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# China's Secret Nuclear Tests

**How Great Power Competition Threatens to Erode International Testing Norms**

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**The United States has accused China of conducting secret nuclear weapons tests in violation of international norms and testing moratoria. Because of its comparatively limited historical testing record, China has strong incentives to obtain additional test data for the modernization of its nuclear weapons programme. Thus, it would be disadvantageous for Washington to respond by resuming underground nuclear testing, as Russia and China would benefit more from the erosion of international testing norms. For their part, Germany and Europe can take only limited action by promoting greater transparency and confidence-building measures.**

The allegation that China is secretly testing nuclear weapons marks a new phase in the global arms competition and raises the question of how Germany, Europe and the United States should respond to the erosion of international norms and the continued lack of nuclear transparency. Since 2019, US compliance reports on arms control agreements have suggested that China and Russia are probably conducting secret underground nuclear testing in violation of international testing moratoria and the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

In February 2026, the United States presented new evidence at the United Nations regarding an underground nuclear weapons test allegedly conducted by China in June 2020. Although the seismic evidence is not conclusive, Beijing has so far failed to provide convincing explanations to the contrary and has not responded to calls for increased nuclear transparency. Germany should therefore seriously consider the possibility that China has violated international norms against nuclear testing and that the alleged June 2020 test was not an isolated incident. As a non-nuclear-weapon state, however, Germany has only limited room for manoeuvre in the strategic great power competition between the United States, Russia and China. Chinese testing activities not only create a verification problem for arms control compliance; they also raise the question of how the United States will respond politically. The resumption of underground nuclear testing by the United States has been discussed on several occasions within the first and second Trump administration. From a strategic perspective, such a step would benefit China and Russia more than it would Washington.

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## Why states test nuclear weapons

Between 1945 and 1992, the United States conducted 1,054 nuclear tests in the atmosphere, in outer space and underground in the Nevada desert. With 715 such tests, the Soviet Union achieved a total of comparable magnitude. By contrast, China had conducted only 45 nuclear tests by 1996. Compared with the United States and Russia, China possesses not only a much smaller but also a qualitatively more limited testing base, as the Chinese tests were conducted using inferior diagnostic instrumentation. In the era of science-based testing, research on nuclear weapons relies on computer simulations as well as high-energy-density physics and X-ray physics. Consequently, test data form the basis of calibration and validation.

Whether computer-based or underground, states test nuclear weapons for a variety of reasons. Nuclear tests have signalling and deterrence effects, particularly for newer nuclear powers such as Pakistan and North Korea in recent decades. Nuclear testing serves to investigate the safety, security and effectiveness of the nuclear weapons arsenal. Complex testing programmes are necessary for the development of new nuclear warhead designs to improve performance. Nuclear tests also make it possible to analyse weapons effects under controlled conditions. These include not only the study of radioactive effects on soldiers but also blast-pressure and radiation effects on urban infrastructure. Military systems such as communications satellites, ballistic re-entry vehicles and the nuclear warhead itself are likewise tested for survivability in a nuclear environment and exposed to gamma radiation.

In addition to effectiveness, safety is a central focus of nuclear testing programmes. One-point safety is intended to ensure that warheads do not detonate unintentionally even if delivery systems fail, crash to the ground, or catch fire. During the Cold War, tensions quickly arose between the need for the safety, security and effectiveness of the nuclear weapons arsenal, on the one hand, and the destabilizing effects of nuclear testing on international security, as well as on people and the environment, on the other.

## Why nuclear testing is regulated

As early as the 1960s, several international agreements regulating nuclear testing were concluded after the scientific community and interest groups had drawn attention to the associated health risks and environmental damage. In 1963, the Limited Test Ban Treaty (LTBT), which restricts nuclear tests in the atmosphere, in outer space and underwater, entered into force. In 1974, the United States and the Soviet Union concluded the Threshold Test Ban Treaty (TTBT), which established a maximum explosive yield of 150 kilotons for underground nuclear tests. But owing to allegations of cheating and mutual distrust, the TTBT did not enter into force until 1990. In the meantime, the US and the USSR had each conducted another 300 or so underground tests.

It was only once the Cold War had ended that the opportunity arose for a comprehensive ban on nuclear testing. In 1992, the US Congress adopted a temporary, unilateral moratorium on underground nuclear testing that became a permanent moratorium in 1996. Although the legislative amendment authorized another 15 tests, President Bill Clinton decided, as a gesture of goodwill, to implement the moratorium with immediate effect. The moratorium contains a clause, still in force to this day, under which the United States could return to nuclear testing should another state test nuclear weapons. Since 1996, Pakistan, India and North Korea have all conducted multiple tests. Yet the current allegations against China and Russia also might provide the United States with a legal justification for resuming underground nuclear testing. As long as the norm against nuclear testing endures, however, technological advances in nuclear weapons design will be delayed and significant barriers will con-

tinue to impede the proliferation of nuclear weapons.

## The Comprehensive Nuclear-Test-Ban Treaty (CTBT)

Since 1996, the international norms against nuclear testing have been codified in the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Although the treaty has been signed by 187 states and ratified by 178, it has not formally entered into force yet. For this to occur, it must be ratified by 44 states in possession of certain nuclear capabilities; to date, only 35 have done so, including Germany. India, Pakistan, and North Korea have not signed the treaty. Meanwhile, China, Egypt, Iran, Israel and the United States have signed but not ratified it.

In 1999, the US Senate rejected the treaty by a vote of 51 to 48, citing, among other concerns, the safety and reliability of the US nuclear arsenal and the limited verifiability of test bans in China and Russia. Nevertheless, both the first Trump administration and the Biden administration reaffirmed their commitment to the unilateral testing moratorium in their respective nuclear posture reviews. Russia, by contrast, revoked its ratification of the CTBT in 2023, in the context of the war in Ukraine, to put itself on an equal footing with the United States.

Although the treaty has not yet formally entered into force, it is largely observed in practice. This is consistent with Article 18 of the Vienna Convention, which obliges states not to undermine the object and purpose of a treaty they have signed. In the case of the CTBT, this also applies to China, Russia and the United States. As a result, an internationally respected norm against nuclear testing has become established.

To avoid creating loopholes in international law, no minimum-yield threshold was stipulated in the CTBT. Instead, the United States relies on the zero-yield standard, under which nuclear explosions that produce a self-sustaining, supercritical chain reaction are prohibited regardless of their yield. At the same time, certain nuclear experiments remain permissible, specifically subcritical hydrodynamic tests that do not produce a self-sustaining chain reaction. These tests make it possible to generate experimental data for incorporation into computer models with the aim of ensuring the continued safety, security and effectiveness of nuclear weapons.

Despite the CTBT's pending entry into force, the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), headquartered in Vienna, has been tasked with establishing an International Monitoring System (IMS). The IMS consists of seismic monitoring stations, hydroacoustic monitoring stations, infrasound stations and radionuclide detection stations. The seismic monitoring stations are intended to unambiguously detect underground nuclear tests with a yield exceeding 1 kiloton of TNT, although the system's true sensitivity is as low as 500 tons of TNT equivalent. The CTBTO and its IMS are funded by UN member states such as China, Russia, Germany and the United States, although Washington's contributions for 2026 remain pending. Only with adequate funding for the IMS can compliance with the norm against nuclear testing be ensured.

## Did China conduct secret nuclear tests?

Although the CTBT has not yet entered into force, the International Monitoring System is of critical importance. At the Geneva Conference on Disarmament in February 2026, the Trump administration's allegations against China were supported by data from a CTBTO monitoring station. On 22 June 2020, a seismic sensor stationed in Makanchi, Kazakhstan, had recorded a seismic event measuring 2.75 on the Richter scale. Two clearly distinguishable explosions were detected 12 seconds apart. Such a seismic signature corresponds neither to natural earthquakes nor to typical mining explosions. The epicentre of the event, which was also recorded by national moni-

toring stations, was beneath the Lop Nur nuclear test site in northwestern China.

Based on the seismic data, the US Department of State estimates the nuclear yield of the June 2020 event at 10 tons of TNT equivalent. But to date there has been no conclusive independent verification of that estimate. This is because the IMS is able to reliably detect nuclear tests only at yields exceeding 500 to 1,000 tons of TNT equivalent. The CTBTO, however, often operates sensor systems that are less capable than national verification systems.

The suspicions directed against China are further strengthened by the dual structure of the seismic signal recorded in Makanchi. When nuclear tests are conducted in underground caverns, the nuclear yield can be seismically decoupled from the surrounding rock, whereby the resulting seismic signature is significantly attenuated. If the explosion causes the cavern to subsequently collapse, a second, time-delayed seismic signal can be recorded. This is precisely what happened at the CTBTO monitoring station in Kazakhstan.

According to current estimates, seismic decoupling can reduce the measurable yield by a factor of at least 20 to 40. Assuming that seismic decoupling occurred, the estimated nuclear yield of 10 tons of TNT equivalent would therefore correspond to an actual nuclear yield of at least 200 to 400 tons of TNT equivalent. Such a yield strongly suggests that a nuclear explosion did take place, since chemical detonations conducted as part of legally permissible nuclear weapons experiments are less powerful.

Despite these indications, the available evidence remains inconclusive. The situation could be more adequately assessed if the United States were to provide additional information, although there are understandable reasons for maintaining secrecy, such as the need to protect intelligence sources and methods. In the absence of convincing Chinese counterarguments, however, the impression is reinforced that the US accusations are to be taken seriously. It is noteworthy that Beijing has categorically rejected the allegations but has not made any formal counter-allegations against Washington.

There are several possible explanations both for the type of nuclear test conducted and for the motivation behind it. The first question is whether the recorded event was a conventional explosion, a subcritical explosion without a self-sustaining chain reaction or a supercritical explosion involving a self-sustaining chain reaction. Under the CTBT, conventional and subcritical tests are permitted and, indeed, are regularly conducted at the Nevada National Security Site in the US state of Nevada. The seismic decoupling hypothesis, however, implies a yield that would be unusually high for conventional and subcritical tests. Consequently, there is reason to support the possibility of a supercritical reaction.

At the same time, it cannot be ruled out that the intensity of the event was the result of an accident. But this line of reasoning can be sustained only if the June 2020 test was an isolated event. The current messaging from Washington suggests that China is conducting a systematic and ongoing nuclear testing programme that violates international norms, testing moratoria and the CTBT.

## China's motivation

Because China has conducted only 45 nuclear tests — far fewer than either Russia or the United States — it has less confidence in the safety, security and reliability of its own arsenal, particularly since those tests employed comparatively rudimentary diagnostic instrumentation. Underground nuclear testing can thus provide important data on the safety of China's nuclear arsenal and the effectiveness of its modernization programme.

Some observers suggest that China has been testing one-point safety mechanisms. Such tests would destabilize the international norm against nuclear testing only to a limited extent since their sole purpose would be to enhance the safety of the na-

tional arsenal against unintended detonations. However, there remains the question of why China rejects the above-mentioned US allegations. Furthermore, a nuclear yield of 200 to 400 tons of TNT equivalent would be unusually high for one-point safety testing.

A more plausible explanation is that the event recorded in June 2020 was an actual weapons physics and warhead design test. The data obtained could be used to validate computer simulations and develop new sub-kiloton tactical warhead designs. From China's perspective, such a capability could provide additional nuclear response options vis-à-vis the United States, particularly in a Taiwan contingency.

Although the nuclear yield alone does not allow one to determine whether the test involved a low-yield tactical nuclear weapon or a strategic nuclear bomb with variable yield, such tests can nevertheless contribute to the miniaturization of warheads and their improved manoeuvrability and survivability. This would be in keeping with China's objectives of expanding its nuclear capabilities in the western Pacific and achieving regional hegemony. China is currently in the process of establishing itself as a third nuclear superpower and has expanded its arsenal in recent years from 300 to 600 warheads. By 2035, the arsenal is projected to increase to an estimated 1,500 warheads. However, Beijing's nuclear programme remains shrouded in secrecy.

As early as August 2019, the US Department of State expressed concern in compliance reports that China had conducted several nuclear tests the previous year. Since then, the US government has repeatedly stated that both Russia and China have likely violated international testing moratoria. These suspicions have been reinforced by publicly available analyses of satellite imagery documenting extensive construction and other activities at the Lop Nur test site in northwestern China between 2020 and 2024. The activities identified included the expansion of roads, electrical infrastructure, storage facilities for high explosives and extensive tunnel construction. Vertical boreholes, horizontal tunnel systems and diagnostic cabling all raise verification issues that are difficult to resolve in the absence of CTBT ratification. The analysis is further complicated by the fact that similar infrastructure developments can also be observed at the Nevada National Security Site and at the Russian test site on the Arctic Archipelago of Novaya Zemlya.

To dispel the impression of double standards, the Biden administration invited observers from the P5 (China, France, Russia, the United Kingdom and the United States) to the Nevada National Security Site as a transparency- and confidence-building measure. China and Russia both declined.

## Washington's response to China

It is no coincidence that China was accused of conducting secret nuclear tests shortly after the New START Treaty on strategic arms reduction between Russia and the United States had expired. During President Donald Trump's first term in office, the White House had already considered resuming nuclear testing. In working-level discussions, US nuclear testing was viewed as a possible means of forcing China to the negotiating table with the aim of concluding trilateral arms control agreements. This approach, however, was quickly dismissed as impractical both by experts and officials within the White House itself. The United States has the most extensive nuclear testing history and the world's most advanced capabilities for science-based stockpile stewardship. Washington therefore has the most to lose if the major powers were to resume underground nuclear testing.

Ahead of the 2024 US presidential election, the conservative Heritage Foundation revisited the issue in its *Project 2025* report and called for the immediate resumption of nuclear testing. President Trump adopted a similar position when, on 30 October 2025, he announced that nuclear testing would resume and justified the move by citing Russian and Chinese testing activities. Al-

though Secretary of Energy Chris Wright was quick to roll back that announcement soon after, the question has since remained whether the United States will soon resume testing in the Nevada desert.

The timeline for such a return is set out in Presidential Decision Directive 15 (PDD-15), issued by President Bill Clinton. According to the directive, the National Nuclear Security Administration (NNSA) could conduct a basic test with minimal diagnostic instrumentation and under relaxed environmental requirements within six to 10 months. A fully instrumented test, on the other hand, would require a lead time of 24 to 36 months, while nuclear tests conducted for the development of new nuclear weapon systems would require up to five years.

Advocates of underground nuclear testing argue that because of the aging plutonium pits and the ongoing nuclear modernization programme, it is not an option to rely solely on computer-based methods, many of which continue to depend on data collected during the Cold War. They also contend that without underground testing, the credibility of nuclear deterrence vis-à-vis China and Russia cannot be maintained.

A crucial argument to be used against the nuclear testing advocates is that China and Russia are already deterred, not least because the United States is itself deterred by their respective nuclear arsenals. From a political perspective, a return to underground nuclear testing would likely receive little support in the swing state of Nevada with potentially far-reaching consequences for US elections. It remains unclear, for example, to what extent newer high-rise buildings in Las Vegas, including the Trump International Hotel, could withstand the seismic vibrations from underground nuclear testing.

In addition, underground tests are only limited simulations of atmospheric nuclear explosions. At the systems level, there are currently no unresolved issues that urgently require underground testing. On the contrary, advances in X-ray and laser experiments have significantly improved the understanding of weapons physics since the testing moratorium went into effect. Whereas underground nuclear test explosions demonstrate primarily *that* a system works, modern methods make it possible to understand *why and how* a system works. Although uncertainties remain in the models, they concern mainly secondary weapon effects, such as electromagnetic pulses and nuclear weapon-induced fires. For the purpose of this debate, such uncertainties can therefore be disregarded.

## How Washington continues to test safety and effectiveness

Since the introduction of the nuclear testing moratorium in 1992, the United States has conducted 34 subcritical tests without a self-sustaining chain reaction at the Nevada National Security Site and plans to increase that number to three tests per year by the end of the decade. Subcritical tests involving fissile material allow scientists to study the behaviour of plutonium under compression. Similar effects occur in the primary stage of thermonuclear weapons — the predominant type of nuclear weapon in today's arsenals. The fission energy released in subcritical tests is negligibly small and comparable to a nuclear yield of approximately 0.1 milligrams of TNT equivalent. This stands in sharp contrast with China's nuclear test in June 2020, which is estimated to have had a nuclear yield of 10 tons of TNT equivalent in the coupled test configuration and 200 to 400 tons of TNT equivalent in the decoupled test configuration.

Under the NNSA's Stockpile Stewardship and Management Program, data from subcritical tests are used to validate science-based stockpile stewardship. The objective is to prevent safety mechanisms from failing and nuclear weapons from detonating unintentionally. At the same time, the programme is intended to increase confidence in the reliability of the US nuclear arsenal, thereby strengthening nuclear deterrence. In the national nuclear weapons

laboratories in Los Alamos, New Mexico, and Livermore, California, the most powerful supercomputers are employed for this purpose and are complemented by advanced X-ray and laser facilities such as the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) and the National Ignition Facility (NIF).

The principal areas of research include fusion ignition, materials physics and the behaviour of plutonium under shock and aging conditions. The programme not only serves to maintain nuclear deterrence and modernize the arsenal; it also generates foundational scientific knowledge with broad applications for society. Science-based stockpile stewardship is the NNSA's highest priority and receives between $10 billion and $16 billion in annual funding from the US Department of Energy. Since 2003, the programme has been subject to annual reviews and certifications by the commander of US Strategic Command and the directors of the Los Alamos, Lawrence Livermore and Sandia national laboratories. Should the programme ever be judged inadequate, the NNSA would resume underground nuclear testing.

## International implications

Because China has conducted only a fraction of the number of nuclear tests that Russia and the United States have each carried out, it has less confidence in its own testing record. At the same time, the United States remains far ahead of both China and Russia in its science-based stockpile stewardship capabilities. Experts largely agree that China would benefit the most from the full resumption of nuclear testing. Given the Sino-American rivalry in the Indo-Pacific and China's emergence as a third major nuclear power, such a development would not be in Washington's interest. At the same time, there is concern that India, Pakistan and North Korea could be drawn into renewed nuclear testing competition, which would further undermine stability in the Indo-Pacific.

Should the major nuclear powers — and, in their wake, the secondary nuclear powers — resume underground nuclear testing on a full scale, the norm of nuclear nonproliferation would continue to erode. Since 1945, nuclear weapon states have conducted tests not only to analyse the effectiveness and performance of their arsenals but also to signal their acquired capability to carry out a retaliatory nuclear strike. An erosion of the norm against nuclear testing could also provide latent nuclear states with new incentives for nuclear testing. In the international discourse, countries such as Poland, South Korea, Saudi Arabia and even Germany are increasingly seen as potential nuclear proliferators, even though proliferation in Germany and other states would face significant technical, legal and political obstacles.

## What can Germany do?

The issue of nuclear testing is also of importance for Germany and Europe. The Federal Republic of Germany regards itself as a values-based actor and supports the preservation of both the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Together with its European allies and international partners, Germany should exert diplomatic pressure on China and call for greater transparency regarding China's nuclear testing programme. Confidence-building measures would help prevent the further hardening of the accusations. Such measures would be consistent with Beijing's repeatedly expressed support for the CTBT. On-site inspections, more comprehensive data sharing from monitoring stations and voluntary advance notification of civilian underground explosions could significantly increase confidence that China is complying with testing norms without incurring a strategic disadvantage. Should Beijing fail to respond to the allegations in a transparent manner, there would be strong grounds for concluding that the seismic event of 22 June 2020 was indeed a secret nuclear

weapons test that violated the CTBT and international testing norms.

In addition, Germany and the European Union should support Washington's call for greater nuclear transparency and new strategic arms control agreements. At the same time, it is important from a security policy perspective that Germany and Europe draw up an independent assessment of the available evidence and emphasize to the United States the central importance of comprehensive testing moratoria for international stability. China, along with Russia, would benefit most from a new era of nuclear testing, while the security of Germany and Europe would likely be weakened.

Finally, at a time when multilateral institutions are increasingly being undermined and overlooked, Berlin can help ensure that there is adequate funding for institutions such as the International Atomic Energy Agency (IAEA) and the CTBTO, along with its International Monitoring System. This, too, would contribute to greater strategic stability, the prevention of nuclear proliferation and the continued adherence to nuclear testing moratoria.



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