EU Non-Proliferation and Disarmament Consortium

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2025 EU NON-PROLIFERATION AND DISARMAMENT CONFERENCE

NEXT GENERATION WORKSHOP

November 10, 2025

Conference Proceedings

Funded by the European Union

"This event was a great opportunity for young professionals from different countries and nuclear disciplines to showcase their work in front of an international audience."

Eva Gyane
Technical Leader, WiN for Peace Leader, WiN Global

"This now annual workshop has become a valuable forum for young researchers and professionals to contribute innovative analysis and thinking to global discussions and to stimulate intergenerational exchange on the pressing issues facing multilateral disarmament, non-proliferation and arms control."

Rebecca Jovin
Chief of office, United Nations Office for Disarmament Affairs (UNODA)

"The next generation workshop has become such a valuable part of the annual EUNPD Conference, allowing us to meet the next generation of scholars and hearing fresh contributions to the field."

Marion Messmer
Senior Research Fellow, Chatham House

The **International Affairs Institute (IAI),** with the support of the **EU Non-Proliferation and Disarmament Consortium (EUNPDC),** organises the annual *Next Generation Workshop* on non-proliferation and disarmament.

Held each autumn as a side event of the EUNPDC Annual Conference, the workshop brings together a select group of outstanding early-career scholars and practitioners from around the world, chosen through a highly competitive selection process. The initiative provides a unique platform for the presentation of innovative research and policy-relevant ideas, while fostering direct exchange with EU officials and members of the EUNPDC Consortium and Network.

The 2025 edition of the workshop took place on Monday morning, **10 November 2025**, and featured eight presentations organised into three thematic panels: **Regional Perspectives on Non-Proliferation and Disarmament; Nuclear Proliferation Challenges and the Future of the NPT Regime; and Emerging Technologies and Arms Control**. Following welcome remarks by Ludovica Castelli, Project Manager of the EUNPDC at IAI, the first session was chaired by Eva Gyane, Technical Leader and WiN for Peace Leader at WiN Global, and included presentations by Sogol Edriss Abadi and Nse-Abasi Ayara. The second session, chaired by Rebecca Jovin, Chief of Office at the United Nations Office for Disarmament Affairs (UNODA), featured contributions from Agata Bidas, Artur Frantz, and Trine Rosengren Pejstrup. The final session was chaired by Marion Messmer, Senior Research Fellow at Chatham House, London, and included presentations by Augustine Eneji Ushie, Gabriel Beltran, and Luca Rastelli. Concluding remarks were delivered by Michał Karczmarz, Chair of the Sub-Working Party on Conventional Arms Exports (COARM), European Union External Action Service (EEAS).

These conference proceedings bring together short abstracts of six of the eight presentations delivered during the workshop, showcasing the innovative research agendas and policy ideas advanced by the next generation of scholars and practitioners in the field of non-proliferation and disarmament.

Iran's Nuclear Programme: Legal and Political Dynamics in 2025

By Sogol Edriss Abadi

On August 28, 2025, after several calls since 2019, the E3 countries (Germany, France, and the United Kingdom) activated the snapback mechanism in response to Iran's failure to comply with its nuclear commitments under the Joint Comprehensive Plan of Action (JCPOA), following the US decision to leave the agreement in May 2018. This action reinstated all United Nations sanctions lifted under the JCPOA and endorsed by UN Security Council Resolution 2231 (2015). The JCPOA, a non-legally binding agreement between Iran, the P5+1 (China, France, Russia, the United Kingdom, the United States, and Germany), and the European Union, was designed to strictly regulate Iran's nuclear programme in exchange for gradual sanctions relief, thereby ensuring its exclusively peaceful nature.

Activation of the snapback mechanism prompted renewed Iranian threats to withdraw from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), an argument repeatedly invoked since the US left the JCPOA.[1] Despite this rhetoric, on September 9, Iran concluded a new understanding with the International Atomic Energy Agency (IAEA), known as the 'Practical Modalities for the Implementation of Safeguards in Iran' and signed in Cairo.[2] The arrangement marked the resumption of cooperation with the IAEA, which had been suspended since July 2, 2025, following the adoption of a domestic law in response to Israeli and US attacks on Iran's nuclear facilities and scientific personnel.[3] Nevertheless, Iran subsequently halted implementation of the arrangement following activation of the snapback mechanism.[4]

The Iranian case illustrates the broader challenges confronting the global non-proliferation regime. Iran has, at various points, threatened to withdraw from the NPT in an effort to deter the E3 from triggering the snapback mechanism. While this strategy ultimately failed, Article X of the Treaty does legally permit withdrawal.[5]

Iran joined the NPT in February 1970 and concluded a Comprehensive Safeguards Agreement (CSA) with the IAEA in 1974. Its Additional Protocol, approved in 2003, was

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[1] See, C. P. Evans, "Going, Going, Gone? Assessing Iran's Possible Grounds for Withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons," *Journal of Conflict and Security Law*, 26 (2021): 309-345; United Nations Security Council, "Nineteenth Report of the Secretary-General," S/2025/397, para 5, 19 June 2025, https://documents.un.org/doc/undoc/gen/n25/162/88/pdf/n2516288.pdf.

[2] IAEA, "Statement by IAEA Director General on Iran" 10 September 2025, https://www.iaea.org/newscenter/multimedia/videos/statement-by-iaea-director-general-on-iran. See also, IAEA General Conference, "NPT Safeguards Agreement with the Islamic Republic of Iran," GOV/2025/53, 3 September 2025, para 11-14, https://www.iaea.org/sites/default/files/documents/gov2025-53.pdf.

[3] See, "President instructs govt bodies to implement law on suspension of cooperation with IAEA," *Official Website of the President of the Islamic Republic of Iran*, 2 February 2025, https://president.ir/en/160022.

[4] See, "Iran declares Cairo deal unviable after sanctions snapback," *Kayhan*, https://kayhan.ir/en/news/144303/iran-declares-cairo-deal-unviable-after-sanctions-snapback.

[5] In accordance with article X of the NPT "Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country".

implemented voluntarily until 2006 and later applied provisionally under the JCPOA from 2016 until its suspension in 2021. Shaped by the Iran–Iraq War, Iran's national doctrine emphasises the elimination of weapons of mass destruction (WMD), the strengthening of the NPT, and the creation of a WMD-Free Zone in the Middle East – positions reinforced by Islamic jurisprudence prohibiting the development of WMD.[6]

Despite these stated commitments, Iran's nuclear programme has raised persistent concerns since 2003. The JCPOA sought to normalise the programme within the NPT framework, yet mistrust, perceptions of bad faith, and regional instability now dominate the relationship. As a non-nuclear-weapon state (NNWS), Iran undertakes not to acquire nuclear weapons (Article II) and to accept safeguards on all peaceful nuclear activities (Article III) to prevent diversion to military use. These obligations are legally distinct: the IAEA is responsible for verifying compliance with safeguards, while overall compliance with NPT provisions is assessed collectively by the States Parties.[7]

In its most recent resolution, the Board of Governors concluded that Iran's repeated failures since 2019 to fully cooperate with the Agency and to disclose undeclared nuclear material and activities constitute non-compliance with its Safeguards Agreement.[8] The resolution cited four undeclared sites, inconsistent in nuclear material accounting, the withdrawal of inspectors, and Iran's failure to implement modified Code 3.1.[9] The legal status of the Subsidiary Arrangements, including modified Code 3.1, remains contested among legal experts, emphasising the need for careful interpretation and further academic scrutiny.[10]

These unresolved issues were further addressed in the Director General's May 2025 report, requested by the Board of Governors (GOV/2024/68), which provided a comprehensive assessment of undeclared nuclear material and activities. The report found that Iran had failed to declare nuclear material at three sites and concluded that, in the absence of credible explanations, the Agency cannot confirm that Iran's nuclear programme is exclusively peaceful.[11]

Since suspending its Additional Protocol in 2021, Iran's level of cooperation has remained limited. The IAEA continues to verify the correctness (non-diversion of declared nuclear activities) and the 'completeness' (absence of undeclared activities) of Iran's declarations under its Safeguards Agreement[12], as it did prior to the JCPOA. This has revived debate over the scope of the Agency's authority. While some argue that the CSA already permits

[6] Mohammad Javad Zarif, "Tackling the Iran-U.S. Crisis: The Need for a Paradigm Shift," *Journal of International Affairs*, 60, 2 (2007), pp. 75-76. See, Preparatory Committee for the 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, "Establishment of a Middle East zone free of nuclear weapons. Report submitted by the Islamic Republic of Iran," NPT/CONF.2020/PC/I/4, 29 March 2017.
[7] Daniel H. Joyner, *Iran's Nuclear Program and International Law: From Confrontation to Accord* (Oxford: Oxford University Press, 2016), p.75.
[8] IAEA Board of Governors, "NPT Safeguards Agreement with the Islamic Republic of Iran. Resolution adopted on 12 June 2025 during the 1769th session," GOV/2025/38, 12 June 2025, para 3.
[9] IAEA Board of Governors, "NPT Safeguards Agreement with the Islamic Republic of Iran. Report by the Director General," GOV/2025/25, 31 May 2025.
[10] Joyner, *Iran's Nuclear Program and International Law,* pp. 118-124; Pierre-Emmanuel Dupont, "Compliance with Treaties in the Context of Nuclear Non-Proliferation: Assessing Claims in the Case of Iran," *Journal of Conflict and Security Law*, 19, 2 (2014), p.208; L. M. König, *The legal status of the Revised Code 3.1 in relation to the Islamic Republic of Iran* (Gothenburg University, 2010), pp. 31-48.
[11] GOV/2025/25, para 83 and 86.
[12] Ibid., para 5, no. 6.

verification of both declared and undeclared activities, others maintain that the Additional Protocol is essential for confirming 'completeness'.[13] The lack of broader inspection tools underscores the legal and operational challenges of Iran's case vis à vis the NPT framework.

In addition to its NPT safeguards obligations, Iran voluntarily accepted a range of nuclear-related commitments under the JCPOA, all of which were verified and monitored by the IAEA. Implemented within the framework of Iran's CSA, these measures strengthen verification, aim to ensure the exclusively peaceful nature of Iran's nuclear programme, and collectively constitute its JCPOA commitments.

Under the deal, Iran committed to limiting uranium enrichment to 3.67% and to maintaining a stockpile of no more than 300 kg of low-enriched uranium for a period of 15 years. Following the termination of the US' participation in the JCPOA[14], Iran progressively reduced its level of compliance, and by mid-2025 the IAEA reported that Iran possessed over 400 kg of uranium enriched up to 60%.[15]

Although the NPT permits uranium enrichment for peaceful purposes, this right remains controversial due to the inherently dual-use nature of nuclear technology.[16] The production of highly enriched uranium raises significant proliferation concerns, particularly given that Iran is the only NNWS under the NPT to have produced such material.[17] This escalation has markedly reduced Iran's breakout time – estimated at approximately one year under the JCPOA – and raises serious legal and political questions under Article II of the NPT.

The JCPOA was originally conceived as a contribution to regional and international peace and security, with UNSC Resolution 2231 (2015) explicitly highlighting its non-proliferation value.[18] Its collapse, or a potential Iranian withdrawal from the NPT, would further weaken the non-proliferation regime. While the remaining JCPOA participants attempted to restore

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[13] Laura Rockwood, "IAEA Safeguards: Correctness and Completeness of States' Safeguards Declarations" in *Nuclear Law: The Global Debate* (T.M.C. Asser Press, 2022), pp. 205-222; Joyner, *Iran's Nuclear Program and International Law,* pp. 142-174; Dupont, "Compliance with Treaties in the Context of Nuclear Non-Proliferation," pp.194-199.

[14] In my opinion, since "withdrawal" is a legal term used in the law of treaties, it is better to avoid this term when the legal nature of the JCPOA is uncertain and rather use "end of the participation" or put the term withdrawal in quotation marks. It is a common mistake, especially in the media, to always use this term without any precaution.

[15] IAEA Board of Governors, "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015) Report by the Director General," GOV/2025/50, 3 September 2025, Section C.2.5.

[16] Tom Coppen "Non-Proliferation of Nuclear Weapons," in E. P.J. Myjer and T. Marauhn (eds), *Research Handbook on International Arms Control Law* (Edward Elgar Publishing, 2022), p. 162. According to Article VI 1. of the NPT "Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty".

[17] GOV/2025/50, para 40; IAEA Board of Governors, "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015) Report by the Director General," GOV/2025/24, 31 May 2025, para 34; IAEA Board of Governors, "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015) Report by the Director General," GOV/2025/8, 26 February 2025, para 40; IAEA Board of Governors, "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015) Report by the Director General," GOV/2024/61, 19 November 2024, para 33.

[18] The Joint Comprehensive Plan of Action, 14 July 2015, Preface; S/RES/2231, 20 July 2015, third preambular paragraph.

compliance, particularly during the 2020–2021 period, negotiations have since stalled amid the Ukraine war, escalating tensions in the Middle East, Israeli strikes, and the activation of the snapback mechanism.

Even if the JCPOA has fallen short of its original ambitions, it remains a landmark achievement in non-proliferation diplomacy and a potential model for future agreements. It shows that states can reach consensus on highly complex nuclear issues through detailed, non-legally binding arrangements.[19] In times of intensified great-power rivalry, such flexible frameworks may help sustain dialogue and mitigate proliferation risks. A 2021 study further suggested that the JCPOA could serve as a basis for regional initiatives, including a WMD-Free Zone in the Middle East, by promoting transparency and confidence-building measures.[20]

The JCPOA demonstrates the capacity of diplomacy to manage complex nuclear challenges, while also exposing the limits of existing enforcement mechanisms. Although the IAEA can detect and report cases of non-compliance, it lacks the authority to enforce corrective measures[21], thereby highlighting the gap between verification and enforcement. As a result, effective enforcement depends largely on sustained political will among States – a condition that has proven difficult to maintain.[22] The success of the non-proliferation regime rests not only on arms-control treaties but also on political processes, including review conferences, working groups, resolutions, and other mechanisms of dialogue and adaptation.[23] As the case of the DPRK demonstrates, sanctions and legal enforcement alone are insufficient; peaceful dispute resolution and diplomacy remain essential.

The snapback mechanism was introduced under the JCPOA as an innovative attempt to narrow the gap between verification and enforcement by giving the former findings direct political and legal consequences. Under the agreement and UNSC Resolution 2231 (2015), once the Dispute Resolution Mechanism is exhausted, a participant may notify the Security Council of significant non-compliance. If the Council fails to vote within 30 days to maintain sanctions relief, all previous sanctions are automatically reinstated – a process commonly referred to as the "reverse veto."[24] The use of snapback has deepened divisions within the UNSC. Russia and China claim that any attempt by the E3 to trigger the mechanism is procedurally and legally invalid, while the E3 argue that their actions are consistent with the Resolution.[25] Earlier attempts by China and Russia to extend the JCPOA and Resolution 2231 were also rejected, highlighting growing fragmentation among permanent members and the challenges of collective enforcement.

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[19] Daniel H. Joyner, "The United States' 'Withdrawal' from the Iran Nuclear," *E-International Relations*, 21 August 2018, https://www.e-ir.info/pdf/75322.

[20] Chen Zak Kane and Farzan Sabet (eds.) "From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ", UNIDIR, Geneva, Switzerland (2021), https://doi.org/10.37559/WMDFZ/2021/JCPOA1.

[21] Kimberly Gilligan, "The Non-Proliferation Regime and the NPT," in J. L. Black-Branch and D. Fleck (eds.), *Nuclear Non-Proliferation in International Law vol. 1* (Springer, 2014), p.89.

[22] See, Coppen "Non-Proliferation of Nuclear Weapons," p.169.

[23] Ibid., p. 170.

[24] See, Jean Galbraith, "Ending Security Council Resolutions," *American Journal of International Law* 109, 4 (2015): 806–21.

[25] UNSC, "Implementation of Security Council resolution 2231 (2015). Twentieth report of the Secretary-General," S/2025/814, para 9-13, 15 December 2025.

Finally, Iran's case brings to light the importance of universalising the Additional Protocol, as repeatedly stressed in NPT Review Conferences.[26]

In conclusion, the credibility and effectiveness of the non-proliferation regime depend on shared commitment, dialogue, and pragmatic diplomacy.

[26] See, 'Preparatory Committee for the 2026 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons," NPT/CON.2026/PC.III/WP.36/Rev.1, 9 May 2025.

Between Law and Strategy: Reimaging Nuclear Deterrence in the Age of Normative Change

By Agata Bidas

Since the Russian full-scale invasion of Ukraine in February 2022, nuclear weapons have once again become a central concern for the international community. Nuclear threats made by Russian President Vladimir Putin in the context of the war have shown that nuclear weapons remain a real danger to humanity. Moreover, the statement by the US President Donald Trump in October 2025, announcing that "because of other countries nuclear testing programs" the United States intends to resume nuclear tests, illustrates that the risk of nuclear escalation is tangible.[27] This trend is further reinforced by the crisis in nuclear arms control: the New START treaty, which limits the number of nuclear warheads that Russia and the US are allowed to possess, is set to expire in February 2026 without any prospects for a replacement.[28] In this context, a critical question arises: what is the role of the European Union in this high-stakes debate?

The European Union (EU), as an international organisation, does not possess nuclear weapons and is not a party to any treaty regulating their possession. Among EU member states, only France has nuclear weapons, while Germany, Italy, Belgium and the Netherlands host the US nuclear weapons under NATO's nuclear sharing arrangements. Moreover, 23 of the EU's 27 member states are NATO members and thus benefit from its nuclear umbrella. At the same time, Austria, Ireland and Malta are parties to the Treaty on the Prohibition of Nuclear Weapons (TPNW), which fully prohibits the possession and acquisition of nuclear weapons.

The EU has traditionally been a civilian and economic power, emphasising its commitment to international law and its principles. Central to this is Article 21(1) of the Treaty on the European Union (TEU), which states that "The Union's action on the international scene shall be guided by the principles which have inspired its own creation, development and enlargement, and which it seeks to advance in the wider world: democracy, the rule of law, the universality and indivisibility of human rights and fundamental freedoms, respect for human dignity, the principles of equality and solidarity, and respect for the principles of the United Nations Charter and international law."[29] Article 21(2) lists the objectives guiding the EU's external policies, including preserving peace, preventing conflicts and strengthening international security.

Against this backdrop, an important question arises: is the reliance of EU member states on NATO's nuclear deterrence compatible with the EU's obligations under international disarmament law?

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[27] Daryl G. Kimball, "Trump's nuclear test rhetoric and reality," *Arms Control Association*, December 2025, https://www.armscontrol.org/act/2025-12/focus/trumps-nuclear-test-rhetoric-and-reality.

[28] Manuel Herrera, "The European Union and the Treaty on the Prohibition of Nuclear Weapons: Let's Agree that we Disagree," *Peace Review*, 36, 2, (2023): 323–334. https://doi.org/10.1080/10402659.2024.2328547.

[29] Treaty on European Union, *Official Journal 115 , 09/05/2008 P. 0028 – 0029.* https://eur-lex.europa.eu/eli/treaty/teu_2008/art_21/oj/eng.

To answer this, it is necessary to first examine how nuclear weapons are regulated under international law. The cornerstone of the global nuclear order is the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), adopted in 1968. The NPT allows five nuclear-weapon states (the United States, the United Kingdom, France, China and Russia) to possess nuclear weapons, while prohibiting non-nuclear-weapon states from acquiring them (NPT, Arts. 1 and 2).[30] At the same time, nuclear-weapons states are obliged to pursue nuclear disarmament over the long term (NPT, Art. 6). Because nuclear-weapon states have not fully met these obligations, many non-nuclear-weapon states negotiated the TPNW, adopted in 2017 and entered into force in 2021. The TPNW frames nuclear weapons as inherently unlawful under humanitarian principles, highlighting the humanitarian and environmental consequences of nuclear use. While the treaty has not yet established a new customary international law norm banning nuclear weapons to emerge, it reflects growing awareness of the risks they pose and challenges the foundational role of nuclear deterrence in the security policies of nuclear-armed states. The TPNW aligns closely with values enshrined in Article 21(1) TUE, including human dignity, human rights, and equality.

At the same time, the EU has sought to play an active role in global arms control and disarmament by promoting the NPT and the peaceful use of nuclear energy. For instance, in 2003 the EU adopted the Strategy against the Proliferation of Weapons of Mass Destruction to strengthen multilateralism and international law in security policy. The Strategy identifies WMDs as a security threat and introduces instruments to tackle them, including supporting universalisation and effective implementation of IAEA safeguards, export controls, verification regimes, and strengthening of international institutions.[31]

WMDs, including nuclear weapons, are also addressed in other key EU strategic documents. The 2016 EU Global Strategy states that the EU "will strongly support the expanding membership, universalisation, full implementation and enforcement of multilateral disarmament, non-proliferation and arms control treaties and regimes."[32] While highlighting the EU's partnership with NATO, the Strategy also stresses that "As Europeans we must take greater responsibility for our security. We must be ready and able to deter, respond to, and protect ourselves against external threats."[33]

Similarly, the Strategic Compass, adopted in March 2022 following Russia's aggression against Ukraine, focuses on strengthening EU security while committing to promoting nuclear disarmament and non-proliferation, "taking into account their security interests and in close coordination with partners, notably the United States and NATO."[34]

However, these strategy documents have notable gaps. They do not include any reference to the nuclear doctrines of EU member states, creating a tension between the EU's advocacy

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[30] United Nations. (1968). *Treaty on the Non-Proliferation of Nuclear Weapons (NPT). United Nations Treaty Series, 729, 161.*

[31] Clara Portela, *The EU's Arms Control Challenge: Bridging Nuclear Divides* (Chaillot Paper No. 166, European Union Institute for Security Studies, 2021), https://www.iss.europa.eu/sites/default/files/EUISSFiles/CP_166.pdf

[32] European Union. (2016). *Shared vision, common action: A stronger Europe – A global strategy for the European Union's foreign and security policy*, p.42. https://www.eeas.europa.eu/sites/default/files/eugs_review_web_0.pdf

[33] Ibid., p.19.

[34] Council of the European Union. (2022). *A strategic compass for security and defence: For a European Union that protects its citizens, values and interests and contributes to international peace and security*, 21 March 2022, p.37. https://www.eeas.europa.eu/sites/default/files/documents/strategic_compass_en3_web.pdf

for disarmament and its reliance on NATO's nuclear deterrence framework. The Strategic Compass, despite being adopted after the TPNW entered into force, does not mention the treaty or consider how it could support the EU's disarmament goals. At the same time, the EU affirms its commitment to NATO, stating that "Russia's aggression against Ukraine has shown both how essential NATO is for the collective defence of its members and the important role that the EU plays in today's complex security and defence environment."[35]

Nuclear disarmament, particularly the Treaty on the Prohibition of Nuclear Weapons, remains a controversial issue within the EU.[36] According to Herrera, TPNW has been treated as a taboo topic in EU Council meetings. Since its adoption in 2017, the EU has not taken an official position on the Treaty, which has not been referenced in EU official documents, including the Strategic Compass. This lack of engagement carries risks. First, it can weaken the EU's credibility as a global disarmament advocate, especially with non-nuclear states that are state parties to the TPNW. This undermines the EU Strategy against the Proliferation of Weapons of Mass Destruction and the values outlined in Art. 21 TEU. Second, it may exacerbate internal political divisions, deepening the rift between NATO members and the three TPNW state parties, potentially affecting consensus in the EU's Common Foreign and Security Policy, which requires unanimity.

At the same time, the EU's composition – consisting of both NATO member states and TPNW state parties – presents an opportunity to rethink and reimagine nuclear deterrence. Addressing current nuclear challenges requires meaningful collaboration and dialogue between states with and without nuclear weapons. In this respect, it is crucial that the EU reaffirms its commitment to multilateralism and international cooperation. Accordingly, it should strengthen its advocacy for nuclear disarmament and non-proliferation. Engaging with the TPNW could provide a platform for constructive discussions, while incorporating a stronger focus on the humanitarian and environmental consequences of nuclear weapons into EU policy could enhance credibility. By leveraging its internal diversity, the EU has the potential to act as a bridge between nuclear and non-nuclear-weapon states, both within Europe and internationally.

[35] Ibid., p.5.
[36] Herrera, "The European Union and the Treaty on the Prohibition of Nuclear Weapons."

After Yes: Differential Cost Structures in Commitment to Nuclear Arms Control Treaties

By Artur Holzschuh Frantz

Scholarship on nuclear proliferation and arms control has long occupied a central place in international relations.[1] Yet, despite growing attention to multilateral nuclear arms control treaties as key institutional components of this regime,[2] important empirical and theoretical puzzles remain unresolved.

International norms governing nuclear restraint have become increasingly contested, Cold War and post–Cold War arms control frameworks are being dismantled, and new initiatives – most notably the Treaty on the Prohibition of Nuclear Weapons (TPNW) – have emerged.[3] Despite its normative ambition, however, the TPNW has attracted only limited participation compared to other initiatives. In this context, understanding why some states join some multilateral nuclear arms control treaties but others do not is more important than ever.[4]

Existing research has generally examined the determinants of state support for arms control, commitment to specific treaties, decisions to forswear nuclear weapons, and broader participation in the nuclear regime.[5] Another strand of literature has focused on treaty design, analysing how institutional features affect negotiation outcomes, compliance, and ratification dynamics.[6] However, a crucial question remains unaddressed: why do states that consistently express support for nuclear arms control norms often stop short of formal treaty commitment?

This puzzle is particularly salient given the near-universal participation achieved by treaties banning other weapons of mass destruction, such as the Chemical Weapons Convention and the Biological Weapons Convention. Even within the nuclear realm, major treaties such as the Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear-Test-Ban

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[1] Alexandre Debs and Nuno P. Monteiro (eds.), "Introduction," in *Nuclear Politics: The Strategic Causes of Proliferation* (Cambridge: Cambridge University Press, 2017).

[2] Stephen Herzog, *After the Negotiations: Understanding Multilateral Nuclear Arms Control* (PhD Dissertation, New Haven: Yale, 2021), p.58.

[3] Maria Rost Rublee and Carmen Wunderlich, "The Vitality of the NPT After 50," *Contemporary Security Policy,* 43 (2022).

[4] Herzog, *After the Negotiations*.

[5] Tobias Risse, External Threats, Internal Threats, and State Support for Arms Control (PhD Dissertation, Aarhus, Denmark: Aarhus University, 2022); Herzog, *After the Negotiations*; Leonardo Bandarra, *Nuclear Latency and The Participation Puzzle: Constructing of the International Non-Proliferation Regime* (Cham: Palgrave Macmillan, 2024); Espen Mathy, "Why Do States Commit to the Treaty on the Prohibition of Nuclear Weapons?" *The Nonproliferation Review* 29, 1–3 (2022): 97–116.

[6] Andrew W. Reddie, *Governing Insecurity: Institutional Design, Compliance, and Arms Control* (PhD Dissertation, Berkeley: Graduate Division of the University of California, Berkeley, 2022); Jan Karlas, "Explaining State Participation in Ten Universal WMD Treaties: A Survival Analysis of Ratification Decisions," *Contemporary Security Policy* 44, 3, (2023): 410–36; Sarah E. Kreps, "The Institutional Design of Arms Control Agreements," *Foreign Policy Analysis* 14, 1 (2018): 127–47 ; Michal Onderco and Valerio Vignoli, "Treaty Legalization, Security Interests, and Ratification of Multilateral Disarmament Treaties." *Conflict Management and Peace Science*, April, 2024.

Treaty (CTBT) enjoy membership rates close to 90 percent of eligible states.[7] Thus, the low level of membership in the TPNW and, notably, the absence of traditional arms control advocates such as Japan and Sweden, is especially puzzling. Given the overall high level of support for arms control in non-binding fora[8], what accounts for the inconsistent pattern of treaty membership across countries and treaties?

This project addresses this puzzle by asking: under what conditions do institutional design features impact states' commitment to nuclear arms control treaties? I argue that treaty commitment is best understood as a multi-step signalling process in which states move from lower-cost signals (Support) to higher-cost ones (Commitment). While higher levels of support generally increase the likelihood of commitment, this relationship is conditional. It is moderated by the interaction between treaty design features and a state's nuclear-reliance status, which together create differential cost structures for the act of committing. These cost structures can generate counterintuitive outcomes in which highly supportive states refrain from commitment, while less supportive states occasionally join.

My theoretical framework builds on Herzog's conceptualisation of treaty signature, ratification, and accession as costly signals, and integrates it with Quek's[9] work on costly signalling mechanisms. By associating specific treaty design features with different types of costs, the framework links institutional design to states' strategic calculations. Commitment, in this view, is neither purely instrumental nor purely normative, but a strategic act shaped by both preferences and constraints.

Empirically, I employ United Nations General Assembly (UNGA) voting records as a measure of state support for nuclear arms control and as a lower-cost signal sent by states to their peers as the basic predictor. I employ Uppsala University's Alva Myrdal Centre's (AMC) newly collected and coded Agreement Information Datasets to measure state commitment to multilateral agreements as higher-cost signals.[10] In total, eight treaties (three universal, five regional) are analysed. AMC's dataset is also used to identify specific treaty features that, alongside nuclear-reliance status, generate differential costs to countries, affecting the probability of commitment.

The empirical analysis consists of logistic regression models estimating the probability of state commitment to relevant treaties. The unit of analysis is the country–year–treaty, allowing the study to capture delayed accession and persistent non-commitment. Particular attention is paid to interaction effects between support, nuclear-reliance status, and treaty design features, analysed through predicted probabilities of commitment across different levels of support.

The findings support the expectation that higher levels of nuclear arms control support are associated with higher odds of commitment. However, as expected, this effect is conditional. Nuclear-reliant states were found to be more likely to commit to non-proliferation treaties, while non-reliant states preferred disarmament and weaponry development restriction treaties. This illustrates the deterrent effect of non-contingent, ex-ante costs. By contrast,

[7] Jan Karlas, "Explaining State Participation in Ten Universal WMD Treaties."
[8] Risse, "External Threats, Internal Threats, and State Support for Arms Control."
[9] Kai Quek, "Four Costly Signaling Mechanisms," *American Political Science Review,* 115, 2 (2021): 537–49.
[10] AMC (Alva Myrdal Centre for Nuclear Disarmament), "AMC DATA." Uppsala University. 2025. https://amcdata.uu.se/sv.

when costs are incurred ex-post – as in the CTBT's constraints on testing – or when treaties offer future incentives such as the NPT's provisions on access to peaceful nuclear technology, the likelihood of commitment increased for all states. Crucially, the level of legalisation, especially the obligation dimension, can either encourage or discourage commitment depending on a state's level of support.

The findings indicate that commitment to nuclear arms control treaties is a multi-step, strategic, and cost-sensitive process, rather than a simple reflection of states' stated preferences or normative alignment. While higher levels of expressed support for nuclear arms control generally increase the likelihood of treaty commitment, this relationship is systematically conditional. States do not automatically move from talking the talk to walking the walk; instead, each treaty leads states down different paths depending on the costs it demands and the characteristics of the states facing those costs.

In particular, the analysis shows that commitment behaviour is shaped by the interaction between states' nuclear-reliance status and specific treaty design features. Treaties that require Sunk Costs, paid in full before committing, are especially deterrent for nuclear-reliant states. By contrast, treaties that shift costs to the post-commitment phase, distribute them over time (Instalment Costs), or allow states to offset them through future, contingent benefits (Reducible Costs) – such as access to peaceful nuclear technology – are more likely to incentivise commitment, even from otherwise reluctant actors. The provision of rights thus appears to mitigate perceived commitment costs across different categories of states.

Beyond the timing of costs and provision of incentives, the findings also suggest that managing entrance barriers, i.e., levels of legal obligation, constitutes a potentially useful tool for addressing holdouts. Lower levels of obligation may incentivise commitment by less supportive or more reluctant states, while higher levels of obligation may reinforce commitment among already supportive actors. This indicates the relevance of interacting state characteristics and treaty features: the same institutional feature can encourage or discourage commitment.

Taken together, the results demonstrate that the variation observed in states' commitment to multilateral nuclear arms control treaties is not purely idiosyncratic, but can be explained in a systematic manner by considering how treaty design interacts with state characteristics. Framing commitment in terms of differential cost structures provides a way to bridge rationalist and constructivist insights, capturing both strategic calculation and normative positioning without reducing state behaviour to either logic alone. While developed in the context of nuclear arms control, this framework may apply to other cost-sensitive international regimes.

Several avenues for future research follow from this study. Methodologically, alternative approaches, such as event-history analysis, could further explore the timing of commitment decisions, while qualitative methods, including interviews with policymakers and negotiators, could help unpack the causal mechanisms underlying perceived costs and incentives. As the coding of treaty features continues to improve, additional institutional variables could be incorporated to test whether similar patterns emerge across a broader range of agreements. More generally, the differential cost structures framework could be extended to other arms control or international cooperation regimes.

From a policy perspective, the findings suggest that treaty design itself can be a lever for change, even in contexts where altering states' underlying preferences appears especially difficult. Avoiding ex-ante Sunk Cost demands, favouring ex-post Instalment Costs, and incorporating rights or incentives that allow states to offset initial burdens over time may improve the prospects for wider participation. Additionally, carefully crafting entrance barriers to address holdouts could also prove useful. More broadly, thinking of commitment as a process that begins before signature and extends beyond ratification expands the space for negotiation and institutional creativity, which could prove an especially valuable insight when arms control processes appear deadlocked.

In a geopolitical environment marked by increasing polarisation, technological change, and renewed nuclear risks, these insights highlight that advancing nuclear arms control should not rely solely on persuading states to change their preferences. Adjusting how commitments are structured through careful treaty design may also help move the international community closer to the shared objective of a safer world, where nuclear arms control is shaped collectively rather than dictated by a small number of powerful or reckless actors.

Reimagining Peace and Security in a Post-Western World

By Trine Rosengren Pejstrup

I was introduced to the world of disarmament and arms control in 2019. At the time, I did not yet know that this encounter would fundamentally shape how I think about peace and security in international politics. From the 30th floor of the United Nations Secretariat building in New York – a space where peace was approached through arms control and negotiated limits on military power – I was interning with the Office for Disarmament Affairs, gradually learning how security was understood, practiced, and negotiated.

Looking back, 2019 was a striking moment to enter this field. During my time at UNODA, the arms control architecture that had structured global security for decades began to unravel in real time. The United States withdrew from the Intermediate-Range Nuclear Forces Treaty,[1] renounced its signature to the Arms Trade Treaty,[2] and announced its exit from the Open Skies Treaty.[3] Each decision was justified in the language of national interest and strategic competition, yet taken together they signalled a broader erosion of restraint as a legitimate security practice. This was my baptism by fire into disarmament diplomacy. What became increasingly clear was not only that arms control was under pressure, but that the notions and imaginations of what leads to peace and security were being displaced. As one of my professors told me when I returned to Denmark: "Disarmament and arms control are diplomatic tools for times of peace, not war and instability." From that moment on, I have been interested in understanding how peace and security are conceptualised, practiced and imagined.

This article introduces my recently started PhD project by situating it within the contemporary conjuncture of rearmament and the erosion of Western hegemony. Rather than presenting findings, it outlines the project's conceptual orientation, case selection, and analytical ambitions, and argues for the importance of examining how peace and security are contested beyond dominant deterrence-based frameworks. By doing so, this article makes the case for why examining alternative security imaginaries particularly those articulated in the Global South has become an urgent task for both critical scholarship and disarmament practice.

According to Stockholm International Peace Research Institute (SIPRI), estimated global military expenditure rose for the tenth consecutive year in 2024, reaching approximately USD

[1] C. Todd Lopez, "U.S. Withdraws From Intermediate-Range Nuclear Forces Treaty," U.S. Department of War, 2 August 2019, https://www.war.gov/News/News-Stories/Article/Article/1924779/us-withdraws-from-intermediate-range-nuclear-forces-treaty/.

[2] The White House, "President Donald J. Trump is Defending Our Sovereignty and Constitutional Rights From the United Nations Arms Trade Treaty," 26 April 2019, https://trumpwhitehouse.archives.gov/briefings-statements/president-donald-j-trump-is-defending-our-sovereignty-and-constitutional-rights-from-the-united-nations-arms-trade-treaty/.

[3] "DOD Statement on Open Skies Treaty Withdrawal," U.S. Department of War, 21 May 2020, https://www.war.gov/News/Releases/Release/Article/2195239/dod-statement-on-open-skies-treaty-withdrawal/.

2.7 trillion.[4] The 9.4 per cent increase in real terms, driven by the war in Ukraine, regional armed conflicts, and heightened geopolitical tensions, pushed global military spending to the highest level ever recorded by SIPRI. Rearmament, in this sense, is not a temporary response to crisis, but a sustained and accelerating trend in international politics. Within the North Atlantic Treaty Organization (NATO), this shift has been explicitly institutionalised. At the NATO Summit in July 2025, allies agreed on a significant recalibration of defence spending commitments, moving beyond the long-standing 2 per cent benchmark toward an ambition of up to 5 per cent of GDP, when defence, defence-related investments, and broader security and resilience expenditures are considered.[5] Crucially, this reflects a shared understanding among allies that long-term security now requires sustained and substantially higher levels of military and security-related spending. This moment is often described by prominent international relations scholars as *a return to realism*, in which deterrence, military capability, and power politics once again dominate security debates.[6]

However, the current moment is marked not only by rearmament, but also by what many scholars describe as the making of a *post-Western world*. This refers to a global order in which Western states can no longer take their moral authority, institutional leadership, or agenda-setting power for granted. While Western military and economic power remain significant, its ability to define the meaning of security, legitimacy, and responsibility in global politics has become increasingly contested. In this context, countries in the Global South are no longer positioned merely as objects of international order, but as active participants in shaping it. States such as South Africa, alongside other influential actors in the Global South, are advancing claims, priorities, and security imaginaries that do not always align with those promoted by Washington, London, or Brussels. These interventions are visible in diplomatic practices, multilateral forums, and debates over war, peace, and global responsibility.

Interestingly, these dynamics are rarely analysed together. The return to rearmament and deterrence is often treated as a primarily Western response to geopolitical instability, while the erosion of Western hegemony is discussed in terms of shifting power balances or institutional reform. Yet if we want to understand how peace and security are being reimagined in the present, these developments must be considered jointly. Doing so requires paying attention to how actors in the Global South invoke history, values, and futures that fall outside dominant security logics—not necessarily as coherent alternatives, but as sites of contestation, friction, and, crucially, imagination.

My PhD project, *Reimagining Peace and Security in a Post-Western World*, addresses precisely this conjuncture. It examines how contemporary rearmament and deterrence discourses intersect with the erosion of Western dominance in shaping global understandings of peace and security. The project is grounded in a theoretical framework that combines the International Relations (IR) perspectives along those developed by Barry Buzan and Lene Hansen with insights from recent Critical Security Studies' turn to post-western views on IR. Rather than treating security as a fixed condition or objective necessity, this approach foregrounds how

[4] Diego Lopes da Silva et al., "Military Expenditure," in *SIPRI Yearbook 2025* (Oxford University Press, 2025).
[5] "Defence expenditures and NATO's 5% commitment," *NATO*, 18 December 2025, https://www.nato.int/en/what-we-do/introduction-to-nato/defence-expenditures-and-natos-5-commitment.
[6] Linda Kinstler, "The Theory that gives Trump a blank check for aggression," *The New York Times*, 9 January 2026, https://www.nytimes.com/2026/01/09/magazine/trump-venezuela-foreign-policy-realism-greenland.html.

security is imagined, justified, and contested through political practices, historical narratives, and claims to legitimacy.

Despite the scale of contemporary rearmament, this turn has attracted relatively limited critical scrutiny in both policy and academic debates. Rearmament is frequently framed as inevitable - a technocratic, even apolitical response to an increasingly dangerous world. Such framings obscure the normative assumptions that underpin deterrence-based security and foreclose alternative ways of thinking about peace. My project challenges this assumption by asking what becomes visible when the West's turn to rearmament is examined from the perspective of a state that has historically aligned itself with multilateral disarmament as a pathway to peace, and that continues to uphold this position in tension with prevailing deterrence logics. By doing so, the project seeks to illuminate how peace and security are being reimagined beyond dominant Western frameworks.

South Africa offers a particularly rich site for examining how peace and security are being reimagined in a post-Western world. This is due not only to its rare experience of voluntary nuclear disarmament, but also to its persistent advocacy for multilateral arms control in an increasingly fragmented global order. Emerging from the end of apartheid in 1994, South Africa – under the leadership of Nelson Mandela – embraced disarmament and arms control as foundational to both national reconstruction and international peace.[7] This positioning was shaped by the global context of the early post–Cold War period, when international disarmament norms were relatively strong. Major nuclear confrontation between the United States and the Soviet Union had been avoided, and there was broad consensus that trust-building, arms control, and verification constituted the primary pathways to security. Within this climate, South Africa dismantled its nuclear weapons programme and emerged as a central actor in a range of multilateral initiatives across weapons categories. These included support for the indefinite extension of the Treaty on the Non-Proliferation of Nuclear Weapons, active engagement in the banning of anti-personnel landmines, and later involvement in the negotiation of the Arms Trade Treaty.[7] Despite recurring controversies surrounding its national arms industry, South Africa has consistently acted as a norm entrepreneur within multilateral disarmament and arms control regimes.

What makes South Africa particularly analytically valuable today is the persistence of this orientation. While Western states increasingly return to deterrence-based logics and large-scale military build-up, South Africa continues to advocate disarmament, diplomacy, and negotiated solutions to war and conflict. It has supported the Treaty on the Prohibition of Nuclear Weapons,[8] called early for diplomatic engagement in the war in Ukraine,[9] and voiced criticism – most notably in United Nations forums – of global priorities towards rearmament rather than humanitarian disarmament and arms control. Speaking at the 2025 United Nations General Assembly, President Ramaphosa warned against prevailing global priorities, stating: "We are building weapons, when we should be building social infrastructure."[10]

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[7] Suzanne Graham, *Democratic South Africa's Foreign Policy: Voting Behaviour in the United Nations* (Palgrave Macmillan, 2016).

[8] "South Africa," *ICAN*, https://www.icanw.org/south_africa.

[9] "President Ramaphosa to participate in African Peace Initiative Mission to Ukraine and the Russian Federation," Department of International Relations and Cooperation Republic of South Africa, 15 June 2023, https://dirco.gov.za/president-ramaphosa-to-participate-in-african-peace-initiative-mission-to-ukraine-and-the-russian-federation/.

[10] "Statement by President Cyril Ramaphosa on the occasion of the General Debate of the 80th Session of the United Nations General Assembly, United Nations, New York," Department of International Relations and

President Cyril Ramaphosa at the General Debate of the 80th Session of the United Nations General Assembly, New York, 23 September 2025 (UN Photo Library).

South Africa's position is not without tension or contradiction. Yet its continued insistence on disarmament, even as global conditions are framed as demanding rearmament, signals something crucial for this project: there are states actively constructing security frameworks that do not treat military build-up as the inevitable answer to insecurity. It is this tension – between dominant deterrence logics and alternative security imaginaries – that makes South Africa a compelling case for rethinking peace and security in a post-Western world.

For practitioners and scholars of disarmament, these dynamics matter because the field is facing a fundamental challenge. Disarmament diplomacy is increasingly portrayed as unrealistic or obsolete in contemporary security discourse - an artifact of post–Cold War optimism rendered irrelevant by renewed great-power competition and the return of deterrence as common sense. Yet this diagnosis overlooks a critical development. As Western states re-entrench deterrence-based frameworks, several actors in the Global South are not retreating from multilateralism or disarmament. On the contrary, they are intensifying their commitment to these principles and articulating security claims that challenge the assumption that military build-up is the inevitable response to insecurity.

This divergence matters. While dominant Western interpretations frame the current conjuncture as confirmation of realist imperatives, alternative security architectures are actively being constructed elsewhere grounded in different historical experiences, normative commitments, and ontological assumptions about what security is and how peace can be sustained. The next generation of arms control and disarmament agreements will be negotiated in a genuinely multipolar world, where Western security logics can no longer be presumed as universal or uncontested. In this context, understanding alternative security

Cooperation Republic of South Africa, 23 September 2025, https://gadebate.un.org/sites/default/files/gastatements/80/za_en.pdf.

imaginaries is not an abstract intellectual exercise, but essential infrastructure for effective disarmament practice. This PhD project seeks to contribute to that task: not by offering ready-made solutions, but by expanding the conceptual space within which disarmament diplomacy can once again be imagined as both relevant and necessary.

Regional Perspective on Non-Proliferation and Disarmament: Analysing Africa–EU Relations on Small Arms and Light Weapons (SALW)

By Augustine Ushie

The global debate on non-proliferation and disarmament has increasingly recognised that the diffusion of small arms and light weapons (SALW) constitutes one of the most persistent and destabilising security challenges of the twenty-first century. Unlike nuclear or chemical weapons, SALW are inexpensive, easily transportable, and widely accessible, making them the primary tools of violence in armed conflicts, organised crime, terrorism, and communal clashes. Their widespread availability and misuse fuels cycles of instability, undermines governance, and impedes socioeconomic development.

For Africa, in particular, the proliferation of SALW intersects with porous borders, weak regulatory institutions, and persistent conflict dynamics. For the European Union (EU), its consequences reverberate through migration pressures, transnational crime, and broader regional insecurity. It is therefore essential to foreground SALW in contemporary non-proliferation discourse, not as a peripheral issue but as a central pillar of global peace and security. This essay examines Africa–EU relations on SALW control, highlighting regional perspectives, institutional frameworks, and the evolving partnership aimed at addressing the complex drivers of proliferation.

Africa's experience with SALW proliferation is shaped by a combination of historical, political, and structural factors that have entrenched these weapons in both conflict and post-conflict environments. Decades of civil wars, insurgencies, and political instability have created vast stockpiles of arms that continue to circulate long after hostilities end. Weak border management and limited state capacity allow weapons to move across regions with relative ease, while illicit trafficking networks exploit governance gaps to sustain a lucrative black market.

Regional organisations such as the African Union (AU), the Economic Community of West African States (ECOWAS), and the Regional center on Small Arms (RECSA) have developed a range of normative and institutional frameworks – including the AU Master Roadmap on Silencing the Guns, the ECOWAS Convention on SALW, and the Nairobi Protocol – to address these challenges. These instruments emphasise stockpile management, marking and tracing, harmonisation of national legislation, and cross-border cooperation. Yet implementation remains uneven, constrained by resource limitations, political sensitivities, and the sheer scale of the problem. Understanding Africa's regional perspectives therefore requires acknowledging both the progress achieved and the structural impediments that continue to hinder effective SALW control.

The EU, for its part, has long recognised the global implications of SALW proliferation and has positioned itself as a key partner in international disarmament efforts. Through its Strategy to Combat Illicit Accumulation and Trafficking of SALW and its Ammunition, the EU has prioritised capacity-building, export controls, and support for multilateral instruments such as the Arms Trade Treaty (ATT) and the UN Programme of Action

(UNPoA). In Africa, the EU's engagement has largely taken the form of financial assistance, technical expertise, and institutional partnerships aimed at strengthening national and regional capabilities.

Initiatives such as the EU-funded Physical Security and Stockpile Management (PSSM) programmes, border security projects, and support for marking and tracing systems illustrate the EU's commitment to addressing the supply side of SALW proliferation. At the same time, the EU's interest is not purely altruistic; instability in Africa has direct implications for European security, particularly in relation to irregular migration, organised crime, and terrorism. The Africa–EU partnership on SALW is therefore shaped by a convergence of security interests, normative commitments, and geopolitical considerations.

Despite these shared interests, Africa–EU cooperation on SALW is not without tensions or asymmetries. One of the central challenges lies in the differing threat perceptions and priorities of the two regions. For many African states, SALW proliferation is intertwined with local conflict dynamics, community security, and state legitimacy. Solutions therefore require holistic approaches that integrate development, governance, and peacebuilding. For the EU, however, SALW control is often framed within broader concerns about transnational threats and border security. This divergence can lead to mismatched expectations, with African actors emphasising long-term structural reforms while EU programs sometimes prioritise short-term technical interventions.

Additionally, questions of ownership and agency remain salient. African regional organisations have repeatedly stressed the importance of African-led solutions, yet donor-driven agendas can inadvertently overshadow local priorities. Effective cooperation thus requires a careful balancing of interests, ensuring that external support reinforces rather than supplants regional initiatives.

Another dimension of Africa–EU SALW cooperation concerns the evolving geopolitical landscape and the emergence of new security actors. The increasing presence of external powers – such as Russia, China, and Middle Eastern states – has introduced new dynamics into Africa's security environment, including arms transfers, military partnerships, and private security arrangements. These developments complicate efforts to regulate SALW flows and challenge the coherence of existing regional frameworks. For the EU, this shifting landscape underscores the need for sustained engagement and strategic partnerships that go beyond technical assistance. It also highlights the importance of supporting governance reforms, conflict-prevention mechanisms, and community-level initiatives that address the demand side of SALW proliferation. The Africa–EU relationship must therefore adapt to a more competitive and complex security environment, ensuring that cooperation remains relevant and responsive to emerging challenges.

In conclusion, the issue of small arms and light weapons stands at the intersection of security, development, and governance, making it a critical component of contemporary non-proliferation and disarmament efforts. Africa's experience with SALW proliferation reveals the deep structural and historical roots of the problem, while the EU's engagement reflects both normative commitments and strategic interests. The Africa–EU partnership has achieved notable progress through regional frameworks, capacity-building programs, and multilateral cooperation. Yet persistent challenges – including implementation gaps,

divergent priorities, and evolving geopolitical dynamics – underscore the need for renewed commitment and innovative approaches.

Addressing SALW proliferation requires more than technical solutions; it demands sustained political will, inclusive governance, and a shared understanding of security that bridges regional perspectives. As global attention increasingly turns to the human and developmental costs of armed violence, the Africa–EU relationship offers a valuable model for collaborative, regionally grounded approaches to non-proliferation and disarmament. The 2025 EU Non-Proliferation and Disarmament Next Generation Workshop provides an important platform for advancing this dialogue, ensuring that the next generation of scholars and practitioners continues to refine and strengthen the frameworks necessary for a safer and more secure world.

AI and Nuclear Stability: Challenges and New Directions for Arms Control in the Digital Age

By Luca Rastelli

Nuclear history is marked by several near-miss episodes in which automated command-and-control systems (C2) generated errors or misinterpretations that brought the world to the brink of a nuclear war. In 1995, for instance, just a decade after the Petrov incident, a Norwegian scientific rocket was misinterpreted by Russian early-warning radars as a potential ballistic missile attack. This misreading prompted the activation of Russia's nuclear command system and led to the opening of the presidential "nuclear briefcase." This and similar incidents showcase a recurring feature of nuclear command and control: nuclear decision-making has long depended on fallible technologies that produce ambiguous and often incomplete information.

Today, as militaries increasingly integrate advanced artificial intelligence (AI) software into command, control, communications, intelligence, surveillance, and reconnaissance (C3ISR) systems, marking a shift from automation toward autonomy, the issue of ambiguity becomes even more pronounced.[1] Although AI-enabled systems may outperform previous technologies in terms of speed and data processing, they also introduce qualitatively different risks. Unlike earlier systems, contemporary machine learning (ML) and deep learning (DL) technologies are often opaque, brittle, and difficult to interpret, making their failures less visible, less understandable, and potentially more consequential. As a result, the same features that may make AI attractive in military contexts, namely speed and autonomy, may exacerbate instability in the nuclear domain by generating wrong information while simultaneously compressing decision-making timelines and reducing opportunities for human intervention and ex-post control.

It is therefore important to investigate the impact of AI integration in the nuclear domain and to assess how its inadvertent escalatory effects might be prevented. Given that the major nuclear-armed states, namely the United States and Russia, are already modernising their nuclear command-and-control systems and broader military infrastructures through the adoption of AI, it is unlikely that these developments will slow or reverse in the near future.[2] The key question, then, is what new governance paradigms are required to limit – or, more precisely, to bring out of a legal grey zone – the use of AI in the nuclear domain in order to preserve strategic stability.

To situate this research within the existing scholarship, it is necessary to review scholarship on AI integration in C2 systems, the risks associated with automation and autonomy, and the current governance landscape. Digital technologies were first introduced into nuclear deterrence architectures during the Cold War, at a time when computational capabilities were

[1] Bin Rashid et al., "Artificial intelligence in the military: An overview of capabilities, applications, and challenges," *International Journal of Intelligent Systems*, 1 (2023).
[2] Hans Kristensen et al., "United States Nuclear Weapons," *Bulletin of the Atomic Scientists*, 81, 1 (2025); Hans Kristensen et al., "Russian Nuclear Weapons," *Bulletin of the Atomic Scientists*, 81, 6 (2025); Vladislav Chernavskikh and Jules Palayer, "Impact of military artificial intelligence on nuclear escalation risk," *SIPRI Insights on Peace and Security*, June 2025.

relatively rudimentary and cybersecurity concerns received little attention.[3] The main goal of these early technological applications was to ensure retaliatory capability, a core requirement of mutual assured destruction and the foundation of nuclear deterrence.[4] Early innovations revolved around automation, creating systems capable of mechanically responding to inputs and following predefined procedures without accounting for broader contextual factors.[5] Despite their apparent sophistication, these systems still relied on deterministic expert systems (commonly known as "if-then" logic).

Both the United States and the Soviet Union quickly integrated automation into their early-warning and command processes[6]: The US Semi-Automatic Ground Environment (SAGE) air defense system and the Soviet Perymetr (also known as "Death Hand") exemplify this approach. Although these systems were semi-automated and allowed for limited autonomous functions, their deployment introduced significant risks. While automation accelerated critical C3ISR processes, it also contributed to the kinds of failures and near misses documented in nuclear history.

The introduction of AI into today's security environment requires a clear distinction between the traditional concept of automation and the emerging one of autonomy associated with the recent AI renaissance (Johnson, 2023). AI refers to systems capable of recognising patterns, learning from experience, drawing conclusions, or taking action in ways that resemble human cognition.[7] Advances in statistical modelling and deep neural links, combined with access to large datasets, now allows machines to operate with a high degree of autonomy.[8] Autonomy, in this context, refers to the ability of systems to execute tasks without human input by independently selecting actions based on knowledge derived from interaction with their environment.[9]

However, reliance on statistical models introduces several challenges, including unpredictability, opacity, and brittleness.[10] The lack of transparency inherent in many AI systems is particularly problematic in high-risk environments such as nuclear command and control, where understanding system behaviour is essential for accountability and risk mitigation.[11] These concerns have already been extensively debated in the context of lethal

[3] Beyza Unal and Patricia Lewis, *Cybersecurity of nuclear weapons systems: threats, vulnerabilities and consequences* (London: The Royal Institute of International Affairs, 2018).
[4] Vincent Boulanin, *The impact of artificial intelligence on strategic stability and nuclear risk,* Volume I, Euro-Atlantic perspectives (Stockholm: SIPRI, 2019).
[5] Shannon Bugos, *Arms Control Tomorrow. Strategies to mitigate the risks of new and emerging technologies* (Washington: Arms Control Association, 2023).
[6] Boulanin, *The impact of artificial intelligence on strategic stability and nuclear risk*.
[7] Reuter-Oppemann & Buxmann, "Introduction to artificial intelligence and machine learning," in Thomas Reinhold & Niklas Schornig (eds.) *Armament, arms control and artificial intelligence: The Janus-faced nature of machine learning in the military realm* (Cham: Springer, 2022); Jeffrey Kaplow & Ryan Musto, "Artificial intelligence and the future of nuclear weapons," in Philipp Hacker, (ed.) *Oxford intersections: AI in society* (Oxford: Oxford Academic, 2025).
[8] Beyza Unal, "Governance of artificial intelligence in the military domain," *UNODA Occasional Papers*, No. 42, June 2024.
[9] Bugos, *Arms Control Tomorrow;* Chernavskikh & Palayer, "Impact of military artificial intelligence on nuclear escalation risk."
[10] Heise, "AI, WMD and arms control: The case of nuclear testing," in Reinhold & Schornig (eds.) *Armament, arms control and artificial intelligence: The Janus-faced nature of machine learning in the military realm* (Cham: Springer, 2022).
[11] Fischer, "Military AI applications: A cross-country comparison of emerging capabilities," in Reinhold & Schornig (eds.) *Armament, arms control and artificial intelligence: The Janus-faced nature of machine learning in the military*

autonomous weapons systems (LAWS), and they are equally—if not more—salient in the nuclear domain.

As in civilian contexts, military applications of AI pose serious governance challenges.[12] The main one relates to verification.[13] Given the intangible nature of AI technologies, traditional arms control frameworks, largely based on quantitative approaches, are increasingly ill-equipped to address these developments. While there is broad agreement in academic and policy circles that meaningful human control over decisions involving nuclear weapons must be preserved, this principle often remains vaguely defined and operationally underdeveloped.[14] As a result, existing governance mechanisms struggle to keep pace with rapid technological change.

This work addresses these challenges by applying a qualitative approach grounded in Science and Technology Studies (STS), particularly as applied within International Security Studies. The first part of the work examines the technical specifics of AI, including its applications, limitations, and potential future developments relevant to the nuclear domain, while situating the discussion within broader debate on autonomy as developed in the LAWS framework. The second part addresses current applications of AI within nuclear deterrence architectures, highlighting the specific risks and vulnerabilities they pose. Lastly, through an analysis of military and political discourse, the research explores possible avenues for international governance aimed at slowing, shaping, and regulating these developments.

Given the current geopolitical context, the adoption of new legal instruments, or the amendment of existing ones, appears highly challenging. Therefore, this presentation advocates for the introduction of a new soft-law governance approach to complement the existing corpus of law on nuclear weapons use.[15] Such an approach would address qualitative issues that existing quantitative non-proliferation and international legal agreements were not designed to regulate.

Methodologically, this research conducts a discourse analysis of publicly available political and military statements, nuclear posture documents, and nuclear doctrines issued by the major actors in nuclear governance: the US, Russia, China, the UK, and France. These cases are selected due to their central role in shaping global nuclear governance. The analysis also includes reports from think tank and non-governmental organisations, as well as outputs from formal and informal multilateral fora, including documents from NPT Preparatory Review Conferences and relevant UN resolutions and working papers. Convergence is identified where common definitions or principles emerge across multiple states. Such

realm (Cham: Springer, 2022); Guglielmo Tamburini, "Nuclear weapons and the militarization of AI," in Paolo Cotta-Ramusino et al. (eds.) N*uclear risks and arms control - problems and progresses in the time of pandemics and war* (Cham: Springer, 2023).

[12] Giacomo Persi Paoli et al., "Artificial intelligence in the military domain and its implications for international peace and security: An evidence-based road map for future policy action," *UNIDIR*.

[13] Fei Su, Dr Wilfred Wan, Dr Lora Saalman and Vladislav Chernavskikh, *Pragmatic approaches to governance at the artificial intelligence-nuclear nexus* (Stockholm: SIPRI, 2025); Alice Saltini, "AI and nuclear command, control and communications: P5 perspectives," *European Leadership Network*, November 2025; Boothby, W.H. & Heintschel von Heinegg, W. (eds.) *The Law on Nuclear Weapons: An International Commentary* (Cheltenham: Edward Elgar Publishing, 2025).

[14] Chernavskikh & Palayer, "Impact of military artificial intelligence on nuclear escalation risk."

[15] Boothby & Heintschel von Heinegg (eds.), *The Law on Nuclear Weapons: An International Commentary*.

convergence, if present, may indicate a common understanding of the issue and may underline a baseline for successful governance.

Biographies

Sogol Edriss Abadi is a Trainee Lawyer at the School of Professional Training for the Bar (École de Formation professionnelle des Barreaux du ressort de la cour d'appel de Paris). She holds a PhD in Public International Law from Paris 1 Panthéon-Sorbonne University. Her doctoral dissertation, "The Joint Comprehensive Plan of Action on the Iranian Nuclear Issue in Light of International Law," examines the JCPOA through the lens of international legal frameworks governing non-proliferation. Her research focuses on public international law, arms control law, international security law, and international relations.

Agata Bidas is a University Assistant and PhD student at the Department of the Theory and Future of Law at the University of Innsbruck. A Law graduate from the University of Warsaw, she also holds a Master's in International Development from the University of Vienna. Her research expertise spans international and European legal norms, legal philosophy, and environmental law, with a critical focus on security issues. She is particularly interested in the legal and ethical structures surrounding global challenges, including nuclear weapons and disarmament. Agata uses an interdisciplinary approach to analyse the role of law in shaping a just and sustainable global order. She also actively supports educational and networking initiatives through the NGO International Community in Vienna.

Artur Frantz is Research Assistant at the Department of Peace and Conflict Research, Uppsala University, working on the research project "Opting out? Explaining the effectiveness of election boycotts". Holds a Master of Social Sciences Degree in Peace and Conflict Studies from Uppsala University and Bachelor's Degree in International Relations (cum laude) from the Federal University of Rio Grande do Sul (UFRGS). Member of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) Youth Group and CTBTO Research Fellow, 2025 Cohort. Former Director of Communications and current Research Fellow at the South American Institute on Politics and Strategy (ISAPE).

Trine Rosengren Pejstrup is a PhD fellow at the Danish Institute for International Studies, where she researches conceptions of peace and security with a particular focus on armament and disarmament. She has previous experience at the United Nations Office for Disarmament Affairs as well as United Nations Institute for Disarmament Research.

Augustine Ushie is a lawyer and designated MEP Research Assistant at the European Parliament, where he focuses on migration policy, administrative reform, defense, and Africa–EU relations. At the United Nations Institute for Disarmament Research (UNIDIR), he serves as a Graduate Professional, contributing to efforts that strengthen weapons and ammunition management in Africa and the Americas. He is currently pursuing a triple master's degree: in International Law of Global Security at the University of Glasgow (Scotland, UK), International Relations and Security at the Institut Barcelona d'Estudis Internacionals (Barcelona, Spain), and European Law Advanced at Radboud University (Nijmegen, The Netherlands).

Luca Rastelli is a graduate student in International Security Studies at the University of Trento and the Sant'Anna School of Advanced Studies of Pisa, where he focuses on disarmament, non-proliferation, and the impact of emerging technologies on weapons of mass destruction. He holds an LL.B. in Comparative, European, and International Law from the University of Trento, where he specialized in international human rights law.