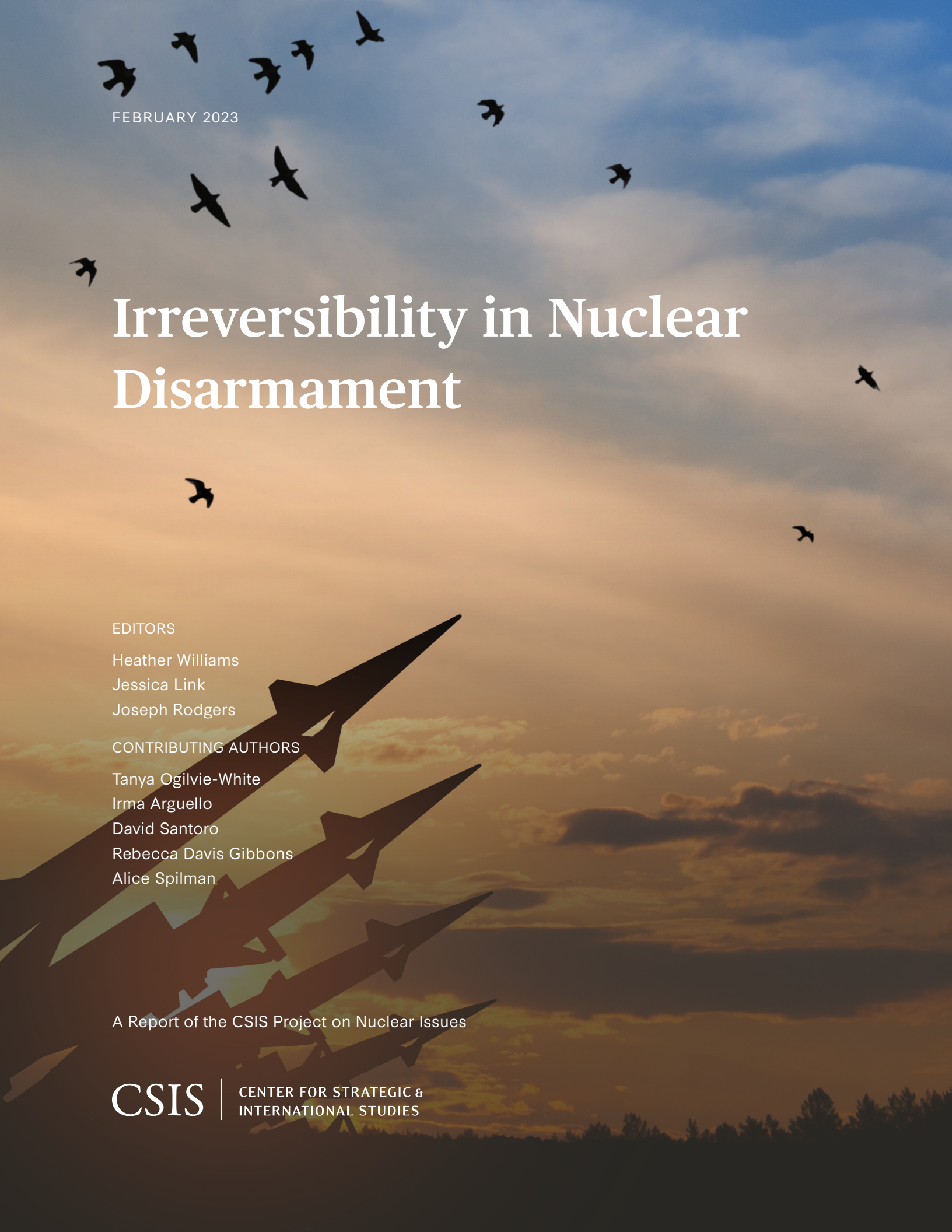

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A Report of the CSIS Project on Nuclear Issues

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Contents

Introduction

Irreversibility in Nuclear Disarmament

By Heather Williams and Jessica Link

Nuclear "irreversibility" is not a new challenge; it has been a component of nuclear arms control and disarmament efforts for decades. Irreversibility entered the Nuclear Non-Proliferation Treaty (NPT) lexicon in the 2000 NPT Review Conference Final Document, in which state parties explicitly linked irreversibility to the verification of fissile material removal, as well as broader arms control and disarmament obligations.[1] The concept appeared again in the 2010 NPT Review Conference action plan in tandem with verification and transparency of disarmament measures.[2] In the 2010 action plan, verification and transparency were a means to ensure irreversibility, specifically in the context of fissile material removal.[3]

Recently, in the lead-up to the 2022 NPT Review Conference, the United Kingdom and Norway launched an initiative involving government and nongovernmental experts to engage with questions about what nuclear irreversibility might look like and how it might happen. The initiative included a March 2022 Wilton Park conference, which described the initiative's goal as "to start an international dialogue to better understand and identify requirements" for irreversible nuclear disarmament (IND).[4] Irreversibility in practice, however, remains relatively underexplored, and future multilateral efforts to implement IND will have to address a series of challenges and questions:

1. Do states need a shared vision of an irreversibly disarmed world?
2. How might future verification overcome contemporary and familiar hedging/latency issues?
3. What is the relationship between political, legal, and technical factors in the pursuit of irreversibility?
4. What are alternate frameworks for thinking about IND?

5. Should non-NPT states be involved in IND and at what stage?

To help explore these questions, the Project on Nuclear Issues commissioned a series of think pieces from a diverse range of authors and regions to explore potential approaches and challenges to IND. The series interrogates narratives about irreversibility and disarmament and theorizes about paths forward.

In the first paper, Tanya Ogilvie-White analyzes historical approaches to irreversibility and evaluates why they failed, helping readers understand how future IND initiatives might succeed. Irma Arguello's contribution assesses the relative importance of and interrelationships among the factors of irreversibility, ultimately arguing that political factors are preeminent and essential to make legal and technical factors achievable. David Santoro applies project management principles to the IND process, arguing that a shared vision of IND is necessary for successful multilateral efforts. Rebecca Davis Gibbons then interrogates the different approaches to IND, examining realist and constructivist approaches. Ultimately, she finds that states may need to pursue realist and constructivist approaches in tandem to increase the likelihood that IND initiatives succeed. Finally, Alice Spilman examines the relationship and sequencing of factors of irreversibility, arguing that political, legal, and technical steps are necessary but not sufficient to achieve IND.

This paper collection highlights important areas of consensus and disagreement in discussions about IND concerning how irreversibility is defined, the importance of confidence in the credibility of IND commitments, and the prospects and prerequisites for progress on IND. It offers a way forward for the IND initiative to focus on (1) drivers of disarmament; (2) historical cases of irreversible disarmament; and (3) building bridges between nuclear possessors and nonpossessors, particularly in the Global South, to better understand concepts of irreversibility and how they can inform multilateral efforts.

Understanding Irreversibility and Its Drivers

The papers in this volume largely reinforce existing scholarship that argues irreversibility should be evaluated as a spectrum. The highest degree of irreversibility means that rearmament would be extremely costly and difficult, but not necessarily impossible, and that states would be reluctant to embark on the endeavor. In a lower degree of irreversibility, however, states might maintain certain capabilities and resources that would make rearmament relatively easy and not incur major financial or political costs. One approach to categorizing the factors that incentivize and sustain irreversible disarmament includes political, societal, legal, military, and technical factors.[5] The conventional wisdom on irreversibility stresses the interrelationship of these factors in incentivizing states to make progress toward sustainable irreversibility.[6] In this series, authors debate how these factors are related and how to prioritize them in a way that enables substantive progress and sustainment of IND.

Authors in this series generally identify some balance of societal, political, and military factors as necessarily preceding technical factors. Santoro argues that technical factors of the IND process, such as the irreversible dismantlement of fissile material production infrastructure, are not achievable without preceding political, societal, and military steps, such as improvement in the security environment. Even after the process of disarmament is complete, states can reduce technical incentives for rearmament, but sustaining irreversibility requires certain political and societal factors.

Other approaches see technical factors as preceding societal, political, and military ones. By showing that the technical task of IND is possible, states can lay the groundwork for subsequent political progress. Additionally, as Davis Gibbons notes, working on technical factors can have bridge-building value in the context of the NPT,

specifically between nuclear weapon states and nonnuclear weapon states. It may also enable progress on disarmament without NPT polarization and political debates bogging down efforts. Spilman argues against both approaches, asserting there is no correct or universally applicable way to sequence factors because their relationship "is neither linear nor cyclical" and their relative importance varies among states.

As this debate highlights, it is unclear what an irreversibly disarmed world or the path to get there looks like. Norms may be a determinate factor; it may be a world in which the utility or acceptability of nuclear weapons comes under question from a moral standpoint, creating widespread pressure to disarm. Alternatively, it may be a world in which states no longer require nuclear weapons because they are in a radically different security environment or because they possess alternative means to ensure their security. In this case, states would voluntarily forego rearmament given decreased military utility or security need for nuclear weapons.

The Role of Confidence and the Issue of Latency

Confidence is a key ingredient to successful IND, as states must feel certain that others have disarmed irreversibly. Verification measures will identify breakouts in a timely manner. As Arguello argues, some scholars contend that mutual trust among states supports this confidence. In a disarmed world, states will trust that others are abiding by their IND commitments. Davis Gibbons argues a normative shift must occur before this confidence can exist. Otherwise, the value of nuclear weapons would remain unchanged, and states would hedge given that the perceived costs of rearmament would be low and the benefits high.

There are challenges to the vision of a disarmed world characterized by trust and confidence. Arms control and disarmament agreements are often violated. And a worsening security environment presents numerous challenges for building trust, if trust must precede cooperation. Nonetheless, the question of whether security precedes trust or vice versa in the context of IND remains unanswered. Several arms control agreements—for example, the Strategic Arms Limitation Talks Interim Agreement (SALT I) and Anti-Ballistic Missile (ABM) Treaty, were implemented and maintained in contexts rife with distrust. But as arsenals shrink, as in the case of IND, the risks of cheating and a state maintaining its nuclear weapons may rise.

A Shared Vision of an Irreversibly Disarmed World

The current international security environment has sparked conversations about the utility of nuclear weapons and raises questions about whether now is the right time to think and talk about IND.[7] Rose Gottemoeller, for example, points to the security environment when arguing for the United States "carrying forward a careful modernization" of nuclear weapons rather than drastically expanding or abandoning them.[8] The Russian invasion of Ukraine renewed debates about the security benefits and deterrent value of nuclear weapons.[9] China, Russia, and North Korea, among others, are expanding their arsenals amid a worsening security environment, a trend seen by many nuclear possessors as motivation for maintaining nuclear weapons.

In this environment, irreversible disarmament might appear to be an unrealistic endeavor. Ogilvie-White highlights in her paper how past IND initiatives failed at times when strategic and political conditions were more conducive to success. This raises the question: If IND efforts failed under better conditions, how could IND succeed in a more complex and tense geopolitical environment? Nonetheless, progress in conceptualizing IND and identifying ways to advance irreversibility can contribute to the health of the NPT overall and play an important bridge-building role between nuclear possessors and nonpossessors alike.

Garnering support may require a shared vision of what an irreversibly disarmed world looks like and what the path toward it might be. Davis Gibbons notes that states may need a shared vision of both the process and intended end state of IND, though this may be difficult and first requires a common definition of IND as a concept. Alternatively, as Arguello posits, states might only need a shared vision of the process, or even just the first steps to kickstart the effort, but not necessarily a shared vision of the end state. However, as Spilman argues, it might also be that a shared vision is impossible or unnecessary since states must operationalize the concept of IND differently.

This paper collection captures the range of views about the importance of a shared vision for IND and is intended to start a wider conversation about the conceptual and practical steps required to pursue irreversibility.

1

A Historical Approach to Irreversible Nuclear Disarmament

By Tanya Ogilvie-White

Much of the current discourse about the irreversible nuclear disarmament (IND) principle ignores its history, treating it as a future-focused legal and technical conundrum that may be divided into two categories: (1) how to make future disarmament steps technically difficult and costly to reverse and (2) how to put in place technical guardrails to prevent breakout in a world free of nuclear weapons.[10] Both questions refer to critically important challenges that deserve serious study, but they fail to address past failures to apply the IND principle; exaggerate the role of military, technical, and economic drivers of disarmament momentum; and underplay the importance of ethical, political, and societal factors.[11]

The principle of IND is neither complicated nor ambiguous.[12] The principle created a clear political commitment when it was included in the 13 practical steps for the systematic and progressive efforts to implement Article VI of the Nuclear Non-Proliferation Treaty (NPT) in the 2000 NPT Review Conference Final Document.[13] State parties agreed that nuclear disarmament, arms control, and other reduction measures, once made, must not be reversed unless replaced by measures that are equivalent or go even further.[14] The principle of irreversibility was to be applied to ensure progress toward nuclear arms control and disarmament would not be undone and future steps would build progressively toward the ultimate goal of eliminating nuclear weapons.

At the time, many considered adoption of the IND principle a major step forward for the nuclear nonproliferation regime. But seasoned experts were more skeptical: they were concerned nuclear weapon states and their allies would reinterpret or simply ignore the commitment. Many of these experts noted that France, the United Kingdom, the United States, Australia, Germany, and Japan had pushed for softer language on irreversibility during 2000 NPT Review Conference negotiations and had succeeded in deleting

the crucial word “all” (which had originally preceded “nuclear disarmament . . . measures”) from the draft text.[15] These early doubts grew as the ambivalence of the new administration under U.S. president George W. Bush toward multilateralism became apparent. The principled international leadership needed to ensure IND would be applied equitably and in good faith was not only missing but heading in the opposite direction, with Washington treating arms control and disarmament treaties and agreements as open to change or replacement.

As early as 2002, disarmament ambassadors warned of the likely consequences of selective or outright nonfulfillment of the IND commitment.[16] With the United States poised to abrogate the Anti-Ballistic Missile (ABM) Treaty despite the recently adopted irreversibility principle, these ambassadors cautioned such action could threaten the mutual reassurance and predictability that arms control treaties are supposed to provide and could reinforce perceptions of double standards in the NPT regime.[17] They were right: not only did abrogation of the ABM Treaty undermine confidence in arms control and disarmament agreements, it caused U.S. adversaries to question the credibility of their own nuclear deterrents, set a precedent for subsequent arms control reversals, recharged arms-racing dynamics in the West, and unleashed new ones into Asia’s arms control void. Twenty years later, much of the arms control architecture lies in ruins, the future of the NPT is in doubt, and IND has lost its meaning except as a distant and abstract goal.

This history highlights that although the principle of IND was adopted by consensus in 2000 and reappeared in the 2010 action plan (and sporadically in NPT documentation since then, including the draft final texts of the delayed 2020 Review Conference[18]), in practice it is selectively applied or ignored. The main problem has been not that the principle itself is unclear or difficult to implement but that the states with the greatest responsibility to apply it have lacked the political will to do so. The root causes of these failures and missed opportunities appear to have been primarily ethical, political, and societal (with the absence of effective international leadership a major factor)—elements of the IND issue that have been mostly neglected in the limited literature and that need to be probed in greater depth.

Revisiting the principle of IND and exploring its application in all its aspects—political, legal, societal, and cultural, as well as military and technical—is a worthwhile exercise. But it could also backfire in the already troubled and divided NPT review process. At worst, the initiative could be criticized as empty virtue signaling or even as a cynical attempt to legitimize the current backsliding on disarmament commitments while the can is kicked further down the road. To prevent this, the initiative must address in depth how and why the principle of irreversibility was derailed 20 years ago despite its adoption by consensus and in a security environment far more conducive to nuclear disarmament than the one nations face today. The initiative must also be framed in a way that makes clear it is not an abstract, future-focused exercise but instead is undertaken to tackle today’s disarmament and security challenges. Finally, even if it is impossible to be inclusive from the outset, the initiative must aim to engage all nuclear-armed states in the dialogue, including the NPT holdouts, and where possible utilize regional forums to facilitate discussion.[19] None of this will be easy in the current international environment, but this dialogue is urgently needed to reinvigorate disarmament momentum.

2

Politics and Irreversible Nuclear Disarmament

By Irma Arguello

Although Article VI of the Nuclear Non-Proliferation Treaty (NPT), which refers to disarmament obligations, does not directly mention the concept of irreversibility, it suggests any disarmament effort should be carried out in such a way as to prevent any rearmament. In principle, complete nuclear disarmament implies elimination of all weapons in the hands of states and their associated capabilities—that is, the comprehensive reduction of risks related to nuclear weapons. The language of Article VI also suggests the need for reliable nuclear disarmament verification, which requires participation not only of the states possessing the weapons but also of other international actors, particularly the nonnuclear weapon states.

Thus, the spirit of Article VI underlies the participation of all state parties in disarmament efforts and, in particular, implies the right and obligation of nonnuclear weapon states to participate, both in substantive negotiations for disarmament as well as in the verification system designed to achieve a "strict and effective international control."[20]

Subsequent developments in the framework of the NPT review process went a step further. They made unequivocally explicit that disarmament must be irreversible, verifiable, and transparent to be understood as such. Irreversibility already appears as the fifth of the 13 practical steps for disarmament (and for arms control and other related efforts) included in the outcome document of the 2000 NPT Review Conference.[21] The 64-point action plan of the 2010 NPT Review Conference also includes, in action 2, transparency, verification, and irreversibility as principles for fulfilling the obligations of the treaty. In turn, action 17 focuses on the irreversible removal of fissile materials no longer required for military purposes.[22]

More recently, the draft final document of the Tenth NPT Review Conference, held in August 2022, reemphasizes

irreversibility as a central factor for fulfilling commitments to Article VI. It also recognizes the need for additional work to ensure irreversibility, first by deepening understanding of the concept and role of irreversibility measures in achieving and sustaining a world free of nuclear weapons. The draft final document, which was not officially approved, illustrated consensus around irreversibility within the framework of the conference, since the reasons the final document was not adopted ultimately had nothing to do with the topic of irreversibility but with objections about the inclusion of points referring to the situation in Ukraine.[23] In parallel with the milestones indicated in the framework of the NPT review process, and especially since 2010, the international community of experts has been active in analyzing the meaning and operationalization of the issue.

Building a Shared Vision of Irreversible Nuclear Disarmament

Arms control and disarmament contribute to a larger objective: integrated reduction of nuclear risks to achieve a safer world. Much as the concept of risk is far from absolute and it does not make sense to speak of zero risk, there is no state of total irreversibility since it is not a binary concept. Bearing this in mind, it is essential to ask what the acceptable threshold for irreversible disarmament efforts is.

International control is an essential part of acceptable irreversibility. Nuclear disarmament verification schemes inside and outside the United Nations—in particular by the UN General Assembly, including the work of the group of governmental experts under A/RES/74/50—should contain political-technical guidelines to determine irreversibility criteria based on unification of standards and shared understanding between states.

Irreversible disarmament is impossible without a clear shared definition of irreversibility. Building it is the first step. The basis of this common understanding should be as close as possible to the intuitive sense of the term used in the treaty and its developments. Without minimizing the importance of building a shared vision of an irreversibly disarmed world, it would be more productive, given the current global context and its future projection, to focus on a shared vision of the gradual process to ultimately achieve irreversible disarmament.[24]

Going deeper, the principle of irreversibility legitimizes any commitment to disarmament and arms control. Without irreversibility, states would vacillate between disarmament and potential successive rearmament at convenience without achieving substantive progress on the path to total disarmament. In the case of nuclear weapons and related technology, states retain the ability to rearm given the endurance of technical knowledge and expertise, even after material products are eliminated. Latency is implicit in irreversibility and should be accepted, even in the long run. Technological knowledge resides in human beings more than in the material objects they produce. However, it is possible to ensure that this latent knowledge is not reflected again in the material world. The question, then, is what conditions will ensure nuclear technology does not materialize again during the disarmament process?

The process will be gradual. It helps to think of arms control measures as intermediate steps along a spectrum to reach the final objective of disarmament. The conclusion is clear: irreversibility is not a binary concept.

Approaches to Irreversible Nuclear Disarmament: The Prevalence of Politics

In terms of irreversibility, politics prevail over legal or technical issues. Reality shows that political will of self-control is as crucial for irreversible nuclear disarmament (IND) as it is for nonproliferation. Although

irreversibility has complex legal and technological edges, politics clearly dictate the required legal framework and technological developments. Both provide a safe path of execution once states perceive favorable political context for disarmament.

In this line of thought, refraining from rearming will also be tied to perceived or actual incentives for political decisionmakers in the states. Here the cost-benefit ratio of rearmament counts as a driver of irreversibility. In other words, the tangible and intangible costs of rearming should significantly outweigh the benefits. Still, the risk of rearmament, like the risk of proliferation, cannot be eliminated since it is unrealistic to assign absolute rationality to decisionmakers.

Operationalizing the concept of irreversible disarmament requires identifying possible steps, considering it a gradual process. Steps include the reduction or elimination of existing stockpiles, dismantlement of weapons, disposition of parts and fissile material, nondevelopment of new nuclear weapons technologies, and dismantlement of infrastructure, to name a few, as well as retaining dual-use equipment and materials to protect the right to peaceful uses of nuclear energy. Regarding the means of launching, those that can be used with conventional loads would be retained. How to carry out these activities in the most efficient way possible falls within the technology field. Of course, disarmament is an inherently gradual process where irreversibility is an intrinsic part of the design for each action.

When discussing an environment conducive to disarmament, especially in the framework of the NPT, state parties generally place greater emphasis on restrictions and controls to reduce proliferation risks related to nonnuclear weapon states. However, concerns tend to be underrated regarding the four nuclear-armed states that are not parties to the treaty and, therefore, are not subject to said rules.

In practice, the level of conflict between legal holders of the treaty adds to the risk from the nuclear-armed states outside of it, raises the level of strategic instability, and reinforces the appetite to maintain arms. In this sense, it is impossible to think of IND, which implies a growing level of confidence among the holders, without encompassing all nuclear-armed states. Therefore, contexts more inclusive than the one provided by the NPT are required. In global terms, one potential proposal is the promotion of a UN General Assembly resolution showing the international community's will to advance the understanding and operationalization of the irreversibility concept by establishing, for example, a working group to define the foundation for a shared understanding of irreversibility.

Likewise, the debate on irreversibility should have a strong presence in all ongoing nuclear disarmament verification projects, such as the International Partnership for Nuclear Disarmament Verification (IPNDV), the Creating an Environment for Nuclear Disarmament (CEND) initiative, the Verification Research, Training and Information Centre (VERTIC), and others that may appear in the future. Such projects should also feed into the work of the established UN General Assembly Group of Governmental Experts on Nuclear Disarmament Verification. The goal would be to add simple descriptive outlines about irreversibility to each previously agreed step of the disarmament process and unify these concepts and efforts in an inclusive, practical, and coordinated manner.

Irreversibility Here and Now

A pertinent question is the relevance and timeliness of these analyses in a political moment of high global insecurity, a context in which the nuclear-armed states are modernizing their arsenals, and some are even betting on increasing them in number and devastating power. It is evident that the prevailing international

context in 2000 or 2010, when the aforementioned relevant milestones emerged, differs significantly from the present situation.

The year 2022 was particularly contradictory regarding nuclear powers' strategic consideration of nuclear weapons, at least in terms of the narrative and its communication to the international community. The year began with the positive joint declaration in January by the five possessors of legal nuclear weapons under the NPT: the United States, the Russian Federation, China, the United Kingdom, and France, which jointly issued a declaration in the style of U.S. president Ronald Reagan and Soviet leader Mikhail Gorbachev in 1985, in which they affirmed "a nuclear war cannot be won and must never be fought."[25] However, a few days later came the Russian invasion of Ukraine and the consequent violation of the security guarantees offered to Ukraine when it handed over its nuclear arsenal within the framework of the Budapest Memorandum of 1994. Threatening rhetoric about the possible use of nuclear weapons further complicates this conflict. Moreover, tensions between the West and China centered in Taiwan also play their part in the complex security environment.

Even so, arguments in favor of furthering these analyses are compelling, given that in times of great crisis, such as now, efforts to carry out fundamental international commitments that act as pillars of the global order should not be abandoned. It is about not giving up in advance, which has granted the world a certain degree of strategic stability. Otherwise, chaos arises, and the path toward a lawless world accelerates. More specifically, it is about working to strengthen international instruments and enrich them in content and meaning so they are capable and flexible enough in times of crisis.

Recommendations

Irreversibility is not an end but an attribute of effective disarmament or arms control. If the concept of irreversibility is not realistic in a given context, it is because disarmament is not realistic in such a context.

As the issue may give room to complex theoretical speculations, efforts to work on irreversibility require a focus on simplicity and realism. Such work should take advantage of the intuitive concept of complete and irreversible disarmament that inspired the NPT and its developments. However, delving into the concept of irreversibility must go beyond the exclusive framework of the NPT, as the necessary shared vision and further commitments about IND must reach all possessors of nuclear arsenals, whether or not they are parties to the treaty.

In the present state of international affairs, debates about irreversibility in a disarmed world do not help move the issue forward; instead, keeping the issue alive requires focusing on possible starting points for multilateral work.[26]

Developing a shared vision and broad participation of nonnuclear weapon states is essential to transit the process toward irreversible disarmament. The incentives for disarmament must be multidimensional. The prevalence of the political factor is unquestionable compared to the legal and technical elements that support it. In this framework, the political will applied to disarmament is essential. It should be treated as a factor dependent on a more or less rational reading of the international context and other motivations or objectives of the leaders and their circles.

Finally, to reinforce the concepts developed here, the analysis will be more fruitful if it sticks as closely as possible to reality. Priority should be given to issues that improve the possibility of progress in the short and medium terms.

3

A Shared Vision for Irreversible Nuclear Disarmament

By David Santoro

When thinking about an irreversibly nuclear-disarmed world, basic project management principles come in handy. These principles generally tell us that a clear vision is essential to the success of any project because a vision helps give direction, set goals and priorities, and anticipate problems before they arise. Further, that vision must be shared by all or most of the concerned parties, at least in its broadest sense. In other words, and quite logically, the future a project seeks to create must have the backing of those involved in the project.

A strategy to bring the project to life typically stems from a vision. Unlike that vision, however, the strategy need not be comprehensive or set in stone (or even widely shared among project participants), especially for complex projects that must be implemented in multiple phases and over long periods. That is because key milestones, technical and legal details, and sometimes even concerned parties will likely change. Therefore, flexibility is of the essence. Agreement on the first steps is generally sufficient.

The implication of this approach for the initiative on irreversible nuclear disarmament (IND), therefore, is that states need a shared vision of an irreversibly nuclear-disarmed world if the project is to make any real or tangible progress. Yet states do not need a comprehensive (or even shared) strategy to get there; rather, the shared vision can help generate ideas on how to jump-start and advance the initiative. At the most general level, these ideas require proper balancing between strategic and political factors, on the one hand, and technical and legal aspects, on the other.

Developing a Shared Vision

Developing a shared vision of an irreversibly nuclear-disarmed world begins with clarity on definitions. A literal understanding of an irreversibly disarmed world suggests that reversing to a nuclear-armed world would not be an option. It implies, in other words, that nuclear rearmament would be impossible.

Embracing the concept of irreversibility in a literal sense presents numerous challenges because, for now, it is unrealistic to expect that nuclear rearmament is preventable. In a fully disarmed world, there would always be risk of one or several states rearming. As Mohamed ElBaradei, the former head of the International Atomic Energy Agency (IAEA), explained over a decade ago, nuclear technology is now "out of the tube"; therefore, the risks that some will use that technology for weapons remains.[27] A nuclear-disarmed world would likely always be, at least in theory, reversible.

A different understanding of irreversible disarmament is thus necessary, one that focuses on the difficulty of reversal as opposed to its impossibility. By that definition, irreversible disarmament means that the costs and risks of rearmament would be extremely high but not out of reach. Disarmament would then be conceptualized less as an end state and more as a process whereby states implement measures or create a regime that make it more (or less) difficult to reverse to a nuclear-armed world after they have abandoned nuclear weapons. Depending on the strength of the measures or regime in place, a disarmed world would become more or less (ir)reversible, as it would be more or less costly and risky for states to change course and rearm.

Such an understanding of irreversible disarmament is more realistic and thus more likely to receive broad support from states. Few states would rally behind the promise of a permanently locked-in disarmed world because they would consider it unrealistic.

Competing Approaches to Irreversible Nuclear Disarmament

The next question is how to move toward an irreversibly disarmed world. By all accounts, the best way to begin doing so is by creating the strategic and political conditions. In other words, a sound strategy entails evaluating various approaches to deliver the irreversibility project.

If there is fertile strategic and political ground for IND, progress will take place naturally, and most other problems—notably technical and legal issues—will resolve themselves. There are several historical examples backing this argument. For example, progress toward disarmament was virtually impossible during the Cold War, but after it ended, the situation changed almost overnight. In the words of Richard Paulsen, "The nuclear arms race did an about-face in 1991 and became a disarmament race."[28] Despite important technical and legal challenges, much was achieved because the security environment improved and was optimal for disarmament.

Without the necessary strategic and political circumstances, however, states might well endorse the idea of an irreversibly disarmed world but be unable and unwilling to set in motion a process to get there. No matter how much they believe in the potential benefits of such a world, the difficult problems posed by a harsh security environment make progress impossible. That is because they have a responsibility to address these problems, including by taking actions that run sometimes directly against disarmament. That is a familiar dilemma, which Max Weber described as one between the "ethic of conviction" (deep-seated belief in the good that a particular course of action or outcome would bring) and the "ethic of responsibility" (duty to deal with present and looming problems).[29]

There are alternative frameworks for thinking about an irreversibly disarmed world. Some say that developing a vision is unnecessary because the benefits of such a world are obvious to almost every country, except the very few with nuclear weapons. That approach typically advocates building pressure on nuclear-armed states to give up their arsenals. For instance, Beatrice Fihn, former executive director of the International Campaign to Abolish Nuclear Weapons, has campaigned for the conclusion of the Treaty on the Prohibition of Nuclear Weapons on the argument that such a treaty "will make it more difficult for nuclear-armed states to continue to justify possessing and planning to use nuclear weapons."[30]

Others say that banking on a shared vision of an irreversibly disarmed world is simply too ambitious. They say that vague agreement on the disarmament goal is the best states can hope for and that muddling through—solving problems as they arise and as conditions allow—is the only way to go. As one analyst has put it, "Given the complexity and fluidity of the underlying dynamics, grand 'uber-solutions' are destined to fail."[31] If getting to a fully disarmed world is a priority, then it is pointless to think about how the world can or should look because full disarmament is a distant prospect that will look considerably different when and if states are in a position to abandon nuclear weapons.

The problem with these approaches is that without a clear and shared vision, the disarmament project risks going nowhere and could very well collapse under its own weight. Even more worryingly, it could bring down entire nonproliferation and nuclear security regimes with it. While many countries already believe that disarmament is necessary, others are equally convinced they need nuclear weapons. No amount of pressure has worked to change this mindset, so simply applying more pressure is unlikely to work.

Similarly, lack of clarity about the disarmament goal and a hope-for-the-best approach are a recipe for disaster. One case in point is the lack of an articulated disarmament vision after the conclusion of the Nuclear Non-Proliferation Treaty (NPT) in 1968, which called for cessation of the nuclear arms race, nuclear disarmament, and even general and complete disarmament. While some nuclear-armed states have since conducted important nuclear reductions, the world today is far from free of nuclear weapons and, at the moment, going in the opposite direction.

Those who wish to see an irreversibly disarmed world must therefore have a clear vision with a large and growing support base.

Meanwhile, others push back against the idea that moving toward an irreversibly disarmed world must begin with creating the strategic and political conditions. They argue these conditions might never emerge and that it is best to focus on making such a world technically and legally possible. They say, in other words, that technical and legal factors should come first and strategic and political issues second, as addressing technical and legal issues will make strategic and political problems almost moot. The logic is simple: if there is a technical and legal pathway to disarmament, then there is no real need to worry about creating the "right" strategic and political conditions. As three analysts have put it, even though more technical work is needed, "existing solutions might be sufficient to enable several near-term disarmament steps and to lay the foundations for a comprehensive nuclear disarmament verification regime."[32]

To be sure, a considerable amount of work can be done to identify the technical and legal requirements of an irreversibly disarmed world, and emerging technologies offer important opportunities (and challenges) in this regard.[33] If evidence surfaces that implementing these requirements is well within reach and that an irreversibly disarmed world may thus safely emerge, then surely some states would conclude that it is the right thing to do.

Yet many, if not most, are unlikely to be convinced because technical and legal fixes alone rarely solve strategic and political problems. In the business world, investors do not bet on a new project solely based on its feasibility and viability; the starting point is always a project's desirability. Much as investors want to make sure that market conditions are right for success, those advocating an irreversibly disarmed world must help create the right conditions to reach their goal—that is, resolve the strategic and political issues that stand in their way.

Recommendations

What, then, does it mean to create the strategic and political conditions for disarmament? What precisely would need to happen? A comprehensive list is beyond the scope of this essay, but there are a few obvious developments that deserve mention.

Because much of the international system is dominated by major power competition, stabilizing that competition would be essential, especially interactions between the United States, Russia, and China. Strategic competition, plainly, would have to decrease significantly and eventually give way to cooperative (or at least nonconfrontational) forms of engagement between these three countries. Resolving the conflicts in South Asia, the Korean Peninsula, and the Middle East would also be paramount. Another important requirement would be thorough implementation of the highest standards of nonproliferation and nuclear security globally.

These developments would, in effect, create the conditions for an irreversibly disarmed world. They would further expedite the technical and legal challenges associated with making that world a reality, so states would agree more readily to transparency and intrusive inspections on their relevant activities mandated by formal arrangements. They would do so both as they disarm and after they have abandoned nuclear weapons completely. For that matter, because getting to an irreversibly disarmed world would require numerous arrangements, these arrangements would eventually take a life of their own and likely withstand, to some extent, a downturn in the strategic and political landscape.

Over a decade ago, Lawrence Freedman argued for a "new theory of nuclear disarmament."[34] Many are still actively searching for that theory today, and ideas abound. No theory is likely to pay dividends, however, if it is not based on a broadly shared vision of what an irreversibly disarmed world can and should look like. Making progress toward that vision must also likely begin with creating the strategic and political conditions for that world, though addressing technical and legal issues in the background can help as well. Anything short of that is unlikely to lead anywhere.

4

Norms versus Security Approaches to Irreversible Nuclear Disarmament

By Rebecca Davis Gibbons

Irreversible nuclear disarmament (IND) is a forward-looking initiative based on the idea that all states in the international system could reject the possession of nuclear weapons at some point in the future. Though difficult to imagine while the Russian Federation is issuing nuclear threats in its "special military operation" in Ukraine, leaders must be able to envision nuclear disarmament before it can occur.[35] Governments and individuals must consider how this future could come about and plan for the organizational, technical, and legal requirements necessary for states to have confidence that others are maintaining their commitment not to build or maintain nuclear weapons. The following think piece contributes to the process of imagining a future without nuclear weapons by responding to two questions: Do states need a shared vision of an irreversibly disarmed world? What are alternate frameworks for thinking about IND?

Defining Irreversible Nuclear Disarmament—a Shared Vision?

Developing an agreed-upon vision or definition of IND is important for the irreversibility initiative to make progress. In several previous cases, complicated concepts within international politics have resulted in extended definitional debates, stymying practical efforts. Sometimes these debates occur because parties have fundamental disagreements about the concepts due to different interests and perspectives. For example, the United Nations still does not have an official definition of terrorism because of political disagreements over actions constituting terrorism and actors defined as terrorists.[36] In other cases, lengthy debates over definitions–whether warranted or not–appear to some participants as a stalling strategy. Efforts by some states and activists to establish a global ban on lethal autonomous weapons has become bogged down in debates over the definition of these capabilities.[37] For many, the difficulty of agreeing on how to define this

concept after years of meetings appears to be a mechanism for certain powerful states to delay establishing any normative ban on this technology.

Based on these examples, it would behoove those leading the effort to begin an international dialogue on irreversibility—Norway and the United Kingdom—to establish a baseline consensus definition within a specified time frame.[38] The goal should be to make the definition as specific as possible within the allotted time. Finding consensus on a definition of irreversibility should be made easier because it need not be conceptualized in absolute terms. Unlike terrorism and lethal autonomous weapons, irreversibility is not a binary concept. Instead, irreversibility should be conceptualized as a spectrum depending on how quickly or easily nuclear rearmament could occur.[39] For instance, on one end of the spectrum is a world in which former nuclear-armed states dismantle their weapons but maintain stores of enriched uranium and plutonium and keep nuclear facilities "warm" so they can easily come on line to manufacture nuclear warheads in an uncertain future. On the other end of the spectrum, existing nuclear stockpiles are dismantled, enriched uranium is down-blended, plutonium is disposed of (admittedly a very difficult challenge), and facilities for building nuclear weapons are razed.

Nuclear weapons knowledge would remain across this notional spectrum, but a higher level of irreversibility means rebuilding a nuclear weapons program would take more time and incur more costs to the proliferator. In other words, irreversibility may be defined by the length of time to build a bomb were a state to reverse its disarmament decision. In definitional discussions about IND, the parties could spend their time considering various factors that would lengthen or shorten this timeline. In this way, irreversibility is similar to nuclear latency, which is rarely defined explicitly in academic literature but may be defined as "the possession of some or all of the technologies, facilities, materials, expertise (including tacit knowledge), resources, and other capabilities needed to develop nuclear weapons, short of full operational weaponization."[40] High irreversibility means a very low level of nuclear latency among states. This logic is similar to that of the original Joint Comprehensive Plan of Action (or the Iran deal), in which the parties of the agreement sought to ensure the international community would have a year's time to act if the Iranian government decided to build nuclear weapons. One goal of pursuing irreversibility should be to make this timeline longer so other states have warning if a state were to change its policy. Ideally, other states could detect this change in posture regarding nuclear weapons through monitoring, inspections, and intelligence collection.

Without establishing a shared definition or vision of irreversibility early on, progress will be stalled as different factions spend excessive (and precious) time debating a more or less narrow definition of this concept. Some factions may use this time to delay progress. Whether proponents, skeptics, or somewhere in between, parties involved in creating a plan for IND will benefit from the exercise of establishing a definition or vision. A shared definition matters because at present, the idea of IND likely implies different end states to different communities. One could imagine that nuclear ban proponents seek a more enduring state of irreversibility. In contrast, in *A Skeptic's Case for Disarmament* (2010), Michael O'Hanlon argues that in a world of zero nuclear weapons, states would want to be able to reassemble nuclear weapons in a relatively short amount of time to counter potential future threats. He argues that existing nuclear weapon states would agree to disarmament only if relatively straightforward rearmament were part of the equation.[41] These two positions appear incompatible, but by beginning with a discussion of why parties want to pursue irreversible disarmament and considering the definition as existing on a spectrum, there may be a way to move forward on political, legal, and technical tasks without becoming endlessly mired in definitional debates. In other words, the parties may not agree at first to the ideal level of latency in a future disarmed world, but they may be able to agree on defining IND as a spectrum based on specific factors that increase or decrease nuclear latency among states.

Competing Approaches to Irreversible Nuclear Disarmament

Theoretical paradigms within international relations offer different frameworks for thinking about how IND may come about in the future. For simplicity's sake, the following section offers two potential paths to nuclear disarmament, one suggested by realist thinking and another by constructivist or normative ideas.

A traditional realist perspective would predict that because distrust and conflict are persistent and pervasive in an anarchic international system, states would be reluctant to eliminate weapons they perceive as providing existential security to themselves and their allies. According to this paradigm, IND would only be achieved if some type of nonnuclear weapon were deemed preferable to nuclear weapons by state leaders and military establishments or if nuclear weapons were no longer deemed useable and therefore unfit for a credible deterrent posture. Perhaps precise and prompt conventional weapons could eventually become favored as they are seen as more useable. Because these weapons are more discriminate and do not result in lasting environmental damage, the threat of their use is more credible. This idea is consistent with Heather Williams's replacement theory of nuclear disarmament: nuclear weapons will be maintained until something perceived as better comes along.[42]

A realist perspective would also suggest that a process of nuclear reductions requires great power leadership, especially from the United States and China. These powers would have to see IND as in their interest and may have to find ways to persuade other nuclear-armed states to participate in their disarmament plans. It is not difficult to imagine at least one great power seeing global nuclear disarmament as in its interest. For example, after the Cold War, some argued the United States should pursue nuclear disarmament for strategic reasons. Washington maintained superior conventional capabilities and therefore would have a military advantage in a nuclear weapons-free world. Agreement among the current great powers to pursue nuclear disarmament in the near term is difficult to imagine given current geopolitical tensions and the disparity in conventional capabilities. Since Russia's attack on Ukraine and the poor showing of its military campaign to date, Russia will likely rely more on its nuclear arsenal in the near term, both for its deterrent value and for its symbolic value.

With its emphasis on norms, ideas, and identities, a constructivist perspective offers a different path to IND. In this paradigm, nuclear disarmament could come about through the changing of global norms and ideas about the appropriateness of any state or political entity possessing nuclear weapons. A norm of nuclear nonpossession, were it to become entrenched in the public, could lead to pressure on leaders in nuclear-armed states to look for ways to reduce or eliminate these weapons. This model is exemplified by the humanitarian initiative in the early 2010s, which eventually led to the negotiation of the Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2017. By emphasizing the negative effects of creating, testing, and maintaining these weapons on bodies, communities, and the environment, the campaign promoted the idea that these weapons should not exist. More widespread knowledge of the devastating humanitarian effects of nuclear weapons may also contribute to reducing their symbolic value as totems of power, prestige, and technical achievement.

Like the realist pathway, the norm of nonpossession appears unlikely to take hold widely in the near term. Nuclear weapons have very low salience among the general public, even with Russian president Vladimir Putin's widely reported veiled and overt nuclear threats since February 2022. For this norm to become more widespread, activists will need to do more to gain the public's attention.

The achievement of IND is more likely to occur and more likely to persist if both the realist and normative mechanisms of change occur. These two pathways may be self-reinforcing in the sense that a growing norm

against possession may make these weapons appear less useful militarily as the threat of their use becomes incredible. IND may not be a permanent condition, but if these weapons are rejected on military and normative grounds, then it is likely to be more sustainable. If the weapons are still widely seen as useful or symbolic of prestige at the time of disarmament, then it is harder to imagine IND will be sustainable.

Regardless of the strength of the global rejection of nuclear weapons in the process of achieving IND, states will likely want to have a robust monitoring and verification system to ensure no state is using nuclear material to build nuclear weapons secretly. Even if states are confident in the wholesale rejection of nuclear weapons globally, circumstances change, and an inspection and monitoring system will increase confidence that other states are in fact remaining free of nuclear weapons. The paradigm of neoliberal institutionalism offers insights into how this regime should be codified in terms of transparency, communication, and monitoring. There could be a global monitoring agency, such as the International Atomic Energy Agency (IAEA), or a series of regional agreements and agencies. While the future former nuclear states are likely to seek a strong monitoring regime, it should be noted most states in the international system are in nuclear-weapon-free zones and do not rely on more than existing IAEA safeguard agreements to monitor compliance.

Recommendations

In addition to developing institutions and protocols for nuclear disarmament agreements, engineers and scientists around the world will need to continue pursuing technical solutions to nuclear disarmament verification. Some may argue that solving technical verification challenges is the most important step at this early stage and that once states have confidence in verification and detection technology, they will be willing to pursue nuclear disarmament. While technological solutions are important, political will is a greater obstacle at this time. Tackling technical challenges could be an important bridge-building activity between nuclear and nonnuclear states (such as the UK-Norway initiative), but technical solutions alone are unlikely to bring states to the table; they require normative pressure or a sense that nuclear weapons have lost their military utility.

In leading the humanitarian initiative and negotiating the TPNW, several nonnuclear states made the argument that discussions over the future of nuclear weapons do not belong exclusively to the nuclear-armed states. Because of the dangers of nuclear detonations, including the long-term harm to the earth and the possibility of radiation spreading across borders, all people have a right to influence the debate over nuclear weapons, and thus nonnuclear states should be involved. That said, practically, extant nuclear weapon states would need to engage in a negotiation process to significantly reduce their weapons over time before a universal IND regime is created. However, work can occur simultaneously, as it is with this IND initiative, with all interested states or a representative group of states beginning the discussion of a notional IND monitoring regime. To the extent possible, the nuclear-armed states should acknowledge that these weapons have widespread effects, and they should invite nonnuclear states to participate. They will need to buy into the IND system just as the current nuclear weapon states must.

5

Necessary but Not Sufficient

Political, Legal, and Technical Factors for Irreversible Nuclear Disarmament

By Alice Spilman

It is not controversial to say that nuclear weapons cannot be uninvented.[43] The technological know-how to build nuclear weapons will always be within the reach of humankind. The task of the irreversible nuclear disarmament (IND) initiative, therefore, is to make it difficult and unappealing for states to reverse disarmament.[44] However, both disarmament and the concept of irreversibility are understudied. There is no shared vision for an irreversibly disarmed world, let alone agreement between actors on how to achieve or sustain it. Frameworks for thinking about IND acknowledge that technical, legal, political, and other factors will play a role, but little work has been done on how these factors interact at different stages in the process of getting to and maintaining an irreversibly disarmed world.[45] This is one of the reasons it is difficult to conceptualize paths to an irreversibly disarmed world.

This think piece contributes to the conversation on IND by positing three arguments concerning the relationship between technical, legal, political, and societal factors of irreversibility, the possibility of a shared vision for IND, and future thinking about IND. First, disarmament and the concept of irreversibility cannot be considered separately because of path dependencies. Second, technical, legal, political, and societal measures are all necessary but not sufficient conditions for irreversibility and deserve equal attention. Third, a shared vision of an irreversibly disarmed world is not possible because states will operationalize irreversibility measures differently depending on their relationship to nuclear weapons. The paper first unpacks the concept and understanding of irreversibility before unpacking each of these arguments.

Defining Irreversible Nuclear Disarmament—a Shared Vision?

In this piece, disarmament is understood as the process of reducing and subsequently eliminating nuclear

weapons, a process that involves both the physical dismantlement of nuclear weapons and a renunciation of those weapons (a technical and a political element).[46] A state may be said to have disarmed when it has publicly renounced these weapons and dismantled their stockpile. Understood as such, the process of disarmament has an end point—a world free of nuclear weapons. Meanwhile, irreversibility may be broadly conceived of as a set of measures, steps, and conditions that increase the likelihood a state will not rearm. These measures serve to sustain a world free of nuclear weapons, but unlike the process of disarmament, there is no end point. It is not possible to get to a state of 100 percent confidence that disarmament will never be reversed. Making disarmament irreversible, therefore, is a continuous and iterative effort. This definition of irreversibility differs slightly from that offered by David Cliff, Hassan Elbahtimy, and Andreas Persbo and Ian Anthony, who refer to the costs and difficulties of rearmament.[47] The language of costs and difficulties implies that measures to ensure irreversibility serve only to disincentivize states from rearming, ignoring the role incentives may play in encouraging restraint. Both carrots and sticks can serve to increase confidence that a state will not rearm.

As there is no end state of an irreversibly disarmed world, irreversibility may be viewed as a spectrum. For example, Cliff et al. present the technical aspects of irreversibility across a spectrum of the physical costs and difficulties of rearmament.[48] At the lower end of the spectrum, a state may be considered unarmed if it has dismantled all nuclear explosive devices but maintained production capabilities. At the upper end of the spectrum, a state may be considered disarmed if it has dismantled all nuclear explosive devices and given up production and delivery capabilities. For those at the upper end of the spectrum, the costs and difficulties of rearming are prohibitively high.

This paper shares the belief that irreversibility should be conceived of as a spectrum, but the spectrum should be expanded in two ways. Firstly, irreversibility is inextricably linked to, and dependent on, the process of disarmament, and the spectrum should reflect this. Prominent works such as those by Cliff et al. and Anthony discuss irreversibility as though disarmament has already taken place, but this creates a false sense that there are clear markers between a disarmed world and an irreversibly disarmed world. Instead, this paper argues that irreversibility cannot be studied independently of the process of disarmament because there is no binary distinction between a disarmed world and an irreversibly disarmed world. The IND spectrum would therefore encapsulate the movement from armed to unarmed to disarmed. Secondly, the spectrum should be expanded to include political, legal, and societal measures that increase the costs of rearmament and positive measures that incentivize restraint. The logic therefore goes that the more measures in place, the higher the degree of irreversibility.

Given the above claim, this paper argues that a singular detailed vision of an irreversibly disarmed world is neither necessary nor possible. While state representatives may agree on a broad conceptualization of irreversibility, the way in which it is operationalized will be different for each state. The differences will depend on several factors, such as the size of the nuclear weapons complex, the embeddedness of nuclear weapons within the nation-state, the status of nuclear energy, the governing system within the state, and so on.

Instead of attempting to develop a shared vision, states should focus on operationalizing the concept of irreversibility. State leaders might consider what irreversibility measures are needed through a form of critical introspection, but they also might consider measures other actors could implement to increase their confidence that disarmament will not be reversed. If numerous states engage in this exercise, these individual visions could be shared among relevant actors to form multiple shared visions for an irreversibly disarmed world. This could provide state representatives an opportunity to discover divergences and convergences in their approaches to irreversibility.

Competing Approaches to Irreversible Nuclear Disarmament

What do irreversibility measures look like? As mentioned, one approach to thinking about irreversibility is to examine the technical, political, legal, and societal aspects.[49] However, within this approach is a tendency to prioritize the technical aspects of irreversibility that increase the time and difficulty of rearmament at the expense of the political, legal, and societal aspects. Technical measures begin with the dismantlement of warheads and "move toward the complete abandonment of all nuclear infrastructure."[50] They may include ceasing production of all fissile material for weapons uses, destruction of warhead pits, destruction of all stocks of highly enriched uranium and plutonium (placed under monitoring while awaiting destruction), and the elimination of all nuclear facilities.[51] These measures are distinct from (but often conflated with) verification, which is a tool "to provide assurances that certain steps have been taken as declared."[52] Verification efforts have increased in recent years with the establishment of the International Partnership for Nuclear Disarmament Verification (IPNDV), designed to develop potential procedures and technologies to address verification challenges.[53] Many believe the development and testing of verification methods now will encourage reductions in nuclear arsenals in the future because verification will enable greater confidence in dismantlement.[54] Irreversibility, however, concerns more than just the dismantling of weapons. To achieve a higher degree of irreversibility, political, legal, and societal measures are required.

Increasing costs and creating incentives across political, legal, and societal dimensions increase confidence that a state will not rearm. Political irreversibility measures may involve commitments such as, but not limited to, nonconditional renunciation of nuclear weapons, denouncement of nuclear deterrence, commitment to conventional and nonkinetic forms of deterrence, and engaging in bilateral/multilateral meetings on irreversibility.[55] Legal irreversibility measures can center around international law, such as a nuclear weapons possession ban and bilateral or multilateral treaties committing to cooperative irreversibility measures, or domestic law, such as criminalization of involvement in nuclear weapons programs.[56] The societal dimension of irreversibility differs slightly in that it involves slow and incremental change among domestic and global populations rather than recognizable commitments or tangible changes. However, this societal transformation is vital for sustaining nuclear disarmament. Societal change could include the decoupling of weapons and great power status, decoupling of weapons and national identity, and development of domestic or international norms condemning "hostage holding" through nuclear deterrence, all of which would serve to make national possession of nuclear weapons less popular.[57] The mechanism behind these changes will likely be education on nuclear risks and the success of grassroots movements such as the International Campaign to Abolish Nuclear Weapons (ICAN) and the Campaign for Nuclear Disarmament (CND).

Getting to and maintaining a nuclear-disarmed world require some combination of these measures. This paper argues that technical, legal, political, and societal measures are all necessary but not sufficient conditions for irreversibility. These four dimensions of irreversibility are interconnected. However, it is impossible to sequence out their relationship because it is neither linear nor cyclical. For example, disarmament requires a political commitment that precedes and underpins any technical dismantlement or negotiation of a legal instrument; before action can be taken, commitment to action is required. The lack of political will (usually driven by the security environment) is often to blame for inaction on disarmament. Moreover, a legal commitment can serve to reinforce and further legitimize a political commitment, but what leads to this political commitment? It may be that political commitment requires societal change first either through domestic or international pressure to give up nuclear weapons.[58] Perhaps the advocates of verification are correct in assuming adequate verification techniques might encourage a political commitment to disarmament. The point is that it is impossible to theorize a route to disarmament or a set of measures of irreversibility that are universally applicable.

Recommendations

The absence of a clear linear or cyclical relationship between political, societal, legal, and technical factors and the individual nature of the process of disarmament are two reasons why it is difficult to conceptualize paths to an irreversibly disarmed world. The fact that "irreversibility" is a misnomer and a largely understudied area compounds this challenge. This paper encourages further thinking on the concept of IND by positing three arguments, all of which require further exploration. Precisely because the international political and security environment is fraught right now, this paper does not end with a call for more multilateral conversations on IND. Rather, researchers, as well as state representatives and practitioners, should undertake the task of operationalizing the technical, political, legal, and societal measures at each stage across the irreversibility spectrum.

Conclusion

By Joseph Rodgers

The irreversible nuclear disarmament (IND) initiative will likely feature prominently in the 2026 Nuclear Non-Proliferation Treaty (NPT) review cycle. Support is building for the initiative as a bridge-building measure between nuclear weapon states and nonnuclear weapon state parties to the treaty.

Today, the NPT desperately needs bridge building. The failed 2015 and 2022 NPT Review Conferences have created unease among the nonproliferation community. Russian nuclear provocations in Ukraine have unraveled international forums and undermined a 70-year taboo of nuclear nonuse. While nuclear weapon states pursue nuclear weapons modernization, a growing number of nonnuclear weapon states are supporting and ratifying the Treaty on the Prohibition of Nuclear Weapons (TPNW).

The IND initiative is not a panacea nor is it a substitute for disarmament. This initiative will not solve all the difficult challenges that face the 2026 NPT review cycle. However, if IND is executed correctly, this initiative can demonstrate good-faith efforts by nuclear and nonnuclear weapon states alike to work toward a world free of nuclear weapons and the fulfillment of Article VI of the NPT. The initiative builds on a legacy of NPT work. For decades, numerous NPT documents have called on states to pursue IND. IND can work from a starting point created by several other initiatives, such as the International Partnership on Nuclear Disarmament Verification (IPDNV), Quad Nuclear Verification Partnership, and Creating an Environment for Nuclear Disarmament (CEND) initiative.

Despite the long history of irreversibility in the context of the NPT, this paper collection demonstrates that flushing out the concept of irreversibility in the context of nuclear disarmament reveals deep and enduring technical, legal, and political challenges. This initiative should convene a diverse set of experts to work toward scoping these problems and developing some initial solutions. To unpack these questions, this conclusion explores what should be done, when specific actions should be taken, and how the initiative can be successful.

Agreeing without Shared Agreement—the "What" Question

As the papers in this collection demonstrate, there is general recognition that irreversibility in nuclear disarmament has no shared vision despite decades of agreed international references and commitments to irreversibility. All understandings of irreversibility recognize that true irreversibility is impossible because nuclear weapons knowledge remains. As Rebecca Davis Gibbons's piece makes clear, nuclear irreversibility may be said to exist on a scale or spectrum ranging from intense nuclear hedging or low degrees of nuclear latency. The IND initiative should seek to elucidate these different understandings and characterize the requirements needed to achieve varying levels of irreversibility.

Getting bogged down in specific definitional debates may be counterproductive if the discussion never moves beyond terminology. Just as the NPT never defines a nuclear weapon, it may be possible to make substantial headway in the IND initiative without a specific shared definition or vision of the end state. However, it may be more important for NPT member states and participants of the IND initiative to have a shared vision of the path to progress toward irreversibility.

While the 64-point action plan from the 2010 NPT Review Conference and the 13 practical steps toward nuclear disarmament from the 2010 Review Conference lay out a series of goals to get closer to nuclear disarmament, many of these goals pose significant and intractable diplomatic challenges.[59] For instance, the international community is far from making progress on a fissile material cutoff treaty or from the entry into force of the Comprehensive Nuclear-Test-Ban Treaty.[60] Rather than hash out previously agreed-upon goals, the IND initiative should take a clear-eyed look at previous commitments and assess what can be done in the near term and what needs to be done in the long term to progress toward irreversibility.

The Journey or the Destination—the "When" Question

It is generally understood that arms control and progress toward nuclear disarmament are a stabilizing factor in international relations. Despite this, negotiating nuclear arms reductions is very difficult between adversaries engaged in strategic competition. This results in a chicken-or-the-egg paradox: Does progress on nuclear arms reductions enable shared security or require it?

David Santoro notes that meaningful progress on irreversibility may require some degree of nonconfrontational cooperation between China, Russia, and the United States. Many observers have noted that Russian actions in Ukraine, heightened nuclear rhetoric, and horizontal and vertical proliferation have filled the nuclear landscape with bleak prospects for progress on nuclear arms control.

Despite this, arms control negotiations have occasionally occurred during or in the immediate aftermath of tense geopolitical competition. For instance, U.S. president John F. Kennedy and Soviet premier Nikita Khrushchev negotiated the Limited Nuclear Test Ban Treaty in 1963, just months after the Cuban missile crisis. There is no universal answer to this security and stability paradox, and further progress toward nuclear disarmament will likely occur during both intense periods of competition and intermittent spans of cooperation.

While there may be no universally agreed timelines for when specific actions toward nuclear disarmament must be taken, it is never too early to discuss and seek a greater understanding of the goals, requirements, challenges, and opportunities posed by irreversibility.

The Path Forward—the "How" Question

The IND initiative will likely be a prominent feature of discussions on Article VI during the 2026 NPT review cycle. To best prepare for these discussions, NPT member states that are interested in furthering the IND initiative should work together to establish a series of track 1.5 working groups that meet on the edges of the NPT review process to identify and discuss three key research areas—political, technical, and legal challenges to the concept of irreversibility. These working groups should pull from historical examples and cases of disarmament and technical and scientific progress on verification to help scope and understand the challenges that IND faces.

While establishing these working groups, it is crucial to capture a diversity of views and geographic backgrounds. Tanya Ogilvie-White's contribution to this compilation notes that IND should aim to involve all nuclear-armed states, including those outside of the NPT if possible. These IND working groups should seek experts in nuclear disarmament and nuclear deterrence theory. A clash of diverse ideas is the best and perhaps only way to ensure recommendations from the IND initiative are meaningful and sincere.

This paper compilation has revealed a range of views about what IND means and what the end state of IND looks like. But several questions about the end state remain: Does this end state exist because the security environment has fundamentally changed and the nature of strategic competition has altered to the point that nuclear weapons and the threat of force are no longer a hallmark of international relations? Or does a nuclear-disarmed world exist despite continued violence and war? Perhaps novel military technologies replace nuclear weapons and the mindset of nuclear strategic stability. All these views of IND end states exist, and the IND initiative should seek to include as many diverse viewpoints as possible across this political spectrum. With meaningful buy-in, the IND initiative can serve to bolster confidence in the NPT review process and demonstrate good-faith efforts to come to collective understandings about this crucial element of nuclear disarmament.

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Endnotes

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11 Along with military, technical, and economic drivers, ethical, political, and societal factors can propel arms control and disarmament forward or hold it back. Progress on IND requires creation of disarmament norms founded on ethical principles; sustained, sagacious political leadership, including from the most powerful states; and extensive public education on nuclear dangers, risks, and costs. Without any one of these, progress on IND will likely be difficult and could be impossible to sustain, even if strategic and economic incentives exist and technical blueprints are created.

12 A good (but now dated) study that explores the technical elements of IND is *Irreversibility in Nuclear Disarmament: Practical Steps against Nuclear Rearmament,* by David Cliff, Hassan Elbahtimy, and Andreas Persbo (London: VERTIC, September 2011). Ian Anthony's excellent study *Irreversibility in Nuclear Disarmament: Political, Societal, Legal and Military-Technical Aspects* (London: SIPRI, September 2011) began exploring some of the political, legal, and societal challenges but must be expanded and updated.

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16 These concerns were expressed during the meetings of the Programme for Promoting Nuclear Non-proliferation (PPNN) working group that led to the publication of Ogilvie-White, Sanders, and Simpson's *Putting the Final Document into Practice*.

17 The history of the U.S. ABM Treaty abrogation provides interesting material for the study of arms control reversal and nonfulfillment of IND. A number of factors coalesced, which appear to have been significant: (1) the leadership style of U.S. president George W. Bush, a foreign policy novice; (2) the terrorist attacks of September 11, 2001, which fed a U.S. drive for absolute security; (3) a stronger U.S. focus on creating coalitions of the willing; and (4) growing bifurcation in U.S. politics and media.

18 Language on IND appeared several times in all three of the 2022 Review Conference's draft final texts. Notably, a key paragraph was deleted between August 22 and 25: paragraph 110 of the August 22 draft included language that was similar to the original 13-steps language on IND: "The Conference reaffirms the applicability of the principle of irreversibility to nuclear disarmament, *as well as nuclear and other related arms control and reduction measures* [emphasis added]." By August 25, this sentence had been cut. The remaining language still committed state parties "to the strict application of the principles of irreversibility, verifiability and transparency in relation to the implementation of their disarmament obligations under the Treaty" (paragraph 15) and noted that "further work is required to ensure the irreversibility of nuclear disarmament and, as a first step, [states] are encouraged to build an understanding of the application of irreversibility measures in attaining and maintaining a world free

of nuclear weapons and to exchange information on the application of the principle of irreversibility in relation to the implementation of their Treaty obligations" (paragraph 27). These draft texts may be found in the section "Substantive Documents" at https://reachingcriticalwill.org/disarmament-fora/npt/2022/documents.

19 Possible forums for dialogue include, among others, the First Committee of the UN General Assembly, the IAEA General Conference, the Association of Southeast Asian Nations (ASEAN) Regional Forum, the East Asia Summit, the Organization for Security and Cooperation in Europe (OSCE), and numerous track 1.5 and track 2 initiatives, including Council for Security Cooperation in the Asia Pacific (CSCAP).

20 "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)," United Nations, https://www.un.org/disarmament/wmd/nuclear/npt/text/.

21 "The Conference agrees on the following practical steps for the systematic and progressive efforts to implement Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons and paragraphs 3 and 4(c) of the 1995 Decision on 'Principles and Objectives for Nuclear Non-Proliferation and Disarmament': . . . 5. The principle of irreversibility to apply to nuclear disarmament, nuclear and other related arms control and reduction measures." 2000 Review Conference of the Parties to the Treaty of the Non-Proliferation of Nuclear Weapons, *Final Document*.

22 Nuclear disarmament action 2: "All States parties commit to apply the principles of irreversibility, verifiability and transparency in relation to the implementation of their treaty obligations." Action 17: "In the context of action 16, all States are encouraged to support the development of appropriate legally binding verification arrangements, within the context of IAEA, to ensure the irreversible removal of fissile material designated by each nuclear-weapon State as no longer required for military purposes." 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, *Final Document*, vol. 1, parts I and 2 (NPT/CONF.2010/50) (New York: United Nations, 2010), https://documents-dds-ny.un.org/doc/UNDOC/GEN/N10/390/21/PDF/N1039021.pdf.

23 Article 15: "States parties commit to the strict application of the principles of irreversibility, verifiability and transparency in relation to the implementation of their disarmament obligations under the Treaty." Article 27: "Consistent with 15 above, States parties recognise that further work is required to ensure the irreversibility of nuclear disarmament and, as a first step, are encouraged to build an understanding of the application of irreversibility measures in attaining and maintaining a world free of nuclear weapons and to exchange information on the application of the principle of irreversibility in relation to the implementation of their Treaty obligations." Article 112: "The Conference reaffirms States parties' commitment to the mutually reinforcing principles of irreversibility, verifiability and transparency and underscores the importance of the nuclear-weapon States' application of these principles in the implementation of their Article VI obligations and related nuclear disarmament commitments under the Treaty." 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, "Draft Final Document (NPT/CONF.2020/CRP.1/Rev.2)," Reaching Critical Will, https://reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2022/documents/CRP1_Rev2.pdf.

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apply today to countries without nuclear weapons with latent capabilities to proliferate and those that do not possess them.

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