

What are tactical nuclear weapons? An international security expert explains and assesses what they mean for the war in Ukraine

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Tactical nuclear weapons were designed to be used on the battlefield rather than for strategic defense, but that doesn't mean there's a plausible case for using them.

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Tactical nuclear weapons have burst onto the international stage as Russian President Vladimir Putin, facing battlefield losses in eastern Ukraine, has threatened that Russia will “[make use of all weapon systems available to us](#)” if Russia's territorial integrity is threatened. Putin has characterized the war in Ukraine as an [existential battle against the West](#), which he said wants to weaken, divide and destroy Russia.

U.S. President Joe Biden [criticized Putin's overt nuclear threats against Europe](#). Meanwhile, NATO Secretary-General Jens Stoltenberg [downplayed the threat](#), saying Putin “knows very well that a nuclear war should never be fought and cannot be won.” This is [not the first time](#) Putin has invoked nuclear weapons in an attempt to deter NATO.

I am an international security scholar who has [worked on](#) and researched [nuclear restraint](#), [nonproliferation](#) and [costly signaling](#) theory applied to international relations for two decades. Russia's large arsenal of tactical nuclear weapons, which are not governed by international treaties, and Putin's doctrine of threatening their use have raised tensions, but tactical nuclear weapons are not simply another type of battlefield weapon.

Tactical by the numbers

Tactical nuclear weapons, sometimes called battlefield or nonstrategic nuclear weapons, were designed to be used on the battlefield – for example, to counter overwhelming conventional forces like large formations of infantry and armor. They are smaller than strategic nuclear weapons like the warheads carried on intercontinental ballistic missiles.

While experts [disagree about precise definitions](#) of tactical nuclear weapons, lower explosive yields, measured in kilotons, and shorter-range delivery vehicles are commonly identified characteristics.

Tactical nuclear weapons vary in yields from fractions of 1 kiloton to about 50 kilotons, compared with strategic nuclear weapons, which have yields that range from about 100 kilotons to over a megaton, though much more powerful warheads were developed during the Cold War.

For reference, the atomic bomb dropped on Hiroshima was 15 kilotons, so some tactical nuclear weapons are capable of causing widespread destruction. The [largest conventional bomb](#), the Mother of All Bombs or MOAB, that the U.S. has dropped has a 0.011-kiloton yield.

Delivery systems for tactical nuclear weapons also tend to have shorter ranges, typically under 310 miles (500 kilometers) compared with strategic nuclear weapons, which are typically designed to cross continents.

Because low-yield nuclear weapons' explosive force is not much greater than that of increasingly powerful conventional weapons, the U.S. military has reduced its reliance on them. Most of its remaining stockpile, about 150 [B61 gravity bombs](#), is [deployed in Europe](#). The U.K. and France have completely eliminated their tactical stockpiles. Pakistan, China, India, Israel and North Korea all have several types of tactical nuclear weaponry.

Russia has retained more tactical nuclear weapons, [estimated to be around 2,000](#), and relied more heavily on them in its nuclear strategy than the U.S. has, mostly due to Russia's less advanced conventional weaponry and capabilities.

Russia's tactical nuclear weapons can be deployed by ships, planes and ground forces. Most are deployed on air-to-surface missiles, short-range ballistic missiles, gravity bombs and depth charges delivered by medium-range and tactical bombers, or naval anti-ship and anti-submarine torpedoes. These missiles are mostly held in reserve in central depots in Russia.

Russia has updated its delivery systems to be able to carry either nuclear or conventional bombs. There is heightened concern over these dual capability delivery systems because Russia has used many of these short-range missile systems, particularly the Iskander-M, to bombard Ukraine.

Video: Russia's Iskander-M mobile short-range ballistic missile can carry conventional or nuclear warheads. Russia has used the missile with conventional warheads in the war in Ukraine.

Tactical nuclear weapons are substantially more destructive than their conventional counterparts even at the same explosive energy. Nuclear explosions are [more powerful by factors of 10 million to 100 million](#) than chemical explosions, and leave deadly radiation fallout that would contaminate air, soil, water and food supplies, similar to the disastrous Chernobyl nuclear reactor meltdown in 1986. The interactive simulation site [NUKEMAP](#) by Alex Wellerstein depicts the multiple effects of nuclear explosions at various yields.

Can any nuke be tactical?

Unlike strategic nuclear weapons, tactical weapons are not focused on mutually assured destruction through overwhelming retaliation or nuclear umbrella deterrence to protect allies. While tactical nuclear weapons have not been included in arms control agreements, medium-range weapons were included in the now-defunct [Intermediate-range Nuclear Forces treaty](#) (1987-2018), which reduced nuclear weapons in Europe.

Both the U.S. and Russia reduced their total nuclear arsenals from about [19,000 and 35,000 respectively](#) at the end of the Cold War to about [3,700 and 4,480 as of January 2022](#). Russia's

reluctance to negotiate over its nonstrategic nuclear weapons has stymied further nuclear arms control efforts.

The fundamental question is whether tactical nuclear weapons are more “useable” and therefore could potentially trigger a full-scale nuclear war. Their development was part of an effort to overcome concerns that because large-scale nuclear attacks were widely seen as unthinkable, strategic nuclear weapons were losing their value as a deterrent to war between the superpowers. The nuclear powers would be more likely to use tactical nuclear weapons, in theory, and so the weapons would bolster a nation’s nuclear deterrence.

Yet, any use of tactical nuclear weapons would invoke defensive nuclear strategies. In fact, then-Secretary of Defense James Mattis notably [stated in 2018](#): “I do not think there is any such thing as a tactical nuclear weapon. Any nuclear weapon use any time is a strategic game changer.”

Video: This documentary explores how the risk of nuclear war has changed – and possibly increased – since the end of the Cold War.

The U.S. has criticized Russia’s nuclear strategy of [escalate to de-escalate](#), in which tactical nuclear weapons could be used to deter a widening of the war to include NATO.

While there is disagreement among experts, Russian and U.S. nuclear strategies focus on deterrence, and so involve large-scale retaliatory nuclear attacks in the face of any first-nuclear weapon use. This means that Russia’s threat to use nuclear weapons as a deterrent to conventional war is threatening an action that would, under nuclear warfare doctrine, invite a retaliatory nuclear strike if aimed at the U.S. or NATO.

Nukes and Ukraine

I believe Russian use of tactical nuclear weapons in Ukraine would not achieve any military goal. It would contaminate the territory that Russia claims as part of its historic empire and possibly drift into Russia itself. It would increase the likelihood of direct NATO intervention and destroy Russia’s image in the world.

Putin aims to deter Ukraine’s continued successes in regaining territory by preemptively [annexing regions in the east of the country](#) after holding staged referendums. He could then declare that Russia would use nuclear weapons to defend the new territory as though the existence of the Russian state were threatened. But I believe this claim stretches Russia’s nuclear strategy beyond belief.

Putin has explicitly claimed that his threat to use tactical nuclear weapons [is not a bluff](#) precisely because, from a strategic standpoint, [using them is not credible](#). In other words, under any reasonable strategy, using the weapons is unthinkable and so threatening their use is by definition a bluff. <http://theconversation.com/republishing-guidelines> —>

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P.S.

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