on the target. The 3M14 variant for the Russian domestic market has an estimated range of 1,500-2,500 km.⁸³ Due to the large number of submarines that could potentially carry long-range SLCMs (*Yasen*, *Oscar II*, *Akula*, and *Sierra I/II* classes, the latter being the new 636.3 variant of the *Kilo*), this type of capability seems destined to play a key role in the Russian posture in terms of escalation management and non-nuclear strategic deterrence. While long-range bombers offer a highly visible force that can be particularly useful for signaling and risk manipulation purposes, Russian submarines armed with cruise missiles offer a stealthy and permanent conventional strike capability which could cover the whole of Western Europe from a limited number of platforms (see Illustration 1).

82. J. Bosbotinis, "'Fire for Effect': Russia's Growing Long-Range Strike Capabilities", *Wavellroom.com*, September 5, 2018, accessible at: wavellroom.com.

83. *The Russian Navy: A Historic Transition*, Washington D.C.: Office of Naval Intelligence, 2015, p. 35.

Illustration 1. Possible coverage of Russian submarine-launched cruise missiles⁸⁴



These long-range, air- and sea-launched strike capabilities have been demonstrated on multiple occasions since the fall of 2015, by 3M14 missiles fired from surface ships or submarines (*Kilo* 636.3) in the Mediterranean Sea and the Caspian Sea, and from Tu-160s and Tu-95MSs.⁸⁵

Finally, in the surface-to-surface strike segment, which has been highly constrained – at least in theory – by the INF Treaty, Russia has acquired substantial capabilities and continues to invest in this sector. The core of its current systems is the SS-26/9M723 *Iskander-M*, a dual-capable ballistic missile that is progressively replacing the older, and shorter-range, SS-21/OTR-21B missile. The SS-26 features precision terminal guidance, increased range (500 km), maneuverability during reentry and a solid fuel ensuring higher tactical mobility and responsiveness. Russia also develops and procures a cruise missile strike capability (*Iskander-K/R-*

84. Illustration 1 assumes that: (1) the cruise missiles are 1,500 km-range 3M14 *Kalibr* missiles; (2) the three submarines firing the cruise missiles would be operating from Russian coastal waters near Saint Petersburg, from coastal waters close to Crimea, and from the Bay of Biscay. Image source: Google Earth.

85. D. Kornev, "Russian High-Precision Weapons in Syria", *op. cit.*

500/9M728/9M729), one variant of which is accused by the U.S. of violating the INF Treaty due to its estimated range (up to 2,000 km). Whether ballistic or cruise, these different missiles offer the double advantage of being dual-capable and transportable not only by ship but also by *Antonov-124* aircraft. If, as announced by President Trump in October 2018, the U.S. withdraws from the INF Treaty, Russia would probably have a strong incentive to both openly pursue a ground-launched cruise missile capability and re-develop theater-range conventionally-armed ballistic missiles as a prompt-strike addition to an already large conventional strike portfolio.

In the long term, Russia has the ambition to complement this portfolio with a long-range hypersonic strike capability, destined primarily to penetrate enemy ballistic missile defenses and developed, for this reason, with a dual payload capacity. Two medium-range hypersonic strike systems have been mentioned in Vladimir Putin's March speech: first, the Kh-47M2 *Kinzhal* is an aeroballistic missile based on the 9M723 short-range ballistic missile that, if and when it becomes operational, should be deliverable by multiple air platforms (at least MiG-31 and Tu-22M3), and possess a range of up to 2,000 km. Second, the 3K22 *Tsirkon* is a hypersonic cruise missile meant to be deliverable through various types of platforms and to reach targets up to a range of 1,000 km.⁸⁶

Finally, the Russian "project 4202/*Avanguard*" program, which resembles the U.S. HTV-2 demonstrator developed at one time under the Conventional Prompt Global Strike projects, combine a hypersonic glider and a ballistic launcher (SS-19 now, *Sarmat* ultimately) launched from an SS-18 silo. Though none of the four first tests of the system seem to have been successful, Russia appears to have successfully tested this system several times since 2016.⁸⁷

Finally, Russia still enjoys the benefits of investments made in the 1970s and 1980s to give the Red Army long-range anti-ship capabilities on a par with the U.S. Navy. It possesses multiple types of long-range anti-ship missiles with 100-600 km ranges, some of which reach supersonic speeds during at least a part of their flight (P-800 3M55 *Onyx*, P-270 3M80 *Moskit*). Though Russia's ability to detect naval targets at long range and transmit tracks to the missiles seems to have diminished due to the

86. J. Bosbotinis, "‘Fire for Effect’: Russia's Growing Long-Range Strike Capabilities", *op. cit.* ; M. Kofman, "Emerging Russian Weapons: Welcome to the 2020s (Part 1 – Kinzhal, Sarmat, 4202)", russianmilitaryanalysis.wordpress.com, March 4, 2018, accessible at: russianmilitaryanalysis.wordpress.com.

87. M. Kofman, "Emerging Russian Weapons: Welcome to the 2020s (Part 1 – Kinzhal, Sarmat, 4202)", *op. cit.*; S. O'Connor, "Russia Upgrades Its Missile Arsenal", *Jane's Intelligence Review*, January 2015; "Objekt 4202 / Yu-71 / Yu-74", globalsecurity.org, undated, accessible at: www.globalsecurity.org (consulted on September 19, 2018).

decreasing number of maritime patrol aircraft, the destructive potential is still extremely substantial and could allow the creation of large contested naval areas which, though they might not be impenetrable, could impose heavy constraints on Western surface ships operations.

Potential operational moves

Given the abundant conventional and nuclear arsenal at Russia's disposal, the number of possible theaters of confrontation and the infinite diversity of crisis scenarios, it is impossible to exhaustively identify the operational moves Moscow could attempt during a crisis – or even a direct conflict – with NATO. Russia's choice will depend on its political goals, the offensive or defensive nature of its motives and plan, and the tempo it intends to adopt. What follows is a number of options chosen for illustrative purposes. Although separated for analytical clarity, these could be combined, simultaneously or sequentially, during a crisis, to reduce NATO's freedom of action in multiple ways:

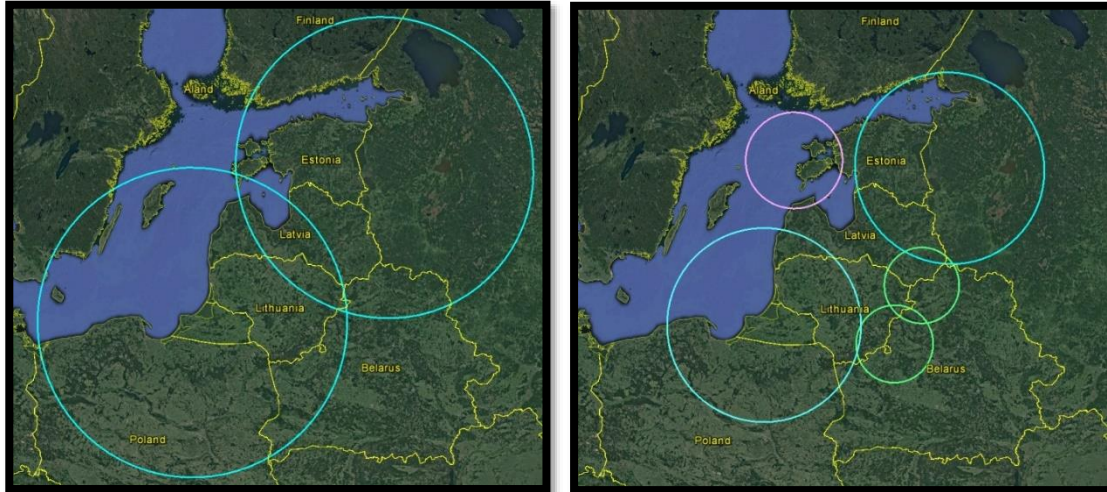
■ **Limited preventive strike**

Russia has a broad range of conventional strike options with which it could perform a preventive strike, limited in geographical terms and/or in terms of intensity. A cruise missile attack could support a wide variety of objectives: (1) send a warning signal through a symbolic strike (a very limited number of targets with no military value), e.g. to increase diplomatic pressure; (2) a substantial (several dozens of missiles) and discriminating strike to weaken defensive capabilities (radars and command centers, air defense or missile defense systems, air bases, etc.) in order to expose the targeted countries to the risk of more massive strikes, and extract diplomatic concessions. Alternatively, depending on the effectiveness of Russian capabilities in electronic and cyber warfare, this type of objective could be pursued using a non-kinetic approach.

■ **Aerial exclusion zone over the Baltics**

By calling on the S-400 regiments deployed in Kaliningrad and in the vicinity of Saint Petersburg, *Krasukha*-type electronic warfare systems, Generation 4.5 interceptors (Su-35), or even limited cruise missile strikes, Russia could deny air access to Lithuanian, Latvian and Estonian territories. The maximum range of the S-400 (assumed to be 400 km for 40N6 missiles, 250 km for 48N6 missiles) is such that just two units would be enough to cover the whole territory of the three Baltic countries (see Illustrations 2.1 and 2.2).

Illustrations 2.1 and 2.2. Possible coverage of two S-400 units over the Baltic region (higher and lower assumptions)⁸⁸

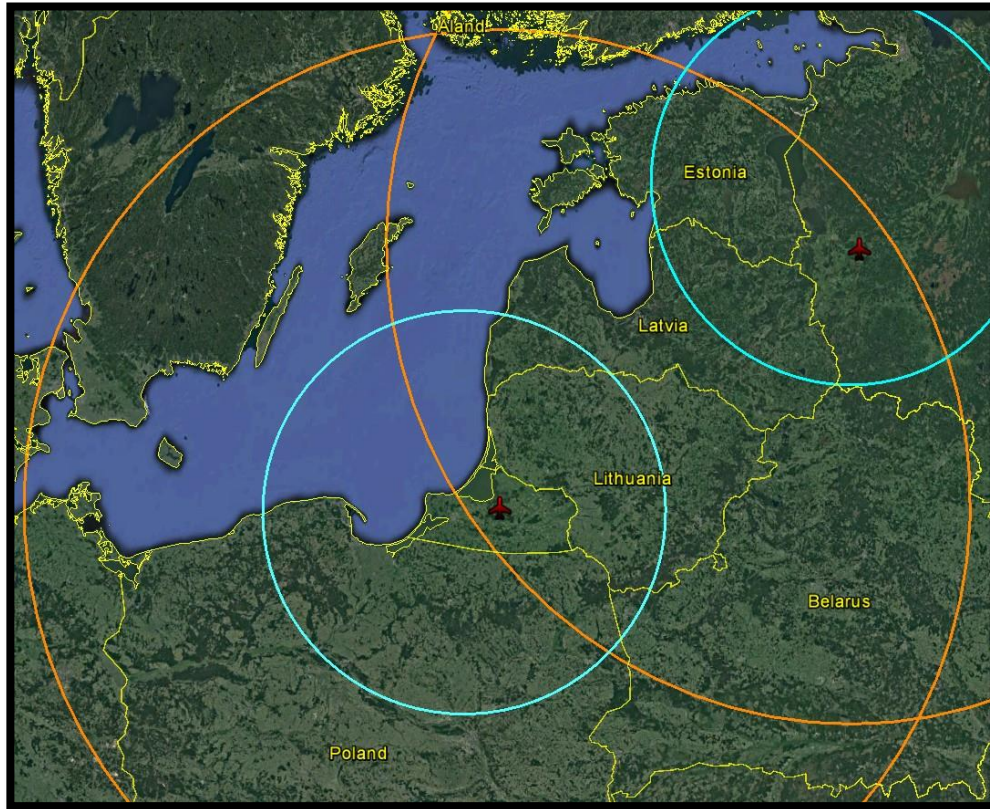


Even assuming the low-end hypothesis in which the range of the S-400s would in reality be “only” 250 km, the range of theater electronic warfare systems, supported by interceptors carrying beyond visual range air-to-air missiles (R-37 or R-77, offering ranges up to 600 km) and Russian AEW&C platforms, would pose a serious threat to any allied aircraft approaching the Baltics (see Illustration 3).

The range of these air defense and EW assets and their deployment in Kaliningrad might also pose a threat to the operational use of every Polish Air bases, which are all located in the northern half of the country. Thus, the range of so-called “defensive” systems may, depending on the geography of the theater, turn them into instruments used for local domination and strategic decoupling, and potentially for coercion and blackmail. Such an initiative would leave NATO with unattractive options: penetrate allied airspace and challenge Russia to execute its threats; bypass the exclusion zone and reinforce the Baltics by land or sea; attack air defense assets located on Russian territory.

88. Illustration 2.1 assumes that: (1) the S-400 units are equipped with 40N6 surface-to-air missiles; (2) this type of missiles has a range of up to 400 km. Illustration 2.2 assumes that: (1) the S-400 units (light blue) are equipped with 48N6 surface-to-air missiles; (2) this type of missiles has a range of up to 250 km. Illustration 2.2 also includes three Belarusian S-300P units (light green) with a 100 km range and Russian S-300FM ship-based air defense missiles (light violet) with a 120 km range. Both illustrations assume that, in a crisis, long-range surface-to-air systems would not necessarily remain at their peacetime locations but may move forward to extend their coverage deeper within the neighboring territories. For a similar analysis, see S. Boston *et al.*, *Assessing the Conventional Force Imbalance in Europe*, *op. cit.*, p. 10. Image source: Google Earth.

Illustration 3. Possible coverage of multiple long-range systems over the Baltic region⁸⁹

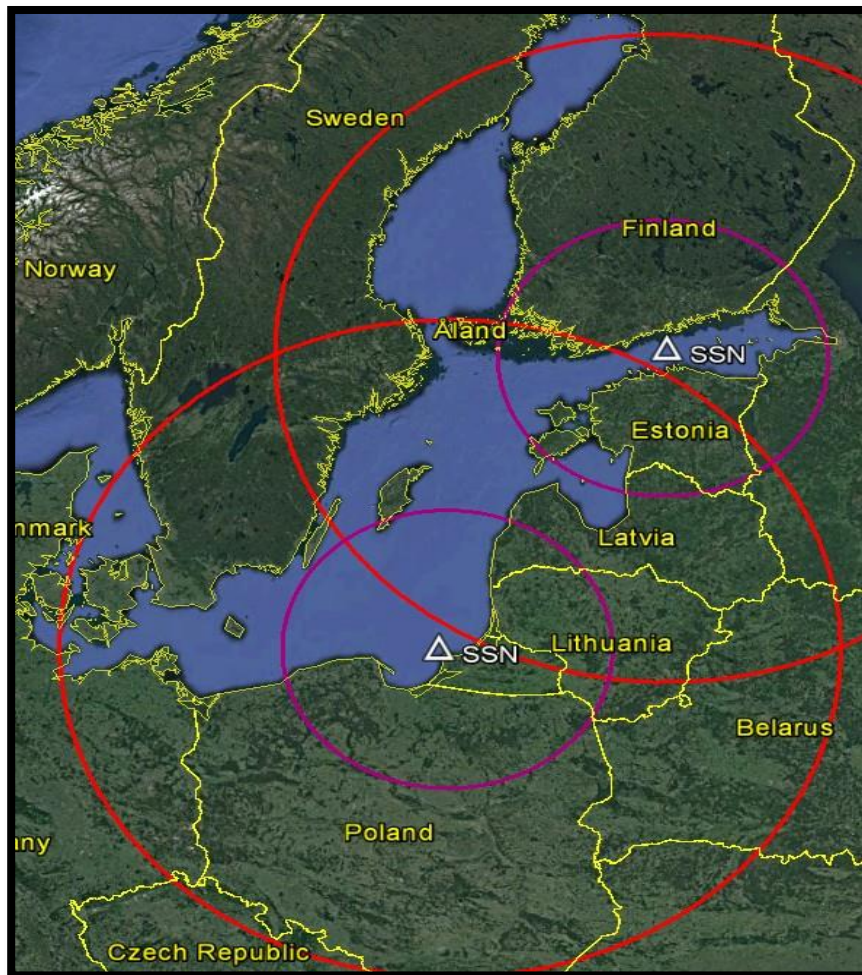


■ Naval exclusion zone in the Baltic Sea or the Black Sea

Using its sophisticated anti-ship capabilities mounted on land-based, surface, submarine or airborne platforms, Russia is capable of posing a threat at very long distances. From coastal waters in the vicinity of Kaliningrad, Crimea or the Gulf of Bothnia, and provided that adequate maritime surveillance and an effective command and control system were available, Russian platforms equipped with P-800 missiles could target surface ships as soon as they emerged from the Danish straits or from the Bosphorus. This threat could be backed up by a second, shorter-range echelon provided by P-270 missiles (see Illustrations 4 and 5).

89. Illustration 3 assumes that: (1) the two S-400 units are equipped with 48N6 surface-to-air missiles (light blue circles); (2) this type of missiles has a range of up to 250 km; (3) Russian fighter aircraft supported by airborne early-warning and C2 air platforms can engage targets with R-77 beyond visual-range air-to-air missiles (orange) as far as 600 km. Image source: Google Earth.

Illustration 4. Possible coverage of anti-ship missiles fired from Kaliningrad and the Gulf of Bothnia⁹⁰



These naval interdiction perimeters would be even more impressive, protected as they would be by long-range air defenses already deployed in the same theaters, or by discreetly lay naval mines with submarines in the Danish straits or close to the naval bases located ahead of them – in Germany, Poland, Romania, Bulgaria, or even Sweden or Finland.

90. Illustration 4 assumes that: (1) P-800 anti-ship missiles (red circles) have a range of up to 600 km; (2) P-270 anti-ship missiles (violet) have a range of up to 250 km. Image source: Google Earth.

Illustration 5. Possible coverage of long-range anti-ship missiles fired from Crimean coastal waters and of S-400 units over the Black Sea⁹¹



■ **Deep preventive or preemptive strike**

These capabilities could also be used, in much greater numbers, to conduct a preventive shock deep in the theater of operations. Once confrontation is deemed to be a certainty, Moscow could preemptively conduct a robust campaign of conventional strikes with the aim of reducing in the long-term NATO's offensive potential. In such a case, strikes would be aimed first and foremost at critical and rare fixed targets such as radars, C2 centers, unsheltered high-value aircraft on air bases (airborne early warning & control, electronic intelligence, tankers, etc.), logistics nodes, etc. The selective destruction of purely military targets with no nuclear role could be intended to cause discriminating damage, producing systemic suppression effects on the adversary's assets, while trying to limit the risk of crossing NATO's nuclear threshold. To achieve

91. Illustration 5 assumes that: (1) P-800 anti-ship missiles (red circle) have a range of up to 600 km; (2) P-270 anti-ship missiles (violet) have a range of up to 250 km; (3) the two S-400 units in Crimea and in the vicinity of Krasnodar are equipped with 40N6 surface-to-air missiles (light blue circles); (4) this type of missiles has a range of up to 400km. Image source: Google Earth.

this, once again, kinetic systems could be combined with non-kinetic methods. Russia might want to combine operational effects (reducing NATO's offensive power) with strategic effects (weakening cohesion) by targeting selectively NATO countries.

■ **Conventional retaliation**

Russia's capability to target civilian infrastructure with conventional strikes is diversified and overwhelming. Some Russian thinkers directly linked the ambition to strengthen Moscow's "non-nuclear strategic deterrence" posture with the capability to inflict economic and political costs on the adversary by attacking civilian infrastructures: energy production plants (except for nuclear power plants), industries, national symbols, targets whose destruction would cause environmental damage, etc. Here again, Russia's goal seems to be to have the capacity to manipulate the risk of growing economic costs and moral collapse, while limiting the number of civilian fatalities.

■ **Diversion, infiltration and destabilization**

If it intends to destabilize or weaken one or several of the Baltic countries in the longer term, Russia will first have to find a way of impeding the forward-deployed NATO forces' ability to react. While a direct attack on the enhanced Forward Presence (eFP) would constitute a clear act of aggression, and risk precipitating a build-up of NATO forces deployed in the theatre, Moscow could resort to other tactics to cause a diversion: unrest, sabotage or terrorism aimed at overwhelming local forces and causing them to seek support from eFP companies for homeland security; "popular" demonstrations and pseudo-insurrectional sabotage aimed directly at NATO forces and preventing them from executing border surveillance; concentrate military forces in a distant border area to divert attention and means, etc. Such methods might capture the attention and capabilities of the eFP formations, while at the same time infiltrations could be carried out at border crossings that were poorly monitored or where surveillance capabilities had been temporarily suppressed by Russian EW/cyber means.

This list of Russian coercive options is in no way exhaustive, and these options are not mutually exclusive. Nevertheless, they illustrate a number of sources of military concerns for NATO members that could weaken strategic stability, and might be alleviated through CSBMs and arms control agreements.

Reinforcing strategic stability in Europe

Based on the multiple and previously identified challenges to strategic stability in Europe, what lines of action could be pursued to reduce the risks associated with escalation? These actions should focus on a long term, two-pronged effort, combining capability reinforcement and negotiations on possible constraints that could be imposed on the Russian and NATO militaries.

A two-pronged effort

Arms control and strategic stability are linked, first through the historical sequence of events that led to their emergence, and because they pursue similar objectives. However, a diplomatic effort whose only goal would be to give fresh impetus to arms control would not strengthen strategic stability. To put it otherwise, neither stability nor arms control are ends in themselves. Such an effort has to be combined with – or even perhaps preceded by – a reinforcement of the capabilities of European countries in order to strengthen their defensive and deterrence posture, while simultaneously providing Russia an incentive to accept transparency measures or constraints on its forces.

Arms control: objectives and desired effects

Arms control consists in regulating, within a formal framework, behavior and capabilities considered to be potentially destabilizing or dangerous for international security. From the standpoint of EU or NATO members, the objectives associated with potential arms control agreements may be defined in generic terms and, subsequently, be broken down into political, strategic and operational effects that will help achieving those objectives.

Four complementary generic objectives can be identified:

- **Reduce the risk of misunderstanding leading to escalation.** The priority here is to reduce the level of ambiguity and uncertainty of postures or ambitions, avoid fueling misperceptions feeding the adversary's fears, particularly the fear of a surprise attack or a decapitation strike.

- **Reduce the Russian ability to deliberately attack a NATO or EU member.** This objective implies reducing the incentives to strike first and the advantage offered by surprise attacks, thus reinforcing crisis stability.
- **Slow down the crisis tempo and, in wartime, the operational tempo** in order to reduce the ability to attain and exploit surprise effects and achieve a *fait accompli*. Increasing warning time and reducing the pressure to escalate leaves more time for diplomacy in order to correct misunderstandings or defuse the crisis.
- **Shape NATO and Russian capability developments so that they are detrimental to strategic stability.** This means encouraging the different parties to show restraint in their choices for R&D, testing, procurement and deployment, and to prefer options that do not aggravate the fear of surprise attack on the other side.⁹²

In pursuing these objectives, arms control and CSBMs in Europe can aim to achieve five sets of strategic and operational effects:

- **Reduce the risk of strategic misunderstanding**

While ambiguity may be deliberately sustained as part of a strategy, it can also be involuntary, thus raising concerns that may fuel an escalation process. When the political conditions are considered appropriate, renewed strategic level discussions should be held on a regular basis, to offer each party an opportunity to express concerns and alleviate the other's. Threat perceptions, national understanding and value of the status quo, mutual rejection of regime change, or the value and role of nuclear weapons could be issues for discussion. From the Western viewpoint, their value is not negligible but limited by uncertainties concerning Russian intentions vis-à-vis the territorial status quo in Europe and by Moscow's tendency to violate, bypass or strip of their substance commitments made with respect to other parties. There is a need for additional transparency, not with respect to intentions – which can evolve or be deliberately manipulated by a malevolent adversary – but with respect to observable features of a given posture.

- **Reinforce operational transparency**

Reinforcing in-theater transparency would call on advances in intelligence, surveillance and reconnaissance (ISR) capabilities, which offer unprecedented surveillance potential, in the visible spectrum and

92. Ford, "Anything but Simple: Arms Control and Strategic Stability", in: E. A. Colby and M. S. Gerson (eds.), *Strategic Stability: Contending Interpretations*, op. cit., pp. 234-236; T. C. Schelling and M. H. Halperin, *Strategy and Arms Control*, op. cit., pp. 37-38.

across the remainder of the electromagnetic spectrum. Just as intelligence collection systems made it possible, in the past, to verify arms control agreements by reinforcing national technical means, their diminishing cost and increasing sophistication make it possible to use ISR capabilities in-theater for stability purposes by offering early warning and high-resolution, persistent, multi-spectral surveillance capabilities, some of which could be jointly operated with Russia. Two lines of actions could contribute to reinforce operational transparency, the first through capability reinforcement (see below), the second through CSBMs and arms control drastically limiting the ability to interfere (electronic warfare, surface-to-air defenses) with forward-deployed ISR assets.

■ **Limit operational overlap of long-range kinetic capabilities**

“Operational overlap” refers to a situation in which units from opposing countries could mutually attack each other with conventional systems without having to move. While this situation is not, in itself, abnormal in peacetime, it could contribute to instability and fast escalation during a crisis in a context of highly deteriorated diplomatic relations. Whereas this problem was relatively limited in the past, the increasing range of modern weapon systems, the velocity of missiles and the shortening of C4ISR⁹³ loops in all domains, make it necessary to reassess the challenges posed by operational overlap. The threat envelopes of multiple systems – whether surface-to-surface or surface-to-air – overlap across borders, extending sometimes hundreds of kilometers deep into neighboring countries. Thus, potential instability would affect wider areas and a more varied set of conflict domains (air-land-sea-cyber-space) with potentially much shorter reaction cycles than in the past. Confidence and security-building and arms control measures to limit operational overlap, by constraining the deployment and numbers of long-range kinetic capabilities, could reduce the risk of rapid escalation and rewarding first strikes, which would be particularly crucial in areas lacking strategic depth – as is the case notably in Kaliningrad Oblast or the Baltics.

93. Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance.

■ **Reduce the operational and strategic value of a surprise attack and its feasibility**

Fear of a first strike remains at the core of the strategic stability. Today, those concerns focus increasingly on conventional strike capabilities that could potentially come into play as coercive tools in the shadow of nuclear deterrence. Multiple military developments over the past two or three decades have contributed to this process: technological progress enabling prompt and more precise strikes, combining the strategic advantages of discrimination and the tactical advantages of reduced warning time; Western operational concepts emphasizing shock and awe which have demonstrated their tactical and operational effectiveness; advances in stealth for manned or unmanned air platforms; the increasing role of attack submarines; the increasing role of cyber capabilities whose speed of attack does not depend on distance, etc. The multiplication of situations of operational overlap in the European theater further increases the potential for disruptive surprise attacks. Reductions in the value and feasibility of a surprise attack can be achieved both by limiting the offensive capabilities present in-theater or possessed globally and by focusing on resilience through dispersion, hardening, redundancy and dissimulation, in addition to efforts to achieve transparency of the theater of operations.

■ **Reduce the other party's concerns regarding the survivability of his second strike capability**

While arms control and capability reinforcement can be mutually beneficial, a capability effort can become destabilizing if it undermines the other side's confidence in his second strike capability, whether directly or indirectly.⁹⁴ Since the second strike capability is based on SSBNs on the NATO side and SSBNs and mobile ICBMs on the Russian side, this line of action could include either constraints on the ability to target platforms prior to launch (conventional or nuclear counter-force options and anti-strategic submarine warfare),⁹⁵ C3I assets, or on ballistic missile defense capabilities (number, type, velocity, deployment, etc.).

94. B. R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks*, Ithaca: Cornell University Press, 1991, pp. 1-4.

95. Progress on arms control and CSBMs applied to ASW, however, appear even more implausible today than during the Cold War. For a brief discussion of the reasons, see D. C. Daniel, *Anti-Submarine Warfare and Superpower Strategic Stability*, Basingstoke: The MacMillan Press, 1986, pp. 206-211; T. Stefanick, *Strategic Antisubmarine Warfare and Naval Strategy*, Lexington: Lexington Books, 1987, pp. 124-125.

No substitute to capability reinforcement

The two-pronged approach adopted by NATO since the Ukraine crisis – combining a firm attitude towards Russia and openness to renewed dialogue – must remain at the core of reflections on future European security architecture, for multiple reasons.⁹⁶

In the first place, arms control for the purpose of strategic stability only makes sense in parallel with preserving credible deterrence. In the current security environment, reducing military capabilities or constraining them should only be contemplated to reinforce security. Arms control emerged in parallel with, and due to, competition between major powers. The offensive and defensive capability developments undertaken by the superpowers or glimpsed in their R&D projects during the 1960s, in addition to major crises between them, provided Moscow and Washington the incentives to put into practice the idea of arms control – as it happens, by limiting defensive capabilities under the ABM Treaty and offensive capabilities under SALT I.

Deterrence and arms control must be combined because they strengthen security through different and complementary mechanisms. Deterrence targets any adversary who might contemplate aggression and who is rational enough to respond to the threat of catastrophic, instantaneous destruction or defeat, bringing him to reconsider a plan of attack. Arms control, on the other hand, can only exist if the other party accepts that a form of cooperation, however minimal, can at least partly serve his security needs.

Thus, deterrence and arms control are both needed to avoid two worst-case scenarios. First, when facing a revisionist adversary, a situation in which he might be led to believe in his ability to upset the status quo without triggering a war with catastrophic consequences. Second, a situation in which an adversary unwilling to alter the status quo is led to attack or escalate out of fear.⁹⁷ In short, given the inescapable uncertainty regarding other powers' intentions, credible deterrence must be maintained in parallel with arms control efforts.

From a transatlantic perspective, the need to pursue, or even intensify capability reinforcement is also important in order to influence Russian perceptions. Reinforcing the defensive and deterrence credibility and the resilience of European countries and NATO will ensure that both are in a

96. This approach is not recent, since it simply represents the continuation of procedures recommended in 1967 in the North Atlantic Council report on "Future tasks of the Alliance," also known by the name of its author Pierre Harmel, the Belgian Minister of Foreign Affairs.

97. This goes back to Robert Jervis' deterrence and spiral models. R. Jervis, *Perception and Misperception in International Politics*, Princeton: Princeton University Press, 1976, pp. 58-67.

better position in the improbable event that Russia were to consider an attack on an ally, all the while it reminding Russia of the reasons why cooperation and transparency could be in its interest. After annexing Crimea and destabilizing Eastern Ukraine and, above all, after reinforcing its strategic and diplomatic positions in the Middle East by its military intervention in support of its Syrian ally, Moscow is considered by many to be in a strong position with respect to the West – an opinion further reinforced by the arrival of the Trump administration.⁹⁸ After underlining its attachment to strategic stability and arms control for years, Moscow's interest in this type of framework started waning in the mid-2000s and has fallen off sharply since 2010.⁹⁹ While not sufficient, maintaining an attitude of firmness appears necessary in order to change Russia's perception of its priorities – underlining the long-term disadvantages for Russia of an irreversible hardening of the European and NATO position and a return to a situation of long-term military rivalry in which Russia is poorly equipped to gain the upper hand.

From a European perspective, investing in high-value military assets would serve a double purpose: (1) to improve European capability and resilience while increasing Russian awareness of a future loss of influence and reduced freedom of action; (2) to improve the West's ability to negotiate from a position of strength by relying not only on US forces, but also on European capabilities, and, in the long run, provide the West with capabilities that could be used as leverage in negotiations, in exchange for Russian concessions.

The options which fit into this approach and which would also contribute to achieving some of the effects identified above include the following developments:

- **Extended air and missile defense** – Partial or complete overhaul of NATO's BMD system to counter the SS-26 threat (statement of intent, increased funding, planned deployments in exposed areas, etc.) or a potential new theater-range ballistic threat; partial reorientation of NATO's missile defense system to include cruise missile defense, notably by investing in look-down ISR sensors¹⁰⁰ and surface-to-air defenses

98. M. Mazzetti, A. Barnard and E. Schmitt, "Military Success in Syria Gives Putin Upper Hand in U.S. Proxy War", *The New York Times*, August 6, 2016, accessible at: www.nytimes.com; D. Lamothe and M. Birnbaum, "Trump and Putin Are Discussing Military Cooperation in Syria. Mattis Says Russia Must 'Prove Itself First.'", *The Washington Post*, February 16, 2017, accessible at: www.washingtonpost.com; S. Heller, "Russia Is in Charge in Syria: How Moscow Took Control of The Battlefield and Negotiating Table", *Warontherocks.com*, June 28, 2016, accessible at: warontherocks.co.

99. A. Arbatov, "An Unnoticed Crisis: The End of History for Nuclear Arms Control?", Moscow, Carnegie Moscow Center, June 16, 2015.

100. D. M. Gormley, "Cruise Missiles and NATO Missile Defense: Under the Radar?", *op. cit.*, pp. 51-56.

purchased in greater numbers to be deployed close to NATO critical infrastructure to defend against cruise missiles; densification and modernization of the air surveillance radar network in Europe;¹⁰¹ investment in defensive electronic warfare systems for surface ships to counter the anti-ship missile threat;

- **Deep strike** – Funding and procurement of Europe-based theater-range precision strike systems, air-, ground- and sea-launched; while the ranges of procured surface-to-surface strike systems should, unless the INF Treaty collapses, remain inferior to 500 km, (1) R&D should be conducted on longer range ground-based options, either ballistic or air-breathing, and (2) procurement of air- and sea-launched strike systems should accelerate¹⁰²; R&D or off-the-shelf acquisition of long-range anti-radiation munitions and/or electromagnetic decoy programs to destroy/deceive/jam air defense radars;¹⁰³
- **Anti-submarine warfare** – Investment plan designed to reinforce NATO member states' collective proficiency in anti-submarine warfare missions, through increased cooperation among allies and with local states, joint training, pooled acquisition of sensors and maritime patrol aircraft, etc.¹⁰⁴; reinforced permanent presence in areas of European interest (Baltic Sea, Black Sea, Mediterranean Sea) and increased number of exercises in these areas;
- **Forward presence** – The possibility of reinforcing enhanced Forward Presence on the territory of East European allies should remain on the table. The current force level (one brigade divided into four battalions spread across four countries) cannot by any means be considered an offensive threat. It constitutes a minimum level to demonstrate solidarity among NATO members. Reinforcing the eFP could be contemplated if, in the future, either (1) this minimum threshold is

101. For previous proposals in favor of a reinforcement of ISR and early warning capabilities, see the "Open Airfield Zone" concept proposed in A. Boserup and J. Joern Graabaek, "A Zonal Approach to the Neutralization of Air Power in Europe" in: A. Boserup and R. Neild (dir.), *The Foundations of Defensive Defence*, op. cit., pp. 159-165.

102. See in particular the options considered by the U.S. in relation to China, in D. W. Kearns, Jr., *Facing the Missile Challenge: U.S. Strategy and the Future of the INF Treaty*, Santa Monica: RAND Corporation, 2012, Chapter 4. Procurement of a large number of cruise missiles which are not fast or stealthy but have a relatively limited cost, could be part of a Western strategy to exhaust the adversary's inventory of surface-to-air missiles.

103. For example, systems like the ADM-160 MALD, an expendable flying drone carrying a signature augmentation system that mimics the signature of other aircraft, like the B-52 or the F-16. The MALD-J variant is equipped with a jammer. T. Rogoway, "The Pentagon's Flying Decoy Super Weapon Is About To Get Much Deadlier", blog *Fox-Trot Alpha*, November 12, 2014, accessible at: foxtrotalpha.jalopnik.com.

104. K H. Hicks, *Undersea Warfare in Northern Europe*, Washington D.C.: Center for Strategic and International Studies, 2016, p. 32-ff.

collectively considered too low to demonstrate political credibility, (2) as part of a temporary force build-up initiated to extract concessions from Russia, or (3) to offer increased assurances to Baltic countries following a CSBM agreement with Russia to reduce operational overlap.

Some military capabilities part of this effort would have to remain outside the scope of potential negotiations. This would be the case for areas in which weaknesses could raise stability concerns, and would thus warrant additional investments. For instance, densifying the ISR assets covering Europe and its neighborhood to monitor Russian capabilities in all domains across the entire spectrum (early warning, air, ground and maritime surveillance, signals intelligence, etc.) would reinforce the transparency and predictability of military activities in regions of interest.

An agenda for arms control and confidence-building measures in Europe

The revival and renewal of the arms control agenda in Europe will be a long and complex affair, and the results can at best be described as uncertain. The recognized deadlock in most of the pillars of the European security architecture encourages the formulation of proposals based on identified operational and strategic problems, without anticipating the framework in which such proposals could be presented, if they are ever presented.

The possibilities outlined below have been organized according to the intended effect. They are part of an approach based on reductions, limitations, bans or transparency, depending on the initiative.

Reinforce transparency and limit operational overlap

1.A – Limits on electronic warfare capabilities in border regions

Type of initiative	Confidence- and security-building measures with respect to high-power electronic warfare equipment
Capabilities affected	High-power ground-based and airborne electronic warfare systems
	Exchanges of technical and geographical information on offensive electronic warfare systems (electronic attack) possessed by the state parties and their regular location
Details	Categorization of various types of EW systems based on power, spectral coverage, and other characteristics deemed relevant, and definition of a transmission power threshold (in kW) above which an EW system will be considered a “theater” or a “strategic” system, since it can potentially produce a disruptive effect at long range (e.g. more than 50 km) ¹⁰⁵
	Establishment of an exclusion zone for ground-based theater/strategic EW systems, with an agreed depth (200-300 km or more) from the border with a neighboring state party (unless the system is taking part in a temporary, previously notified exercise)
	Establishment of an exclusion zone for high-power airborne offensive EW systems, with an agreed depth (500-1,000 km) from the border with a neighboring state party (unless the system is taking part in a temporary, previously notified exercise)
	Inspection regime with provisions for several visits per year, including at short notice, to verify the presence of equipment in agreed deployment zones and the absence of such equipment in the exclusion zone
	Verification of the non-utilization of these types of EW systems close to the border through overflights by platforms equipped with passive SIGINT sensors, and of their non-deployment through IMINT
Intended effects	▲ Limitation of each party’s capacity to obstruct/interfere through mutual observation

105. The diversity of bands of the electromagnetic spectrum in which the system can emit could also be taken into account.

1.B – Limits on air defense capabilities in border regions

Type of initiative	Confidence- and security-building measures with respect to the performance and deployment of long-range air defense systems
Capabilities affected	Air defense systems with missile ranges greater than 75 km (S-300, S-400, S-500 families; <i>Patriot</i> ; <i>Aster 30</i> ; etc.)
	Exchanges of technical information on air defense systems possessed by the state parties and on the maximum ranges of their associated missiles
Details	Categorization of types of air defense systems as a function of range
	Establishment of an exclusion zone for ground-based long-range air defenses, with an agreed depth (200-300 km or more) from the border with a neighboring state party (unless the system is taking part in a temporary, previously notified exercise)
	The entire weapon system, including associated radars (early warning/surveillance, acquisition, engagement) would be affected by deployment restrictions
Intended effects	Inspection regime with provisions for several visits per year, including at short notice, to verify the presence of equipment in agreed deployment zones and the absence of such equipment in the exclusion zone
	<ul style="list-style-type: none"> ⤴ Limitation of the capacity to obstruct/interfere through mutual observation ⤴ <i>De facto</i> exclusion of long-range air defense systems from certain zones (Kaliningrad, Baltic countries), where air defense would be provided by ground-based medium-range, sea-based systems, and fighter aircraft

Reduce the value and feasibility of surprise attacks

2.A – Information exchange on large-scale upcoming exercises

Type of initiative	Confidence- and security-building measures concerning upcoming major exercises
Capabilities affected	General purpose forces (troops and CFE/Vienna Document categories of equipment)
Details	<p>Lower the thresholds of notifiable/observable military exercises as defined by the 2011 version of the Vienna Document to account for the fact that, in today's Europe, a smaller volume of modern forces can be militarily significant than in 1990, when the current limits had been defined. Approximately halving the levels of troops, battle tanks, armored combat vehicles, and artillery pieces¹⁰⁶ as well as limiting the number of exercises simultaneous held by a given party.</p> <p>Information exchange concerning upcoming large-scale exercises, their location, duration, tactical scenarios, units involved, nature of the involvement of strategic forces or dual-capable platforms/means of delivery involved), potential role assigned to nuclear capabilities</p>
Intended effects	<ul style="list-style-type: none"> ▲ Reinforce predictability ▲ Reduce the risks of misperception ▲ Reduce the feasibility of surprise attacks

106. See chapters V and VI of the 2011 Vienna Document for the corresponding articles.

2.B – Limits on snap exercises

Type of initiative	Confidence- and security-building measures with respect to the organization of snap exercises
Capabilities affected	General purpose forces (troops and CFE/Vienna Document categories of equipment)
Details	Set quantitative limitations concerning the volume of snap exercises, in terms of troops and equipment involved
	Set geographical limitations concerning the location of snap exercises (at least 100-200 km from a border between state parties)
	Set quantitative limitations concerning the number of snap exercises conducted each year in a given theater
Intended effects	<ul style="list-style-type: none"> ▲ Reduction of the fear of surprise attack ▲ Reduction of the risk of accidental escalation

2.C – Constraints on in-theater deployments of stealth aircraft

Type of initiative	Confidence- and security-building measures with respect to stealth combat aircraft
Capabilities affected	Tactical aircraft (F-22, F-35, Su-57, future manned aircraft) and unmanned combat/armed air systems with low/very low radar cross section
Details	Information exchanges on NATO and Russian fleets of combat tactical aircraft defined as having a low/very low radar and/or to their infrared signature, on the basis of the difference between the estimated signature based on size and power, and their measured signature
	Establishment of an area with an agreed depth (several hundred kilometers) from the border with a neighboring state party, in which the relevant aircraft cannot be permanently stationed, and can only be temporarily based as part of a previously notified exercise
	Inspection regime with provisions for several visits per year, including at short notice, to verify the absence of such equipment in the exclusion zone
Intended effects	<ul style="list-style-type: none"> ▲ Reduce the fear of surprise attack by stealth aircraft ▲ Reduce the incentive to strike first by targeting tactical platforms deployed in-theater

Alleviate concerns regarding the survivability of second strikes forces

3.A – Information exchanges on critical capability development plans

Type of initiative	Confidence- and security-building measures with respect to critical military capabilities and their roles in the respective postures
Capabilities affected	<ul style="list-style-type: none"> ▲ Ballistic and Cruise missile defenses (sea-, ground-, air- or space-based) ▲ Non-ballistic hypersonic strike capabilities (glider or cruise missile) ▲ Conventional deep strike capabilities ▲ Other critical future capabilities (autonomous systems and artificial intelligence, cyberweapons, antisatellite weapons, directed energy, EW, etc.)
Details	<p>U.S.-Russia dialogue identifying a set of “critical” military capabilities seen as potentially destabilizing by at least one party, whether offensive or defensive, combat or support, kinetic or non-kinetic, in any domain</p> <p>Information exchange setting forth (or updating) the national ambition for critical capability domain, build-up plans (qualitative or quantitative) in the foreseeable future, in terms of budgets, R&D, acquisition, planned or past deployments (dates, numbers)</p>
Intended effects	<p>U.S.-Russia dialogue on strategic and operational doctrines guiding plans and uses of critical capabilities, on stability concerns associated with critical capabilities and on potential codes of conduct and CSBMs to alleviate those concerns</p> <ul style="list-style-type: none"> ▲ Start a dialogue on respective ambitions in critical capability areas ▲ Reinforce predictability of capability developments

3.B – Transparency measures concerning missile defense capabilities

Type of initiative	Confidence- and security-building measures on missile defense sites and capabilities
Capabilities affected	U.S./NATO/Russian ground- and sea-based missile defenses (S-300 PMU1/2/V4, S-400, S-500; A-235, GBIs, Patriot PAC-3; THAAD; SM-3; Aster 30, etc.)
Details	Information exchanges on existing and planned missile defense systems, providing current plans for qualitative and quantitative developments affecting strategic and theater missile defense capabilities and technical characteristics of existing systems or systems in production
	The CSBM would cover the entire weapon system, including associated radars and C2 mobile posts
Intended effects	Inspection regime with provisions for several visits per year, including at short notice, to all types of relevant facilities (silos, depots and maintenance facilities at fixed sites, launchers, depots, and maintenance facilities at the bases of mobile missile defense units, production facilities, ships at their homeports) to verify an agreed set of technical data provided in information exchanges
	<ul style="list-style-type: none"> ▲ Reinforce transparency on missile defense capabilities (strategic and theater-level) ▲ Reassure parties on current and future missiles defense capabilities

3.C – Limits on ballistic missile defense capabilities

Type of initiative	Arms control agreement limiting U.S./NATO and Russian BMD capabilities
Capabilities affected	<ul style="list-style-type: none"> ▲ Russian, U.S. and NATO strategic BMD ▲ Russian and NATO theater BMD
	Systematic evaluation of all existing types of missile defense interceptors in terms of (1) measured velocity during live tests and (2) the measured velocity of the ballistic target against which the interceptor has been tested
Details	Identification of a capability threshold, based on observed characteristics, above which an interceptor would have a probability of intercept agreed to be significant against strategic ballistic missiles, and would be considered a strategic interceptor ¹⁰⁷
	Listing of U.S. and Russian strategic interceptors and of a protocol to evaluate new types of interceptors
	Establishment of a quantitative fixed limit for deployed and non-deployed strategic interceptors, whether in silos or on mobile launchers, or on deployed and non-deployed strategic interceptor launchers
	Inspection regime with provisions for several visits per year, including at short notice, to all types of relevant facilities (silos, depots and maintenance facilities at fixed sites, launchers, depots, and maintenance facilities at the bases of mobile missile defense units, ships at their homeports)
Intended effects	Ban on testing of BMD technologies considered to offer breakthrough potential, such as multiple kill vehicle concepts
	<ul style="list-style-type: none"> ▲ Alleviate concerns regarding a disarming first strike and reduce incentives to escalate ▲ Reinforce arms race stability ▲ Offer verifiable guarantees on current and future strategic missile defense capabilities

107. In a way similar to the 1997 agreement on demarcation between different types of theater missile defense systems based on interceptor speed and interception tests performed. For a presentation of the agreements and the discussions, see A. F. Woolf, *Anti-Ballistic Missile Treaty Demarcation and Succession Agreements: Background and Issues*, Washington D.C.: Congressional Research Service, April 27, 2000.

3.D – Limits on non-ballistic hypersonic strike capabilities

Type of initiative	Arms control agreement limiting U.S./Russian non-ballistic hypersonic strike capabilities
Capabilities affected	Long range non-ballistic hypersonic strike capabilities
Details	Systematic evaluation of all existing non-ballistic hypersonic missiles in terms of (1) measured post-boost velocity during live tests (for hyperglide vehicles) and/or (2) maximum range reached during tests (for cruise missiles and hyperglide vehicles) and/or (3) payload
	Delimitation of several classes of hypersonic strike capabilities based on range and type of launcher (fixed or mobile) to single out a class of systems most capable of conducting conventional counterforce operations at intercontinental/global range
	Establishment of a quantitative limit for deployed and non-deployed hypersonic missiles and glide vehicles belonging to the class of systems most capable of conducting conventional counterforce operations at intercontinental/global range
	Inspection regime focused on the class of systems constrained by the agreement, with provisions for several visits per year, including at short notice, to all types of relevant facilities (silos, depots and maintenance facilities at fixed sites, launchers, depots, and maintenance facilities at the bases of mobile launchers, ships at their homeports)
Intended effects	<ul style="list-style-type: none"> ▲ Reduce crisis instability ▲ Alleviate survivability concerns of the second strike forces

Conclusion

The future of the European security architecture is today under threat. Renewed strategic competition between Russia and NATO and Moscow's posture of intimidation and opacity make it essential to reintroduce the risk of a major war, including nuclear use, into national security planning.

With the end of the Cold War, the twofold development that saw the end of bipolarity and the diminished risk of major war brought an increasing number of Western diplomats to progressively forget about the value and the very logic of arms control. Since 2014 and the Ukraine crisis, European countries and the U.S. have rediscovered the risk of seeing a local crisis with Russia follow a dangerous path toward escalation that could potentially lead to the employment of nuclear weapons. They now need to think again about how to adapt arms control practices and tools to contemporary needs and challenges. This study proposes a review of some of the risks of military instability that currently faces, or could face in the near future. It identifies possible avenues that appear worth exploring to sustainably reinforce stability and security on the Continent, with no claim to exhaustiveness and without trying to identify what would be the suitable political conditions that would allow new CSBMs and arms control negotiation to come again at the forefront of Western diplomatic priorities.

Although it was outside the scope of this study to analyze the obstacles that could prevent a renewed focus on confidence-building and arms control measures in Europe, it is important to underline some of the most crucial ones.¹⁰⁸

From a political and strategic viewpoint, although there are numerous issues that could, on paper, bring the U.S., Russia and Europe to discuss and, possibly, negotiate CSBMs and arms control agreements, the alignment of priorities between them – and even within Europe – could prove impossible to achieve for many reasons. Many Western modern capabilities which have been deployed or are in development might generate enough concern in Russia to bring it back to arms control.¹⁰⁹ These capabilities, however, like

108. For a recent and valuable analysis focused on the prospects for *conventional* arms control in Europe, see L. Kulesa, "The Future of Conventional Arms Control in Europe", *op. cit.*

109. See for example A. Arbatov, "An Unnoticed Crisis: The End of History for Nuclear Arms Control?", *op. cit.*; U. Kühn, "U.S.-Russian Relations and the Future Security of Europe", *Arms Control Today*, January-February 2017, accessible at: www.armscontrol.org.

ballistic missile defense or conventional prompt strike options, are largely possessed by the United States. Yet Russia is only one among several major factors driving Washington's strategic orientations and capability developments, which also have to take into account the distinct challenges posed by the rise of China. Thus, at this stage, and as evidenced by the stated U.S. intention to withdraw from the INF Treaty, it seems at best improbable that the U.S. administration and, even more so, Congress, would be inclined to consider limitations on U.S. conventional capabilities for reasons related to European security.

At the same time, from a capability viewpoint, efforts intended to significantly limit the risk of escalation will face a number of unfavorable trends. First, the growing versatility and modularity of modern platforms and equipment (tactical aviation, surface ships with vertical launch systems, submarines, etc.) give them a built-in flexibility that does not easily lend itself to the imposition of limitations on specific capabilities and the necessities of verification focused on a specific class of equipment. Second, the continuous advances in information technology allow reductions in the size and the signature of sophisticated and critical pieces of equipment (tactical missiles, radars, electronic warfare systems, etc.). This trend, combined with the increasing mobility of critical military capabilities (long-range surface-to-air defenses and theater missile defenses, electronic warfare, missile launchers, etc.), makes it increasingly difficult to monitor and track relevant systems, posing major challenges to the conception and implementation of robust and reliable verification regimes.¹¹⁰ Third, due to the increased range and speed of missiles and the mobility of launchers, operational overlap problems seem destined to increase over time.

Although the key priority to strengthen the European security architecture will remain to bring Russia back into compliance with its multiple arms control and CSBM commitments, reaching that goal requires identifying ways to incentivize such a move by Moscow. The two-pronged effort outlined in this study combines a reinforced and more credible NATO deterrence and defense posture with a renewed thinking on arms control and confidence-building instruments tailored to current and anticipated European security challenges. While focused on specific stability concerns, isolated from multiple outstanding sources of tensions in the relations between Russia and the West (among which Ukraine/Crimea, Syria, Russian meddling in democratic processes and assassination attempts using chemical agents), this effort could contribute to alter the Russian strategic

110. For some of the challenges raised by modern conventional arms control, see H.-J. Schmidt, *Verified Transparency: New Conceptual Ideas for Conventional Arms Control in Europe*, Frankfurt-am-Main: Peace Research Institute Frankfurt, 2013, pp. 14-25.

calculus. This study only represents an early step in a long and complex process, a step to be followed by difficult discussions among diplomats, officers and experts from European and NATO countries. Although the process might never be completed, due to the strategic calculations of the major military powers, the potential divisions among European countries, and the extreme complexity of the issues at hand, it appears to be a step worth taking.



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