

Tried and tested: Why the CTBT must be preserved

December 2025

This paper reflects discussions among members of the ELN's project **Protecting the Non-Proliferation Treaty**. The project seeks to preserve the multilateral nuclear non-proliferation regime and prevent further erosion of the nuclear taboo and the Nuclear Non-proliferation Treaty (NPT). Bringing together an intergenerational, pan-regional Network of experts, it works to identify pathways to success in the eleventh review cycle, taking a holistic approach to the NPT and its three pillars.

For more information on the project please go to www.europeanleadershipnetwork.org/protecting-the-non-proliferation-treaty.

This project is funded by:



Norwegian Ministry
of Foreign Affairs

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Executive summary

- US President Donald Trump's statement about the US resumption of nuclear testing has heightened concerns over a renewed arms race and the erosion of the global norm against nuclear testing enshrined in the Comprehensive Nuclear-Test-Ban Treaty (CTBT).
- The CTBT already faces mounting pressures: Russia's de-ratification of the treaty, North Korea's continued tests, modernisation of nuclear test sites and irresponsible US rhetoric make a return to nuclear testing increasingly plausible. Even a single test could trigger destabilising arms race dynamics and weaken the credibility of the Nuclear Non-Proliferation Treaty (NPT).
- Sustaining the CTBT is a strategic imperative. The treaty reinforces the NPT by bolstering the nuclear non-proliferation norm and constraining the development of new nuclear warhead types. Undermining the CTBT would deepen divisions among NPT state parties, increase mistrust between Nuclear-Weapon States, and negatively impact long-term international security.
- States Parties to the NPT, therefore, need to work together to strengthen the CTBT's credibility and relevance to international security, and prioritise collective multilateral action over any perceived short-term security gains.
- All NPT Nuclear-Weapon States should refrain from a resumption of nuclear weapons tests. They should maintain and publicly reaffirm their unilateral testing moratoria while pursuing early ratification of the CTBT.
- EU and NATO States should ensure consistent and resolute support for the anti-test norm, emphasising that any nuclear weapons test, by any actor, would trigger a unified and robust response.
- All NPT states should reaffirm the CTBT's centrality to the NPT, use all possible diplomatic channels to promote ratification of the CTBT, strengthen their political and financial support for the Comprehensive Test-Ban Treaty Organization (CTBTO), and support remediation measures and assistance for communities affected by nuclear testing.

Introduction

On 30 October, US President Donald Trump announced that he had instructed the Pentagon to “start nuclear testing on an equal basis” with Russia and China.¹ The statement and the ambiguity surrounding its intent have sparked deep concern – reinforcing fears of renewed arms race dynamics among states possessing nuclear weapons and a weakening of the global norm against nuclear testing upheld by the Comprehensive Test-Ban Treaty (CTBT).²

The CTBT is one of the cornerstones of the global nuclear disarmament, non-proliferation and arms control architecture. By prohibiting all nuclear test explosions, it has halted most nuclear weapons tests and curbed the development of new nuclear warheads. The CTBT also reinforces the Nuclear Non-Proliferation Treaty (NPT) regime. The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has strengthened the non-proliferation norm through a global monitoring system capable of detecting even the smallest seismic events, including those associated with nuclear explosions.

Yet the CTBT faces ongoing challenges that threaten both its credibility and its prospects for entry into force. Almost thirty years after its adoption, the CTBT remains in limbo, pending ratification by key states. DPRK’s continued testing, Russia’s de-ratification of the treaty, the modernisation of test sites, and recent pro-testing statements from the US mean that the risk of renewed testing has become increasingly plausible.³

These pressures unfold amid a broader weakening of the global disarmament and arms control architecture. The US and Russia have abandoned key bilateral arms control treaties and agreements. The New START Treaty between the US and Russia – the last remaining agreement limiting the size and deployment of nuclear arsenals – will expire in February 2026. Its lapse will leave both arsenals without verifiable limits, potentially paving the way for an unrestrained arms race.⁴ In this context, any resumption of nuclear testing or further erosion of the test-ban regime will only add fuel to the fire of nuclear competition.

Protecting the CTBT is therefore essential, not only to uphold international norms but also to preserve the credibility of the broader non-proliferation and disarmament framework. The treaty is central to the integrity and credibility of the NPT; its negotiation and entry into force have long been a key demand of the majority of Non-Nuclear-Weapon States and are widely regarded as necessary steps toward a nuclear-weapons-free world.⁵ Weakening the treaty would deepen divisions within the NPT membership, undermine constructive engagement and consensus-building, and complicate efforts to curb nuclear proliferation. It is therefore in the interest of the global community to maintain a legally binding instrument prohibiting all nuclear tests.

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The normative impact of the CTBT

The CTBT complements and reinforces the NPT, serving as a bridge between its non-proliferation and disarmament pillars.

The negotiation of the CTBT marked one of the most significant achievements in the history of global nuclear disarmament and non-proliferation. By establishing a de facto global taboo against nuclear testing, the CTBT has contributed substantially to international security and stability, reducing incentives for nuclear competition and curbing the development of new warhead types. The more than 2,000 nuclear tests between 1945 and the CTBT's adoption in 1996 caused radioactive contamination, health damages, and ecological degradation – humanitarian and environmental consequences that generations of test survivors still grapple with.⁶ By banning any further tests, the treaty has reduced additional instances of such human suffering and environmental devastation.

The CTBT complements and reinforces the NPT, serving as a bridge between its non-proliferation and disarmament pillars.⁷ The preamble of the NPT formally recognises the discontinuance of all nuclear test explosions as an essential step toward nuclear disarmament.⁸ During the 1995 NPT Review and Extension Conference, the indefinite extension of the NPT was explicitly tied to the political commitment to negotiate a comprehensive test ban. The successful conclusion of the CTBT thus served as a critical bargaining chip underpinning the indefinite extension of the NPT, linking the NPT's legitimacy to progress on test-ban commitments.⁹ Since then, the importance of the CTBT has been repeatedly reaffirmed at NPT Review Conferences.¹⁰

The CTBT reinforces confidence in the NPT by limiting horizontal proliferation – ensuring, through an effective International Monitoring System (IMS) operated by the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO), that no nuclear test will occur undetected. The treaty also constrains vertical proliferation by limiting the development of new types of warheads.¹¹

For the majority of Non-Nuclear-Weapon States, the CTBT has been a disarmament priority, seen as essential for achieving a nuclear-weapons-free world and for preserving the equitable balance of rights and obligations under the NPT.¹² The negotiation of the CTBT was seen as a signal that the Nuclear-Weapon States remain committed to their obligations under Article VI of the NPT. The CTBT and NPT are, in this sense, inseparable: the erosion of one directly undermines the credibility of the other, and a return to nuclear testing would be widely perceived as a broader rollback on NPT commitments.

The CTBT's institutional framework, including the CTBTO and the IMS, has demonstrated substantial practical effectiveness. The IMS continuously monitors the globe through a network of seismic, hydroacoustic, infrasound, and radionuclide stations capable of detecting even the smallest nuclear-related events. It provides an unprecedented level of transparency, offering assurances beyond what voluntary moratoria could achieve. Fully operational, the CTBT's verification mechanism – complemented by on-site inspections – should make nuclear tests virtually impossible to conceal, contributing to the irreversibility of disarmament.¹³

Even in the absence of its formal entry into force, the CTBT has exerted a powerful constraining effect.¹⁴ Near-universal adherence to the treaty and the strength of its monitoring and preliminary

verification regime have rendered nuclear testing politically costly and illegitimate; apart from the DPRK, no state has conducted a nuclear test explosion since 1998, a testament to the treaty's normative strength. All five NPT Nuclear-Weapon States have signed the CTBT (with the UK and France having ratified it) and, under international law as reflected in Article 18 of the Vienna Convention on the Law of Treaties, are generally expected to refrain from acts that would defeat its object and purpose.¹⁵ Combined with their unilateral moratoria, this places legal and political restraints on these states to adhere to the “zero-yield” standard by the CTBT, which prohibits any nuclear explosions regardless of size or yield.¹⁶

New and old challenges

Even if not acted upon, Trump's rhetoric increases mistrust among other Nuclear-Weapon States and raises the risk of a renewed nuclear arms race.

Despite the CTBT's normative power and broad international agreement on its value, the treaty's "early" entry into force remains out of reach. The rising geopolitical tensions and deteriorating relations among Nuclear-Weapon States have placed unprecedented strain on the CTBT – including renewed interest in nuclear modernisation and the erosion of political will to sustain nuclear testing moratoria. These growing technical and political pressures on the treaty threaten to undermine the integrity and sustainability of the global test-ban regime.

Political and strategic pressures

Senior US officials have publicly mused about resuming nuclear testing since the first Trump administration, as part of broader efforts to advance US nuclear modernisation or to react to perceived strategic imbalances. This rhetoric reflects the persistent domestic opposition to the CTBT within the US, exemplified by the Senate's refusal to ratify the treaty since 1996.¹⁷ President Trump's recent statement has only revived this pattern in his second term, culminating in the US voting against a CTBT-related resolution in the UN General Assembly for the first time.¹⁸ The fact that Washington alone opposed adopting the resolution marks a growing divergence between US policy and longstanding global support for the treaty.

Such moves undermine the long-standing taboo against nuclear testing, risk normalising discourse around renewed testing, and embolden other states to question the value of maintaining their moratoria. Even if not acted upon, Trump's rhetoric increases mistrust among other Nuclear-Weapon States and raises the risk of a renewed nuclear arms race. US rhetoric has already prompted reciprocal signalling: Russian officials have repeatedly stated that Russia would be ready to resume testing should the United States take such steps.¹⁹

In 2023, Russia formally revoked its ratification of the CTBT, further complicating diplomatic efforts to advance the CTBT's entry into force. Russian officials framed the decision as necessary to restore "strategic parity" with Washington, citing the United States' continued failure to ratify the treaty as justification.²⁰

Meanwhile, satellite imagery and open-source reporting suggest that China has been expanding facilities at its Lop Nur nuclear test site.²¹ These developments, coupled with the rapid expansion of China's nuclear arsenal, raise doubts about the long-term credibility of its testing moratorium and may prompt reciprocal moves by other Nuclear-Weapon States. Reports indicate similar modernisation activities in Russia and the US, highlighting that all of the largest Nuclear-Weapon States may be positioning themselves to resume nuclear testing in the future.²²

Lastly, the actions by the DPRK – the only state to have conducted nuclear tests in the 21st century – continue to challenge the CTBT's normative authority. The emerging strategic partnership between Russia and the DPRK further threatens to undermine collective resolve toward enforcing the anti-test norm. Recently, Russia criticised the "anti-DPRK tone" within the CTBT – a stance that could complicate international responses to future DPRK tests, including within the NPT.²³

Technological and institutional limits

In addition to these political pressures, the CTBT faces long-standing technical and political challenges. While the CTBT explicitly forbids all nuclear test explosions and thus complicates the development of entirely new warhead types, broader modernisation endeavours cannot be constrained by the treaty alone: the CTBT does not cover the development of new delivery systems or qualitative improvements in nuclear command, control, and communication; subcritical tests or computer simulations, that Nuclear-Weapon States have relied on in lieu of full-scale warhead tests, are not prohibited under the CTBT.

Disputes over alleged low-yield testing have been strategically used and politicised, reflecting broader mistrust between Nuclear-Weapon States. The United States has accused Russia and China of non-compliance,²⁴ while Russia has levelled similar allegations against the US.²⁵ Such exchanges further undermine confidence in the regime. In the absence of the treaty's entry into force, on-site inspections cannot be used to check the veracity of such non-compliance allegations.

The intersection between nuclear testing and emerging technologies could put additional pressure on the regime: advanced simulations supported by AI, machine learning, or even quantum computing, could reduce the need for Nuclear-Weapon States to undertake subcritical testing;²⁶ however, this could also nurture the belief among potential proliferators that they can bypass the testing phase – thus undermining non-proliferation objectives. The use of emerging technologies to bolster the CTBTO's increasingly sophisticated monitoring network could, in turn, enhance the organisation's capacity to detect violations, underscoring the treaty's continued practical utility.²⁷

Beyond geopolitical and technical considerations, the CTBT's moral reach is increasingly tied to the recognition of the ongoing humanitarian and environmental consequences of nuclear tests. A resumption of US nuclear testing would likely provoke bipartisan domestic opposition, particularly in US states historically impacted by nuclear tests.²⁸ Affected communities beyond the US continue to suffer from long-term health problems, environmental degradation, and socioeconomic marginalisation resulting from exposure to radioactive contamination. The lack of remediation, compensation, and recognition underscores the political imperative to prevent a resumption of nuclear testing and highlights the importance of addressing these legacies to maintain the legitimacy and moral authority of the global non-proliferation and disarmament regime.²⁹

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Implications for global disarmament and non-proliferation

Nuclear tests are not only technical exercises, but also symbolic acts: states can use them to demonstrate their capabilities and signal their political resolve to domestic and international audiences. Even a single test, therefore, carries significant diplomatic and normative consequences.

Weakening the CTBT in the current security environment would only aggravate great-power relations, intensifying the ongoing deterioration in trust between Nuclear-Weapon States. Recent statements have highlighted the fragility of the existing testing moratorium: Russia and the US have both signalled that they are *ready to resume testing if others do*. This trend risks creating a self-reinforcing cycle of suspicion and renewed testing readiness.

As arms control agreements are interlinked and mutually reinforcing, damage to the CTBT would generate spillover effects and weaken the normative and political foundations of the broader non-proliferation and disarmament regime, particularly the NPT. Challenges to the CTBT's institutional framework could enable clandestine nuclear weapons tests and proliferation. Violations or withdrawals would undermine the legitimacy of the NPT's indefinite extension and cast doubt on political commitments, thereby deepening divisions among State Parties and complicating consensus-building efforts. Weakening the CTBT would also hinder efforts to address the humanitarian and environmental consequences of nuclear testing.

Even passive neglect or unaddressed treaty violations would gradually erode global disarmament and non-proliferation norms. For instance, Russia's protection of the DPRK's illicit nuclear activities makes it increasingly difficult to respond decisively to any future North Korean tests and to uphold the anti-test norm. If the US resumed nuclear testing, European states would face a dilemma between safeguarding the CTBT and NPT and maintaining alliance cohesion. European silence or hesitation to any violation of the norm against testing would legitimise selective compliance and reinforce perceptions of double standards. A clear and principled response – although diplomatically difficult – would be essential to preserve the normative authority of both the CTBT and the broader disarmament and non-proliferation framework.

If the CTBT erodes, all states will lose, though some more than others. The two largest Nuclear-Weapon States, the US and Russia, would gain little from resuming nuclear testing, as both already possess extensive historical test data and advanced simulation capabilities.³⁰ Advanced infrastructure to maintain reliable arsenals has made full-scale tests strategically unnecessary for established nuclear powers: subcritical tests and simulations provide sufficient assurance of warhead safety and reliability.³¹ By contrast, nuclear newcomers and proliferators would benefit from a weakened anti-test norm, in that it would allow them to refine their weapon designs and narrow technological gaps. At the same time, without the CTBT, established nuclear powers would be left with fewer reliable means to verify their opponents' activities and growing uncertainty about others' capabilities.³²

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Preserving the global test-ban regime

Preventing the weakening of the CTBT while working towards its full operation must remain a primary objective for the international community.

It remains, therefore, in the global interest to maintain a legally binding prohibition on all nuclear weapons tests. The CTBT offers the only comprehensive, verifiable framework capable of sustaining this global ban. Achieving universal ratification and entry into force would strengthen the broader disarmament, arms control and non-proliferation architecture, including the NPT, and contribute to a more predictable and secure international environment. Preventing the weakening of the CTBT while working towards its full operation must remain a primary objective for the international community. Most importantly, States Parties to the NPT need to work together to strengthen the CTBT's credibility, uphold long-term international security, and prioritise collective multilateral action over any perceived short-term gains. As part of this effort, there are concrete steps that the P5, EU and NATO states, NPT States Parties at large, as well as other relevant stakeholders can take to preserve and reinforce the test-ban regime.

For the P5:

- The five NPT Nuclear-Weapon States should maintain and publicly reaffirm their moratoria on nuclear testing, including a commitment to refrain from acts that would defeat the object and purpose of the CTBT.
- China, Russia, and the United States should engage in confidence-building measures to reduce potential misperceptions and reinforce adherence to the zero-yield standard. Such measures could include mutual notification of the purpose and scope of subcritical tests and reciprocal visits to nuclear test sites.³³
- China, Russia, and the United States should actively tackle domestic barriers to CTBT ratification and take concrete, time-bound steps to pursue early ratification.
- The UK should place the preservation and entry into force of the CTBT on the P5 agenda and leverage the P5 process to encourage China, the United States, and Russia to refrain from nuclear weapons tests and to renew and reinforce unilateral moratoria.³⁴
- France and the UK should lead efforts to recommit the P3, and possibly the P5, to support the CTBT, reaffirm their zero-yield moratoria, and call on all nuclear-armed states to maintain similar moratoria.

For EU and NATO states:

- Both in the European Union and NATO, states should coordinate to ensure consistent and resolute messaging regarding the anti-test norm and the potential resumption of nuclear testing: they should emphasise that any nuclear weapons test, by any actor, would trigger a unified and robust response.
- EU states should underscore in their discussions with US counterparts, including at the highest political level, the CTBT's value for international security and non-proliferation, as well as the humanitarian and environmental impacts of nuclear testing.

- NATO states should ensure that internal discussions – at both political and strategic levels – consistently highlight the CTBT's value for international security and non-proliferation, as well as the strategic disadvantages the United States would incur were it to resume nuclear testing. These points should be raised regularly in consultations to help shape a coherent position and to encourage a coordinated approach in engagements with the United States.

For all NPT States Parties:

- All NPT States Parties should reaffirm the CTBT's centrality to the NPT and maintain strong language on the CTBT at the 2026 RevCon – in line with the Outcome Documents of 2000 and 2010 and the draft 2022 Outcome Document (see table).
- States Parties to the CTBT should utilise all available diplomatic channels to promote the ratification of the CTBT by all remaining Annex-2 States, maintaining pressure on both Nuclear-Weapon States and Non-Nuclear-Weapon States.
- All states should maintain and, wherever possible, strengthen their political and financial support for the CTBTO and its International Monitoring System.
- All states should champion initiatives linking nuclear disarmament to justice for communities affected by nuclear testing, including efforts on victim assistance and environmental remediation.

For all stakeholders:

- Governments, think tanks, and civil society actors focused on arms control and disarmament should devote the utmost attention to the CTBT's entry into force and increase their diplomatic and public advocacy efforts to strengthen the test-ban regime.
- All stakeholders should strengthen their support for the CTBTO and its activities, including funding, outreach, and technical cooperation.
- All stakeholders should actively support communities affected by nuclear testing by promoting comprehensive victim assistance, environmental remediation, and long-term recovery efforts, ensuring that humanitarian and ecological consequences are addressed alongside broader non-proliferation objectives.
- Governments, think tanks, and civil society actors should intensify engagement with US policymakers and communities supporting them to raise awareness of the humanitarian and environmental consequences of nuclear testing, highlight the broader security risks posed by any resumption of testing, and promote direct dialogue on the importance of maintaining the testing moratorium.

Possible language for the 2026 NPT Review Conference

To strengthen the CTBT and the test-ban norm, the 2026 NPT Review Conference should, inter alia,

- reaffirm the importance of the entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) at the earliest possible date, recalling the responsibility of all States that have ratified the Treaty to promote the CTBT;
- recognise that the entry into force of the CTBT is of the utmost importance as it will provide the global community with a permanent, non-discriminatory, verifiable and legally binding commitment to end any nuclear weapon test explosion or any other nuclear explosion, as a means to constrain the development and qualitative improvement of nuclear weapons, which constitutes an effective measure of nuclear disarmament and nuclear non-proliferation;
- urge all States to refrain from any action that may hamper progress towards the entry into force of the Treaty and its universalisation;
- express concern over Russia's de-ratification of the Treaty and call on Russia to respect the object and purpose of the Treaty, including its commitment, as a State signatory, to the moratorium on nuclear tests and to the deployment of the Comprehensive Nuclear-Test-Ban Treaty verification regime;
- express concern over the continued rhetoric of resuming nuclear testing by the USA and Russia and call on both states to respect the object and purpose of the Treaty, including their commitment, as State signatories, to their moratorium on nuclear tests and to the deployment of the Comprehensive Nuclear-Test-Ban Treaty verification regime;
- call upon the five Nuclear-Weapon States to acknowledge and continue observing their unilateral moratoriums on nuclear weapon tests since the opening for signature of the Comprehensive Nuclear-Test-Ban Treaty and refrain from any act that would undermine the Treaty's object and purpose;
- call for the immediate and unconditional cessation of all forms of nuclear weapons tests and encourage Nuclear-Weapon States, pending the Treaty's entry into force, to take steps towards irreversibly converting their test sites to prevent a resumption of nuclear explosive testing, following the example of France;
- reaffirm that a ban on nuclear test explosions constrains the development of new nuclear weapons, as well as the development of advanced new types of nuclear weapons, thus contributing both to nuclear disarmament and non-proliferation;
- reaffirm the commitment of all States parties, in particular the Nuclear-Weapon States, to ending all nuclear weapon test explosions, thereby constraining the development and qualitative improvement of nuclear weapons;
- reiterate that the Nuclear-Weapon States have a particular responsibility to ratify the Treaty, encourage ratification of the Treaty, and call upon them to take the initiative in this regard;
- call upon all States to strengthen support for communities affected by nuclear testing, including through victim assistance and environmental remediation.

Strengthening long-term global gains over short-term security

Preserving the CTBT is not merely a legal or moral obligation, but a strategic imperative: a test of whether the international community can still prioritise long-term collective security over short-term geopolitical gain.

The condition of the anti-test norm can be viewed as a litmus test for the international community's capacity and will to uphold collective security over perceived short-term gains. Renewed calls for nuclear testing reflect not strategic necessity but a failure of strategic memory. Reversing the global test-ban norm would dismantle one of the most enduring achievements of post-Cold War diplomacy, eroding transparency, trust, and stability. If lost, the CTBT's legal, normative, and institutional framework would be almost impossible to replace.

The lessons of history underscore the enduring strategic and moral significance of banning nuclear tests. Nuclear tests were the harbinger of a nuclear arms race during the second half of the last century. A sustainable and verifiable, legally binding test-ban regime will remain central to advancing nuclear disarmament in the years ahead. In any future world without nuclear weapons, the CTBT's institutional framework will be indispensable for verifying that no state (re-)acquires nuclear capabilities.

Safeguarding the CTBT is therefore also a forward-looking investment in global security. It strengthens verification, sustains restraint, and prevents the return of destabilising arms race dynamics. Nuclear-Weapon States, in particular, bear a heightened responsibility to reaffirm their moratoria, advance ratification, and restore credibility to their disarmament obligations under the NPT.

Weakening the CTBT would have consequences far beyond the test-ban regime itself. It would weaken the normative and institutional fabric of the disarmament and non-proliferation system, amplify mistrust among states, and create conditions conducive to renewed nuclear competition. Preserving the CTBT is thus not merely a legal or moral obligation, but a strategic imperative: a test of whether the international community can still prioritise long-term collective security over short-term geopolitical gain.

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Published by the European Leadership Network, April 2025.

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