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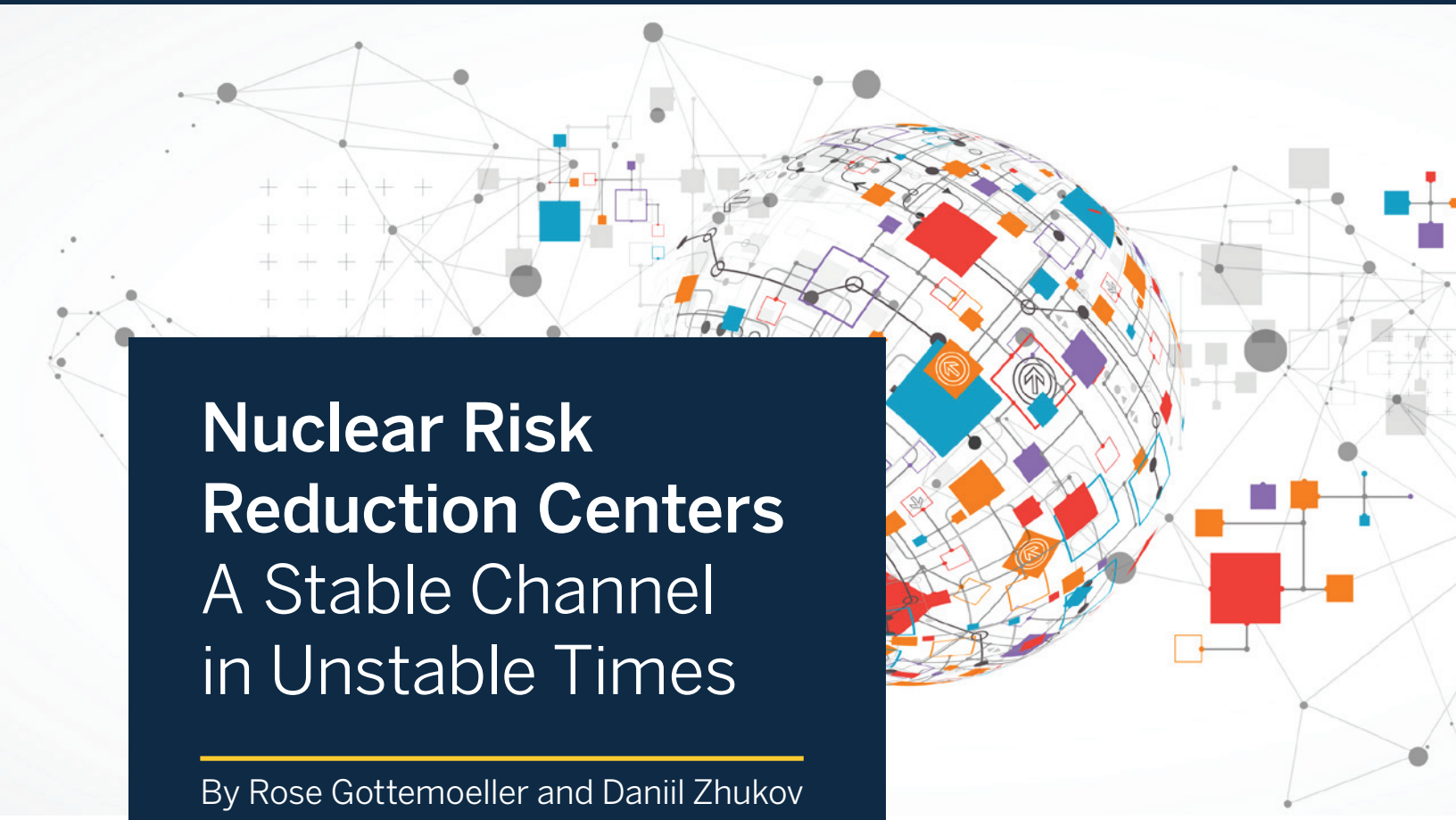

Nuclear Risk Reduction Centers
A Stable Channel in Unstable Times

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This working paper explores the history of the Nuclear Risk Reduction Centers in the United States and the USSR (now Russia)—to explain the risks they were designed to address; to consider how well they have performed to mitigate those risks; and to identify benefits or hazards that were not anticipated when the NRRCs were conceived. Finally, it lays out some ideas for developing the NRRC concept going forward, to enhance risk reduction on a wider global basis.[1]

Formally negotiated between the United States and the Soviet Union on September 15, 1987, the Nuclear Risk Reduction Centers form an always open and secure channel for rapidly communicating messages related to implementation of various arms control treaties and measures. Today, technical staff at the US NRRC maintains the line 24 hours a day, immediately translating and disseminating incoming messages to relevant agencies and transmitting outgoing messages to Russia and over 50 other international partners in service of 13 treaties and agreements covering nuclear, conventional, chemical, and cyber domains.[2]

Besides the treaty-mandated notifications, the US and Russian NRRCs also routinely exchange service messages related to various maintenance issues, sometimes transmit ad hoc messages not pertaining to any particular treaty, and test the line with human contact every two hours.[3]

Shaped by the context of several nuclear close calls in the decades preceding the agreement, the NRRCs have been designed from their inception as a reliable channel to reduce the risks of inadvertent nuclear escalation. While measuring their definitive contribution to the risk reduction enterprise is challenging, we nevertheless argue that the centers have proven their worth in serving their original role. The NRRCs' evolving role in facilitating various arms control and confidence-building measures in itself constitutes an important contribution to international security. The NRRCs also provide a crucial ability to transmit ad hoc communications as necessary to prevent incipient crises and ingrain routine messaging into the institutional DNA of the United States and Russia, maintaining an open channel even as bilateral interactions became sparse after Russia's 2022 invasion of Ukraine. These qualities make the Nuclear Risk Reduction Centers an attractive model for replicating in other contexts and domains, including, as an example, for communication among all P5 nuclear powers.

The Need for Risk Reduction

The final decade of the Cold War gave both sides sufficient reason to worry about nuclear escalation, whether inadvertent or deliberate. The breakdown of détente following the Soviet invasion of Afghanistan in 1979 led to a period of increased tensions in the early 1980s, shaped by military build-up and punctuated by close calls. In such a charged atmosphere, memories of the two superpowers' near collision during the 1973 Arab-Israeli War reinforced awareness that the danger of nuclear war was ever present. In recent years, the rising number of nuclear-capable countries has understandably aroused deep concern about the proliferation of nuclear weapons.

In the United States, this amalgam of anxieties spurred calls to reduce the threat of inadvertent nuclear escalation that could result from misinterpretation of the other side's action, or from third-party involvement. By contrast, the Soviet Union was preoccupied with the threat of a direct conflict with the United States, fearful of the growing US power and its own self-perceived vulnerability.

In Washington, calls for risk reduction echoed President Ronald Reagan's own proposals for confidence-building measures that were put forward to the Soviet Union in 1982, two days after the death of the Communist Party's general secretary, Leonid Brezhnev.[4] The Reagan administration sharply shifted its rhetoric and policy toward the Soviet Union in the coming months, announcing the Strategic Defense Initiative (SDI) in early 1983 and further setting Soviet decision makers on edge. However, other groups in Washington continued to drive the momentum for reducing inadvertent risks. One particularly successful effort was the Working Group on Nuclear Risk Reduction, begun by Senators Sam Nunn and John Warner.

The group launched an interim report in 1983 that urged the United States and the Soviet Union to establish nuclear risk reduction centers designed to "maintain a 24 hour watch on any events with the potential to lead to nuclear incidents."[5] The centers were envisioned as channels with wide-ranging functions for crisis prevention and crisis management, whereby the two sides could exchange information on actions that could be misinterpreted, as well as maintain close contact during nuclear terrorism incidents and "establish a dialogue on nuclear doctrines, forces, and activities," emphasizing the voluntary nature of such exchanges. The Nunn-Warner report came out in parallel with the Department of Defense's own recommendations to President Reagan, urging the addition of a facsimile capability to the Washington-Moscow hotline and implementation of other crisis management measures.[6]

The report presciently emphasized the need for a concerted risk reduction effort, for just several months later, the United States and the Soviet Union found themselves near the precipice of nuclear confrontation. The tense atmosphere of the 1980s grew particularly unstable after the SDI announcement, sharpening the aging Politburo's fears about American intentions. Unbeknownst to the US leadership and intelligence community, the Kremlin grew deeply concerned that its own strategic forces could become vulnerable to a first strike by the United States, creating a dangerous space for further potential misinterpretations.[7]

A series of crises and close calls occurred against this unstable backdrop in fall 1983. One crisis was the Soviet shoot-down of a Korean Air Lines flight on September 1, increasing the temperature and raising the specter among rank-and-file Soviet officials of nuclear conflict. Anatoly Chernyaev, then the deputy director of the Central Committee's International Department, wrote in his diary "this vast world, full of fantastic achievements of the human mind and labor, can in a few short minutes fall victim to a nervous breakdown of one of the two 'superpower' leaders."[8]

Another crisis occurred September 26, 1983, when the Soviet Union's early warning system mistakenly detected five missile launches from the United States; the decision not to escalate the alert was made by one colonel, Stanislav Petrov.[9] Finally, that November, as NATO carried out its Able Archer 83 nuclear exercise, Soviet misinterpretation of NATO communications suggested US readiness to launch a real nuclear strike, triggering the USSR's own increase in combat readiness.[10]

These and other incidents contributed to an increased appreciation in Washington and Moscow of the risks of nuclear confrontation. Anatoly Chernyaev would go on to become Soviet General Secretary Mikhail Gorbachev's chief foreign policy adviser, and his first documented contemplation of the possibility of nuclear war in 1983 may well have contributed to the

Kremlin's search for greater nuclear restraints in subsequent negotiations.[11] And on the US side, the 1983 crises spurred further momentum toward nuclear risk reduction, leading Senators Nunn and Warner to co-sponsor the 1984 Senate Resolution 329. The resolution expressed concern over "an increasing number of scenarios, including misjudgment, miscalculation, misunderstanding, possession of nuclear arms by a terrorist group or a state sponsored threat" that could result in a nuclear confrontation between the US and the USSR.[12] To address these worries, the resolution urged President Reagan to pursue negotiations on nuclear risk reduction centers with the USSR.

Making Risk Reduction Real

President Reagan and General Secretary Gorbachev agreed to begin expert-level discussions on the matter during the 1985 Geneva Summit.[13] These discussions turned into full-fledged NRRC negotiations, which proceeded alongside the resumed Intermediate Nuclear Forces Treaty and the Strategic Arms Reduction Treaty talks and took on a complementary role within the broader US-Soviet arms control process.

This role was clearly reflected in the final 1987 agreement, under which the centers served as a secure communications channel through which both sides could transmit notifications required by other treaties and agreements.[14] During the September 15, 1987, signing ceremony, President Reagan and Soviet Foreign Minister Eduard Shevardnadze highlighted the NRRCs' role in the broader system for reducing the "risks of conflict that could otherwise result from accident, miscalculation, or misunderstanding" and implementing the understanding that "nuclear war should never be fought."[15] The 1987 INF Treaty and the 1988 Ballistic Missile Launch Notification Agreement became the first agreements to utilize this nascent channel.

The NRRCs, established within the US State Department and the Soviet Ministry of Defense, thus took on a narrower role than originally envisioned by the Nunn-Warner Working Group. Far from the proposed wide-scoped avenue for discussions on nuclear doctrines and management of nuclear incidents, the NRRCs became a focused crisis-prevention mechanism through which the sides could securely and rapidly share information required by other bilateral agreements.

Once the agreement was concluded, several commentators in the United States suspected that the Reagan administration significantly bounded the Nunn-Warner proposal in order to limit Congress's ability to influence the negotiations, thereby falling short of the original risk reduction vision.[16] However, CIA reports from the negotiations noted that the US delegation did propose "various roles for such centers" during the exploratory meetings, including notifications of military exercises, and it was the Soviet delegation that insisted on keeping the centers' original function strictly in the nuclear domain.[17] In fact, even the narrower role of the actual NRRCs still constituted the core of the Nunn-Warner vision; two of its members, Barry Blechman and Michael Krepon, wrote in a 1986 Center for Strategic and International Studies report that "most of the [proposed] centers' activities" would take on a technical and pre-crisis nature, focusing on notifications of military activities and crisis prevention.[18] And a 1987 National Academies of Sciences report, co-chaired by Lynn Rusten and Paul Stern, assessed that "these centers might function more effectively for crisis avoidance" rather than full-on crisis management.[19]

Thus, while not reaching the full ambition of the Nunn-Warner Working Group, the NRRCs retained their essential function as a clearinghouse of nuclear data exchanges. This role solidified over time as both sides exchanged immense amounts of data on deeper strategic arsenal cuts, including over 25,000 notifications under the New START Treaty.[20] As the amount of information exchanged grew, the channel between the two countries' centers served a vital role for securing this exchange and giving both sides confidence in the authenticity of the information being received.

This bounding of the centers' function allowed them to evolve and expand over time as well, facilitating data exchanges not just under new bilateral arms control arrangements but also with allies, partners, and international organizations. In its first year, the US NRRC exchanged 1,800 messages with the Soviet Union pursuant to the two agreements negotiated alongside it. On its 10th anniversary, Acting Assistant Secretary of State Eric Newsom stated that the center "sent and received 15,000 notifications in support of nearly 20 agreements" and communicated "directly or indirectly with more than 100 countries" beyond Russia through several international agreements.[21]

In 1997, these agreements already included the Conventional Forces in Europe Treaty, the Vienna Document, and the Chemical Weapons Convention, definitionally expanding the NRRCs' role beyond the nuclear domain to cover restrictions on conventional and chemical weapons. In 2013, the cyber domain entered the mix as well, as the United States and Russia began exchanging notifications under cyber confidence-building measures. Now, the US center plays an important role in sharing data on attribution of cyber events with OSCE (Organization for Security and Cooperation in Europe) partners, a notification regime that was utilized for the first time to report on the SolarWinds cyberattack in fall 2020.[22]

Such expansion needed to be acknowledged, and the US center was aptly renamed the National and Nuclear Risk Reduction Center in 2021. Besides codifying the name change, the National Security Presidential Memorandum 34 reaffirmed the NNRRC's consistently relevant role as a mechanism for facilitating risk reduction and enhancing communication with willing partners. The latter point crystallized in the channels between the US NNRRC and corresponding centers in Ukraine and Kazakhstan, which were willing to negotiate standalone agreements after the collapse of the Soviet Union.[23] Since then, Ukraine has successfully updated its agreement and modernized the link with the United States, while Kazakhstan is in the process of negotiating the updated agreement.

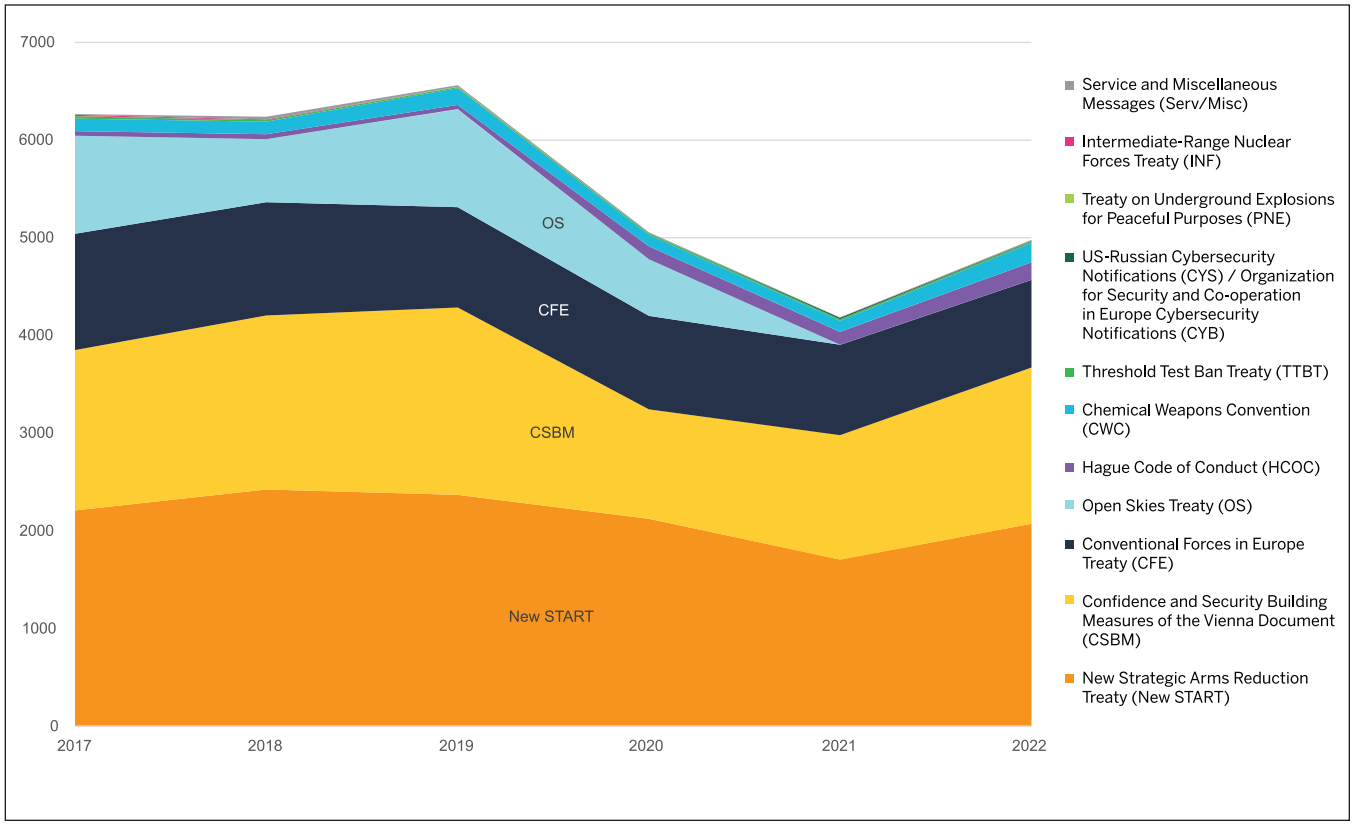

Figure 1: The total number of notifications that the US NNRRC has exchanged annually (incoming and outgoing) shows the evolution and expansion of the treaties and agreements it services. Some categories of notifications have values too low to be seen at this scale. For complete data, see Appendix: US NNRRC Notification Data.

A World-Wide Risk Reduction Web?

The United States is not the only country to adopt the Nuclear Risk Reduction Center as a tool for exchanging information with a broader range of interlocutors than originally designed. The Russian counterpart center, the Ministry of Defense's Treaty Compliance Directorate, similarly began exchanging information under other international treaties, including the Open Skies Treaty and the Vienna Document. Notably, Russia also uses its center to exchange notifications under the Shanghai and Moscow Agreements—the 1996 and 1997 confidence and security building measures between Russia, Kazakhstan, Kyrgyzstan, and Tajikistan acting as a joint party on one side, and China on the other.[24]

The 1996 agreement places limits on the scope, location, and purpose of military exercises and sets up an annual data exchange schedule on "agreed components of armed forces and border guards." It also introduces the concept of not using forces deployed within 100 kilometers of each border against one another.[25] The 1997 agreement reduces forces deployed within 100 km of the Chinese border and mandates that they be "only defensive in nature," with the verification mechanism including four annual inspections.[26] In both cases, notifications are sent through "diplomatic channels or other means agreed upon by the Sides."

The way the United States and Russia have employed the centers provides a template that other countries, especially the latest actors to acquire nuclear capabilities, could follow in their risk reduction efforts. A similar model has already been proposed as a viable method for India, Pakistan, and China to establish their own "strategic risk-reduction centers."[27] India and Pakistan have had some experience in sharing key data through confidence-building arrangements including the Agreement on Pre-Notification of Flight Testing of Ballistic Missiles and the Agreement on the Prohibition of Attack Against Nuclear Installations and Facilities.[28] And while it is unclear whether China already has a comparable institution to facilitate its data exchanges with Russia, it is evidently well familiar with the concept of conducting data exchanges and notifying each other of measures to implement the Shanghai and Moscow Agreements.

In fact, the flexibility with which both the United States and Russia have expanded the centers' role to facilitate exchanges with new partners shows that this model can be applied to any agreements that include a data exchange and notification component. Other states could adopt the model in order to implement their existing agreements and pave the way toward new diplomatic arrangements, whether focused on mitigating strategic risks or preventing regional crises. These centers do not even have to be

connected to the US NNRRC; as its current director, Jody Daniel, has noted, the very propagation of risk reduction centers and networks would enhance international security. As each country node would have confidence in the origins of the messages it receives through these channels, the risk of inadvertent conflict through misunderstanding would be reduced.[29] In turn, greater communication among adversaries and partners may raise international transparency and strengthen global security.

A Worthwhile Endeavor

To be sure, the number of treaties and notifications facilitated by the NRRCs does not, in and of itself, show the efficacy of the centers in reducing nuclear risks. Likewise, while the evolution of the centers' role demonstrates the flexibility of the institutions, this adaptability alone is not a direct indicator that the risks have gone down. To begin addressing this question, we need to recall the NRRC's original mission and assess publicly known instances in which the NRRC successfully fulfilled or failed to meet its foundational goals.

Measuring something as intangible as the risk of nuclear use is notoriously difficult. The United States and other countries, as well as the international expert community, have long worked on figuring out the right approaches and methodologies to defining, categorizing, and analyzing nuclear risks, especially as those risks evolved alongside the development of new technologies. As the 2023 National Academies of Sciences report *Risk Analysis Methods for Nuclear War and Nuclear Terrorism* notes, two factors in particular make nuclear risk analysis and measurement challenging: the extreme (and fortunate) rarity of past cases of nuclear use and terrorism, and the dependence of those risks on key actors' perceptions and intentions.[30]

The fact that there have been no more nuclear weapon uses since the atomic bombings of Hiroshima and Nagasaki in 1945 complicates the process of measuring any given risk reduction measure's efficacy. Do we deem such measures successful by default for as long as there is no more nuclear weapons use? Or do the current geopolitical tensions and deliberate risk manipulation by actors such as Russia suggest the failure of the entire risk reduction enterprise?[31] And, in fact, is the underlying assumption at the heart of nuclear risk reduction and arms control—that transparency and predictability necessarily contribute to mutual security—even correct?[32]

These are all crucial questions to grapple with. When it comes to assessing the NRRCs, however, it is worth recalling their original mission to mitigate the risks of *inadvertent* nuclear escalation. While other strategies and approaches may be needed to counter the risks of deliberate escalation, we argue that the centers have been effective in minimizing the risk of miscalculations or misunderstandings. That function is particularly crucial in today's difficult environment, when any misperception or an unfavorably misinterpreted signal can spiral into a crisis.

To be sure, there is little public evidence to determine causation between the absence of inadvertent nuclear escalation and the NRRC's crisis-prevention function. But two specific episodes that occurred since the negotiation of the NRRC agreement may give us a sense of the role the centers can play in reducing such risks, and the risks that can emerge when the centers are not used. These episodes are the US forces' alert on September 11, 2001, and the 1995 Black Brant XII incident in Norway.

In the wake of the attacks on September 11, 2001, the United States moved its forces to high alert and needed a way to signal to the Kremlin leadership that the action was not directed at Russia. Given that the military-to-military communication link in the Pentagon was down, it fell to Deputy Secretary of State Richard Armitage to transmit the following message through the NRRC to the Russian counterpart center: "At this time the United States has moved to DEFCON THREE (3). This is not directed at Russia, this is due to current emergency situations."[33] This was an example of the NRRC's ability to transmit ad hoc messages in order to provide a clear signal and avoid miscommunication with the other side. It is worth noting that on that occasion, Russian President Vladimir Putin was the first national leader to call President George W. Bush, to offer assistance.[34]

The foil to this instance is the 1995 Norway-Russia incident, during which the Russian early warning system's detection of a Black Brant XII weather research rocket launch prompted President Boris Yeltsin to place Russia's strategic forces on high alert.[35] Norwegian scientists used previously established procedures to notify the Russian Ministry of Foreign Affairs ahead of the launch. However, for reasons still unknown, the notification never made it into the Ministry of Defense and up the chain of command, leaving the personnel staffing the early warning system in the dark.[36] The result was perhaps one of the closest nuclear calls the world has seen thus far, with Yeltsin and his top military leadership considering for several long minutes whether to activate their "nuclear briefcases."

It seems fair to assume that had Norway and Russia updated their scientific missile-launch procedures to involve the Russian NRRC, this particular launch notification would have correctly found its intended recipient and averted this dangerous moment. The contrast between this case and the ad hoc use of the NRRC on September 11 illustrates the benefit of clear and transparent communication when either side does not want its actions to be misunderstood. When such nuclear risk reduction measures are in place in the times of crisis, they help winnow the actual signals—deliberate risk manipulation and threats—from the noise of actions that the sides do not intend to be threatening.

The juxtaposition of these two cases illustrates the value of an institutional mechanism that is agreed between countries with the goal of making certain communications routine and seamless. Where nuclear risk reduction is concerned, three factors are important for governments: (1) someone picks up the communication, (2) processes and transmits it to other responsible agencies, and (3) does it quickly. The NRRCs have assured all three factors are

satisfied in US and Russian treaty interactions. They also ensure that the governments are communicating, through protocols and formats, a requisite amount of information in a predictable way. In an era when mis/disinformation is altering the information landscape in rapid and unpredictable ways, being able to rely on the information emanating from the NRRCs is vital.

Predictability, reliability, and timeliness are thus three characteristics that should be considered in any analysis of metrics for NRRC performance. Thus, although the numbers of NRRC notifications reported in Figure 1 do not convey a diminution of risk in their own right, they do convey a sense of the predictability, reliability, and timeliness by which the NRRCs operate. In essence, by providing for routine and virtually real-time communication between countries, the NRRCs serve an important predictability function. In times of crisis, such predictability could prove vital.

If one wished to dig deeper into these characteristics, an analysis might be tried of how quickly routine NRRC messages are translated and transmitted among government agencies. The results would convey a sense of how well the NRRCs fulfill their basic mission. Whether they reduce risk between the governments involved, however, depends on who reads the messages and how they react.

Keeping the Lines Open

When Russia launched the full-scale invasion of Ukraine and its leadership kept issuing veiled nuclear threats, the United States sought to prevent any misinterpretation of its actions that could result in a direct clash between Russia and NATO that could lead to nuclear escalation. When Vladimir Putin declared a "special duty regime" of Russia's strategic nuclear forces at the start of the invasion, the United States responded by postponing its ICBM test launch and refrained from changing its own nuclear alert levels.[37] The same principle applies to the ongoing exchange of information through the NNRRC; the continued process of transmitting notifications under New START and other US-Russian agreements helped clear up any potential misperceptions of strategic force movements on both sides. In 2022–23, the United States sent 1,182 notifications and received back 891 Russian notifications under the treaty, well in line with the previous years' levels.[38]

Even once Russia announced the illegal suspension of the New START Treaty in February 2023, tying its reimplementation to the demand that the United States cease supporting Ukraine's defense, the bilateral channel remained operational. Until June 2023, the United States continued to send notifications in a unilateral and voluntary fashion in an effort to incentivize Russia's return to implementation.[39]

Both sides have also committed to using the NNRRCs for implementing the Ballistic Missile Launch Notification agreement.[40] Deputy Foreign Minister Sergei Ryabkov recently stated that "all corresponding communication channels [with the United States] are periodically tested, there are certain technical procedures to ensure their operation," implying the same thing that Jody Daniel has confirmed—that the centers' technical operators continue to send routine service messages (e.g., regarding maintenance of the system) and test messages, which go multiple times a day.[41]

The centers have thus not provided a means to handle the deliberate nuclear risks emanating from the Kremlin throughout its war against Ukraine, primarily because they were not designed to manage such deliberate risks in the first place. Nevertheless, the ongoing US and Russian reliance on the NRRCs to transmit ballistic missile launch notifications and other routine messages underscores their utility in limiting the chance of misinterpretation in this dangerous moment, thus reinforcing the original mission of avoiding inadvertent nuclear escalation.

Conclusion and Policy Options

In essence, the NRRCs today continue addressing the same challenge they were designed for in 1987: the risk of inadvertent armed conflict and nuclear escalation, even as the factors that increase those risks grow more complex through the advent of cyberoffensive capabilities, entanglement of nuclear and conventional systems, and rampant disinformation fueled by generative artificial intelligence. In contrast with the end of the Cold War, the United States now confronts the potential of two peer competitors in Russia and China. This triangle complicates strategic stability dynamics and exacerbates the risk of inadvertent escalation, especially with the potential of third-party involvement. In this context, the history of US-Soviet/Russian interactions provides a potential toolbox for mitigating strategic risks.

The Nuclear Risk Reduction Centers may be one such tool. Their ultimate purpose—stable, secure, and timely communications—could become an essential aspect of mutual confidence building under the P5 umbrella. The United Kingdom, France, and China could establish their own versions of the centers, which would allow all five countries to exchange notifications on ballistic missile launches, as proposed by National Security Advisor Jake Sullivan in June 2023.[42]

More broadly, the centers could facilitate a continuing dialogue on nuclear doctrines, forces, and activities, as well as allow the sides to share data on "national measures to prevent unauthorized or unintended use of nuclear weapons," reaffirmed by the P5 leaders in January 2022.[43] This wider agenda for the centers would return them to the original purpose that the Nunn-Warner Working Group on Nuclear Risk Reduction envisioned in 1983. Not only would they serve as a means to exchange information, but they could also, as noted above, "establish a dialogue on nuclear doctrines, forces, and activities."[44] Some experts in the Russian Federation seem to be thinking along similar lines, suggesting that the US-Russian NRRC agreement might be used as a basis for consultations beyond the narrow technical talks concerning NRRC modernization that have occurred in recent years.[45]

The P5 members understand the importance of engaging in multilateral risk reduction to lessen the potential for inadvertent nuclear escalation. In a working paper on strategic risk reduction submitted by the P5 for the 2022 NPT Review Conference, all five nuclear-weapon states emphasize their shared desire to "limit the risks that nuclear weapons could be used based on or as a result of incorrect assumptions, by reducing the potential for misperception, miscommunication, and miscalculation." The paper outlines three key areas for advancing risk reduction efforts: "building confidence and predictability through dialogue"; "increasing clarity, communication and understanding"; and "effective crisis prevention and crisis management tools." The NRRCs, which are a crisis-prevention mechanism that provides the United States and Russia with a secure, reliable, and timely channel for clear communication, can serve as a foundation for these efforts.

A P5 network of NRRCs offers a valuable means of maintaining government-to-government communications in times of crisis and creating a foundation for future multilateral agreements to emerge. To begin P5 cooperation in this area, several initial briefings might be considered:

1. Basic briefings on how notifications and messages for treaty and agreement implementation are exchanged between P5 members (e.g., United States-Russia, China-Russia, United Kingdom-France). This phase should include detailed description of notification formats and how they are arrived at in negotiation.

2. Technical briefings on how upgrades have occurred over the years since the links were established, including discussion of current upgrades in process.

3. Briefings on how innovation might contribute to upgrades in the future, with participation of outside experts (e.g., Catalink).[46]

It will be important to establish during these early briefings the degree to which well-formulated notification formats and protocols can create a routine, preagreed, and real-time environment for exchanging information required for the implementation of treaties and agreements. The notifications are in essence preauthorized and do not require those "up the chain" to pick up the phone on every occasion.

Crisis communications can be accommodated, moreover, with a special notification agreed on for just that purpose, mirroring the US and Russian NRRCs' current capacity to transmit ad hoc messages. Although rarely used, it would immediately be flagged as special by the system and would quickly trigger urgent communications inside the government that received it. Even if consensus on the importance of intragovernmental communication cannot be reached quickly, its importance can be modeled by the United States and Russia to the other members of the P5 through mechanisms such as crisis communication exercises.

While this initial phase is being carried out, it would be important for the P5 to simultaneously be working on a specific agreement that would require regular notification of actions. An agreement on ballistic missile launch notifications seems like a good candidate to fulfill the P5 commitment to the NPT Review Conference in 2022 to develop "measures, agreements and actions" among the P5 on risk reduction.[47] Such an agreement is already in place between the United States and Russia, as well as Russia and China.[48]

Perhaps here is a case where it would make sense for Russia and China also to communicate to the rest of the P5 their agreed-on formats for notifications and protocols; they presumably have some similarity to the US-Russian launch notification agreement in place since 1988. Once Beijing and Moscow have had a chance to communicate how they exchange launch notifications on a bilateral basis, these processes could be compared with the US-Russia launch notifications and protocols, with the discussion taking place among the P5 as a whole. This results of this process would serve as a template for extending ballistic missile launch notifications to the P5 as a whole.

Once all P5 countries are accustomed to the routine exchange of notifications, it should be possible to establish a common technical platform through an NRRC agreement among all five. It would be a complex endeavor, but one for which there are many policy and technical precedents on which to draw. The P5 might also wish to consider, at this juncture, what technical innovations they could incorporate to make the communications links more resilient, with faster response times.

In this way, we emphasize that "keeping the lines open" must apply not only to this period of dire crisis with Russia but also, in the future, to the potential for crisis involving more states possessing nuclear weapons. We must think about what the opportunities are for P5 cooperation in this area of risk reduction, in the light of a Chinese government that is not at all accustomed to routine communications that are not constantly overseen from above. If the notion of routine predictability in the way the communications are exchanged can be conveyed to Beijing, perhaps the Chinese comfort level in this kind of nuclear risk reduction will increase.

It will undoubtedly take some convincing for the Chinese to see the value of the NRRCs and agree on establishing their own version. And yet, in their August 2023 paper for the NPT Preparatory Committee, the Chinese laid out as a basic principle, "insisting upon the precedence of crisis prevention over crisis control. All parties should reject the hypocritical approach of inciting confrontation and creating crises on the one hand while calling for reducing nuclear risks on the other, and give first priority to crisis prevention."[49]

In this paper, we made the case that the centers significantly contribute to their original purpose—reduction of inadvertent nuclear risks—by facilitating confidence-building measures and arms control treaties across the nuclear, conventional, chemical, and cyber domains. As an always-on crisis-prevention mechanism, this US-Russian channel institutionalized the act of routine

and transparent communication between the two governments and proved to be sufficiently adaptable for new agreements and emerging challenges. In this way, the centers amply fulfill the Chinese principle of insisting on the precedence of crisis prevention over crisis control.

The NRRCs' ability to send ad hoc messages builds on this foundation and further lessens the chance of misinterpretation and miscalculation. And although the link between transparent communication and security is not axiomatic, we argue that mutual predictability is even more important in dangerous times such as today, when the risks of an accidental misinterpretation spiraling into a full-blown escalation are very high. In turn, centers for the reduction of inadvertent risks create more space for crafting effective responses to deliberate threats.

Whatever the future possibilities, the Nuclear Risk Reduction Centers have fulfilled a good deal of the promise for which they were established in the 1980s. The question for today is, how can we get them to do *more to lower nuclear risks*?

Appendix: US NNRRC Notification Data

The following data shows the numbers of incoming and outgoing notifications processed by the US National and Nuclear Risk Reduction Center between 2017 and 2022. The data was provided to the authors by Jody Daniel, the center's director.

US NNRRC Notifications 2017-2022 (Incoming and Outgoing)												
Agreement	2017		2018		2019		2020		2021		2022	
	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing
Serv/Misc	4	6	19	8	6	7	10	2	0	2	10	2
INF	8	4	4	2	2	0						
PNE	1	1	1	1	1	1	1	1	1	1	1	1
CYS/CYB	4	4							14	1	2	1
TTBT	7	7	7	7	7	7	7	7	7	7	7	7
CWC	56	76	53	78	70	101	59	59	47	66	77	122
HCOC	0	46	0	48	13	31	61	70	69	63	66	114
OS	921	80	582	65	915	89	533	45				
CFE	1136	55	1110	48	974	50	909	48	891	34	844	55
CSBM	1608	35	1744	40	1885	33	1100	24	1253	23	1561	36
New START	1035	1172	941	1479	854	1514	825	1295	677	1027	891	1182

Abbreviations

NNRRC— National and Nuclear Risk Reduction Center

INF—Intermediate-Range Nuclear Forces Treaty

PNE—Treaty on Underground Nuclear Explosions for Peaceful Purposes

New START—New Strategic Arms Reduction Treaty

TTBT—Threshold Test Ban Treaty

CFE—Treaty on Conventional Armed Forces in Europe

CSBM—Confidence and Security Building Measures of the Vienna Document

CWC—Chemical Weapons Convention

HCOC—Hague Code of Conduct

OS—Open Skies Treaty

CYS—US-Russian Cybersecurity Notifications

CYB—OSCE Cybersecurity Notifications

Serv/Misc—Service and Miscellaneous Messages

Endnotes

1 The authors express sincere thanks to the Stanley Center for Peace and Security for supporting this paper, and to all participants of the two Stanley Center workshops in summer 2023 for offering their invaluable feedback.

2 For more information on the NRRCs, see Agreement between the United States of America and the Union of Soviet Socialist Republics on the Establishment of Nuclear Risk Reduction Centers (and Protocols Thereto), Federation of American Scientists, https://nuke.fas.org/control/nrrc/docs/nrrc1.htm; US Department of State, "Renaming of the National and Nuclear Risk Reduction Center," February 8, 2021, https://www.state.gov/renaming-of-the-national-and-nuclear-risk-reduction-center/; US Department of State, *United States Nuclear Risk Reduction Center* (NRRC), October 2012, https://www.hsdl.org/c/abstract/?docid=724411.

3 Jody Daniel (director, US National and Nuclear Risk Reduction Center), interview with the authors, July 24, 2023.

4 *Preventing Nuclear War: A Realistic Approach*, ed. by Barry M. Blechman (Bloomington: Indiana University Press, 1985), 175.

5 Ibid.

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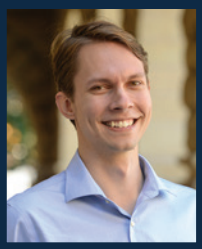

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