

10.25.2022 SHOW NOTES

On Nuclear Warfare

THE EPOCH TIMES

Nuclear War Is Thinkable

The West is miscalculating if it thinks it can safely push Putin to the brink

Patricia Adams and Lawrence Solomon

October 12, 2022

Commentary

In an [address to his nation](#) in September, Russian President Vladimir Putin said he would use nuclear weapons if [Russia's](#) territorial integrity were threatened.

[“This is not a bluff.](#) ... Our independence and freedom will be defended—I repeat—by all the systems available to us,” he said.

Most military authorities in the West all but dismiss Putin’s threat, confident that they can corner Putin without risking a nuclear response. “He knows very well that a [nuclear war](#) should never be fought and cannot be won,” stated [NATO](#) Secretary-General Jens Stoltenberg.

The scenario that the West dismisses would begin with Russia’s use of a battlefield tactical nuclear weapon in Ukraine. The United States would then make good on its high-profile threat of an [“overwhelming”](#) retaliation by [itself and its NATO allies](#) against the Russian homeland using conventional non-nuclear weapons. That U.S. attack on Russia’s territorial integrity would then trigger Russia’s nuclear weapons doctrine, which calls for Russian nuclear-weapons retaliation against the United States and NATO.

When NATO asserts that a nuclear war cannot be won, it is referring to the doctrine of “mutual-assured destruction,” which posits that in an all-out nuclear war, both sides would annihilate each other, making nuclear war futile. The doctrine is strengthened by the popular belief that detonating nuclear bombs would lead to radioactive fallout that would render land uninhabitable.

These conventional wisdoms don't stand up to scrutiny. The nuclear bombs that the United States dropped on Hiroshima and [Nagasaki](#) in 1945—the only sources of real-world data involving the effects of radiation on nuclear bomb victims—provide compelling evidence that the devastation wrought by nuclear bombs is mostly limited to the target.

As documented by the Atomic Bomb Disease Institute of the Nagasaki University School of Medicine, most of the physical damage to property was confined to 1.2 miles from ground zero. As for the human toll, the bombs killed 97 percent of those who were [within less than 1 mile](#) of ground zero, 28 percent of those within 1.2 miles, and very few who were as much as 1.8 miles away.



A Japanese soldier walks through the atomic bomb-levied city of Hiroshima, Japan, in September 1945. Photographed by Lt. Wayne Miller, USNR. (NARA)

The institute, which analyzed the medical records of [120,000 survivors](#) continuously since 1968, found that deaths from radiation mostly occurred within a 1.8-to-2.5-mile radius from ground zero, where victims received high doses of radiation. [Beyond 2.5 miles](#), the institute discovered, those who received relatively low doses of radiation outlived the general population. To underscore the short-lived nature of radiation from a nuclear bomb, [Hiroshima was rebuilt in two years](#),

and Nagasaki took longer for lack of funds. By the mid-1950s, [their populations matched their pre-bomb size](#).

When pundits dismiss a Russian resort to nuclear weapons, they are referring to a tactical bomb of [the same order of magnitude](#) as the 21-kiloton Nagasaki bomb. Putin is merely “fearmongering,” asserted retired [Gen. Jack Keane](#), chairman of the Institute for the Study of War, who says Putin’s generals wouldn’t undermine their army’s ability to continue its invasion. “His army on the battlefield, they’re not trained to deal with a radioactive nuclear battlefield.”

Keane should remember that Russians were involved in the aftermath of the Chernobyl disaster in Ukraine, which taught that the only precautions Russian troops would need to take before entering a radioactive battlefield would be to [avoid consuming produce](#) from contaminated farms. At Chernobyl, lives were lost among firefighters in the inferno, who absorbed deadly amounts of radiation, but otherwise, the [United Nations Scientific Committee](#) on the Effects of Atomic Radiation found no scientific evidence of increases in “mortality or in non-malignant disorders that could be related to radiation exposure.”

If Russia were to defy the nuclear taboo and employ a tactical nuclear weapon, [as some in the Russian military argue](#), the result could be catastrophic, but not because the battlefield would have become radioactive. The catastrophe would arise should the United States follow through with its threat of “[catastrophic consequences](#)” by unleashing massive non-nuclear bombardments of the Russian homeland in order to [obliterate Russia’s military](#), topple its government, and [end the Russian Federation](#). As punctuated by Putin, the United States intends to “[finish off](#)” Russia.

In the event of such an existential attack on the Russian homeland, Russia and its leaders—who would now have nothing to lose—would almost surely adhere to their [long-established military doctrine](#) and launch strategic nuclear weapons against the West. Any other response would be improbable, not least because [Russia has a superior nuclear arsenal](#), according to Hans Christensen, director of the Nuclear Information Project.

While both countries have a comparable number of nuclear bombs—[5,977 for Russia and 5,428 for the United States](#)—Russia’s arsenal is in a superior state of readiness. Moreover, the United States seems to acknowledge that [it has no](#)

[defense](#) against Russia's [submarine-based Poseiden](#) nuclear bombs, which could trigger tsunamis that would overwhelm its coastal cities, or its [air-based hypersonic missiles](#), which could evade U.S. missile defenses on their way to destroying U.S. cities.



FA hypersonic Zircon cruise missile is fired from the guided missile frigate Admiral Gorshkov during a test at the Barents Sea, in this still image taken from a video released on May 28, 2022. (Russian Defence Ministry/Handout via Reuters)

U.S. military analysts believe that Russia is capable of [destroying all major U.S. cities](#) and that the United States could potentially do the same to Russia. Here lies another advantage for Russia, whose “[scorched-earth](#)” military strategy defeated the Swedes under Charles XII when they invaded in the 18th century, the French under Napoleon in the 19th century, and the Germans under Adolf Hitler in the 20th century. Unlike the United States, whose conduct in Vietnam, Somalia, Beirut, Kosovo, Iraq, and Afghanistan has led military analysts to believe it has no stomach for casualties, the Russians see as heroic their ability to bear immense hardship—its willingness to abandon Moscow to Napoleon’s army remains a symbol of its indomitability.

If Russia resorts to a tactical nuclear weapon, an all-out nuclear war is unlikely to happen because the United States—not Russia—is bluffing in its claim of

retaliation. But Russia is unlikely to use a tactical nuclear weapon because it is confident of victory—Ukraine’s recent recoveries of territory came of massively outnumbering Russia’s military, a failing Russia plans to remedy by a call-up of reserves that will [triple its forces](#) facing Ukraine’s military.

The threat of nuclear war is nevertheless real amid continuing attempts to push Putin to the brink. Ukrainian President Volodymyr Zelenskyy recently argued that [NATO should preemptively strike Russia](#) to “exclude the possibility of use of nuclear weapons by Russia,” and U.S. [military hawks](#) beat a perpetual drumbeat.

All bets are now off. “The idea of nuclear conflict, once unthinkable, has become a subject of debate,” [U.N. Secretary-General António Guterres](#) admitted after Putin’s “this is not a bluff” warning. Russia’s nuclear superiority, national pride, and willingness to suffer hardship allow it to consider nuclear war both thinkable and winnable.

Views expressed in this article are the opinions of the author and do not necessarily reflect the views of The Epoch Times.

Nukes pretty please

A blog about nuclear power. Also debunking false claims about radiation, and nuclear power.

Tuesday, 16 June 2015

What's the real risk in a nuclear war?

Most people are very confused about nuclear war because all the information we pick up about it comes from science fiction, fantasy and dystopian culture. Being a child of the nuclear age, I can't help asking myself **what's the real risk?**

Nuclear bombs are powerful weapons

The data from Hiroshima and Nagasaki tell us that the real risk is immediate and proximate. Nuclear weapons are bombs of immense power. Anyone caught up in the blast radius is at major risk from the blast, the heat, and the electromagnetic (radioactive) pulse. This is all obvious.

If I survived the bombs, could I survive in the resultant nuclear *wasteland and fallout?*

People frequently write about a nuclear wasteland making life impossible after bombs have dropped. For example:

- ["Horribly compelling: Bruce Conner's nuclear test film still holds us in rapture"](#). Pay particular attention to the comments following the article.
- In the 1957 novel ["On the Beach", by Nevil Shute](#), the characters are told they will die when radiation fallout from the atomic war reaches Australia. Reading that novel prompted [Helen Caldicott](#) into a lifetime of anti-nuclear activism!
- In the TV series Battlestar Galactica (2004 / 2009), our human fugitives eventually find earth but it is a radioactive wasteland where they can't survive due to widespread atomic war a thousand years ago. This is fantasy, not science fiction.

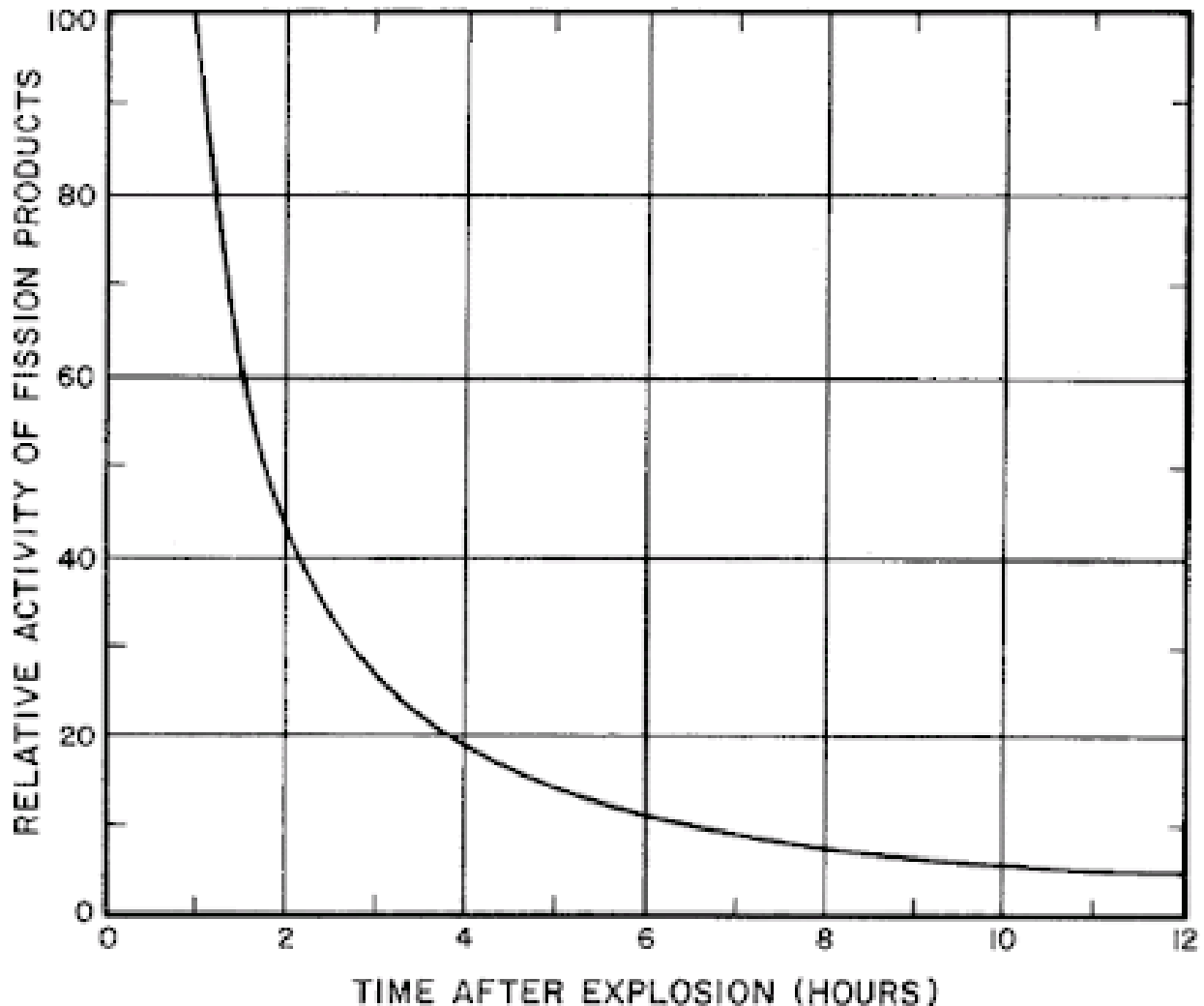


Figure 1.64. Rate of Decay of fission products after a nuclear explosion (activity is taken as 100 at 1 hour after the detonation).

Three months after an atomic war, the real risk to life is barely measurable. Consider the chart showing how radioactivity decays after a nuclear bomb blast. Notice how sharply the curve falls until it almost flattens out. That's because many of the fission products produced have very short half-lives. They quickly decay into other radionuclides or inactive substances. After 2 hours activity is down to 18% of initial. Thereafter the biggest threat is from iodine-131. Iodine-131 can be absorbed by the thyroid and may lead to thyroid cancer. It has a half-life of 8 days, so is thought to pose a real risk for up to 80 days. After 80 days its activity is down to just 0.1% of the initial value. The risk from iodine-131 is mainly to children and teenagers (those still growing). The way to mitigate this threat is to use [iodine pills](#).

Longer lived radionuclides such as caesium-137 and strontium-90 have half-lives of 30 years. It won't be until 300 years after the blasts that their activity is down to 0.1%. Yet these longer lived substances pose no big problem for survivors. First, longer half-lives give substances with much lower radioactivity; second, because survivors will be living in areas outside blast radii such as the countryside, suburbs, or small towns; third, because exposure to radioactivity below 100 mSv is not found to pose significant long-term harm to people. There's a radiation threshold we can tolerate. The realization of this threshold is quite recent. Prior to that, nearly all projections made for harm due to post-blast radioactivity and fallout assumed *no-threshold*. Modeling with no-threshold was regarded as the safe and responsible thing to do. Further, the mathematical model used, called [linear no-threshold](#), LNT, had assumptions to make the maths as easy as possible. It was linear, had no dose threshold, and dose was considered additive. This *theory* turns science inside out. In place a theory deriving from evidence, LNT is a theory to make modeling as easy as possible. Field evidence doesn't support LNT. Much of the evidence outright contradicts it - showing improved health after low exposure to radiation; what is known as [radiation hormesis](#). In short: when scientists follow the evidence they can't possibly arrive at a LNT model.

What about birth defects?

Don't worry. There's some small danger to pregnant women exposed to the electromagnetic pulse, but no danger to anyone exposed only to fallout. Read: [Birth defects among the children of atomic-bomb survivors \(1948-1954\)](#). Far more harm has been experienced from worrying over this. 200,000 women were persuaded to have abortions after the Chernobyl accident. We're now pretty certain that exposure to the Chernobyl radiation fallout would not have led to even a single birth defect.

Radiation sickness

Again, [radiation sickness](#) is only a threat to those exposed to the electromagnetic pulse at the time of an explosion. Such people will be close to the centre of a bomb explosion and be exposed to large amounts of radioactivity (exposure: 1000 mSv or more). It will be a small minority of people. Far more bomb casualties are blast or fire victims. Radiation sickness can lead to death but some subjects do recover. It's caused by massive tissue damage and cell die off.

Cancer

A larger number of people exposed to a high A-bomb electromagnetic pulse may develop cancer. (exposure: 100 mSv or more).

The Hiroshima and Nagasaki evidence shows the great majority of nuclear bomb victims died due to injuries inflicted by the blast, or fires.

Nuclear Winter?

In the 1970s, some scientists guessed that a large scale nuclear war would lead to fires most everywhere, burning for days on end, sending a plume of dust into the atmosphere. This dust would affect the climate for many months causing global cooling and a [nuclear winter](#). Atomic bomb survivors would be hard pressed to feed themselves after the atomic war. These scenarios are basically models which assume the worse in every case. Other scientists have completely dismissed the nuclear winter scenarios. See: [Cresson H. Kearny; Home Office dismissed nuclear winter threat as scaremongering, files show](#)

Summary

Provided a bomb didn't drop right on you, and that you weren't in the immediate area of the blast and radiation pulse, you're unlikely to suffer radiation harm. The real threats after an atomic war will be crime, social breakdown, disease and malnutrition. Exactly what we find in the aftermath of conventional war. Even if you're close to an explosion centre, provided you don't die from blast or fire, you're still far more likely to live on, to survive, than you are to die.

Useful information

- [The Dangers from Nuclear Weapons: Myths and Facts](#)
- [Hiroshima and Nagasaki: The Long Term Health Effects](#)
- online book: [Radiation and health, by Thormod Henriksen and Biophysics group at UiO, 1997](#)
- online book: [The Effects of Nuclear Weapons, compiled and edited by Samuel Glasstone and Philip J. Dolan, 1977](#)
- book: [Nuclear War Survival Skills \(2012 Edition\), by Cresson H. Kearny](#)
- book: [Radiation and Reason, Wade Allison, 2009](#)

- book: [Radiation Hormesis, by T. D. Luckey, 1991](#)
- video: [BBC Horizon Nuclear Nightmares 2006](#) (has good discussion on LNT)
- [Birth defects among the children of atomic-bomb survivors \(1948-1954\)](#)
- [Home Office dismissed nuclear winter threat as scaremongering, files show](#)

Posted by [Jack Eddyfier](#) at [10:49](#)

Russian military doctrine calls a limited nuclear strike “de-escalation.” Here’s why.

By [Nikolai N. Sokov](#) | March 8, 2022

Editor’s note: This article was [originally published](#) in 2014, as Russia was seizing Crimea. It is being published in updated form here because of its obvious relevance to the current Russian invasion of Ukraine, and to Russian President Vladimir [Putin’s recent threats](#) regarding the use of nuclear weapons.

In 1999, at a time when renewed war in Chechnya seemed imminent, Moscow watched with great concern as NATO waged a high-precision military campaign in Yugoslavia. The conventional capabilities that the United States and its allies demonstrated seemed far beyond Russia’s own capacities. And because the issues underlying the Kosovo conflict seemed almost identical to those underlying the Chechen conflict, Moscow became deeply worried that the United States would interfere within its borders.

By the next year, Russia had issued a new military doctrine whose main innovation was [the concept of “de-escalation”](#)—the idea that, if Russia were faced with a large-scale conventional attack that exceeded its capacity for defense, it might respond with a limited nuclear strike. To date, Russia has never publically invoked the possibility of de-escalation in relation to any specific conflict. But Russia’s policy probably limited the West’s options for responding to the 2008 war in Georgia. And it is probably in the back of Western leaders’ minds today, dictating restraint as they formulate their responses to events in Ukraine.

Game-changer. Russia’s de-escalation policy represented a reemergence of nuclear weapons’ importance in defense strategy after a period when these weapons’ salience had decreased. When the Cold War ended, Russia and the United States suddenly had less reason to fear that the other side would launch a surprise, large-scale nuclear attack. Nuclear weapons therefore began to play primarily a political role in the two countries’ security relationship. They became status symbols, or insurance against unforeseen developments. They were an ultimate security guarantee, but were always in the background—something never needed.

Then a very different security challenge began to loom large in the thinking of Russia's political leaders, military officers, and security experts. That challenge was US conventional military power. This power was first displayed in its modern incarnation during the Gulf War of 1990 and 1991—but the game-changer was the Kosovo conflict. In Yugoslavia the United States utilized modern, high-precision conventional weapons to produce highly tangible results with only limited collateral damage. These conventional weapons systems, unlike their nuclear counterparts, were highly usable.

The Russian response, begun even before the conflict over Kosovo had ended, was to develop a new military doctrine. This effort was supervised by Vladimir Putin, then-secretary of Russia's Security Council, a body similar to the National Security Council in the United States. By the time the doctrine was adopted in the spring of 2000, it was Putin who signed it in his new capacity as president.

The doctrine introduced the notion of de-escalation—a strategy envisioning the threat of a limited nuclear strike that would force an opponent to accept a return to the status quo ante. Such a threat is envisioned as deterring the United States and its allies from involvement in conflicts in which Russia has an important stake, and in this sense is essentially defensive. Yet, to be effective, such a threat also must be credible. To that end, all large-scale military exercises that Russia conducted beginning in 2000 featured simulations of limited nuclear strikes.

De-escalation rests on a revised notion of the scale of nuclear use. During the Cold War, deterrence involved the threat of inflicting unacceptable damage on an enemy. Russia's de-escalation strategy provides instead for infliction of "tailored damage," defined as "damage [that is] subjectively unacceptable to the opponent [and] exceeds the benefits the aggressor expects to gain as a result of the use of military force." The efficacy of threatening tailored damage assumes an asymmetry in a conflict's stakes. Moscow reasoned when it adopted the policy that, for the United States, intervening on behalf of Chechen rebels (for example) might seem a desirable course of action for a variety of reasons. But it would not be worth the risk of a nuclear exchange. Russia, however, would perceive the stakes as much higher and would find the risk of a nuclear exchange more acceptable. Indeed, in the early 2000s, Russian military experts wrote that US interference in the war in Chechnya could have resulted in a threat to use nuclear weapons.

The new strategy did not come out of the blue. Its conceptual underpinnings follow from Thomas Schelling's seminal books *The Strategy of Conflict* and *Arms and Influence*. At the operational level, the strategy borrows from 1960s-era US policy, which contemplated the limited use of nuclear weapons to oppose "creeping" Soviet aggression (as expressed, for example, in a 1963 document produced by the National Security Council, "[The Management and Termination of War with the Soviet Union](#)").

How and where? Common sense might suggest that any limited use of nuclear weapons for de-escalation purposes would involve non-strategic (shorter-range) weapons. But this does not appear to be the thinking. In 2003, the Ministry of Defense issued a white paper that dotted the new doctrine's i's and crossed its t's. The white paper emphasized, among other things, that because the United States could use its precision-guided conventional assets over significant distances, Russia needed the ability to deter the use of those assets with its own long-range capabilities.

Accordingly, simulations of the limited use of nuclear weapons have featured long-range nuclear-capable systems (long-range air-launched cruise missiles above all, but medium-range bombers as well). To the extent that one can determine the targets that have featured in these exercises, they seem to be located over much of the world—Europe, the Pacific, Southeast Asia, the Indian Ocean, and even the continental United States. Targets appear to include command and control centers as well as airbases and aircraft carriers from which US aircraft could fly missions against Russia. In other words, for limited-use options, Russia appears to target military assets rather than the population or economic centers that were typical targets under Cold War strategies.

It is important to note amid all this that Russia's nuclear weapons are assigned only to conflicts in which Russia is opposed by another nuclear weapon state. When Russia was preparing the 2010 edition of its military doctrine, some proposed that the possibility of using nuclear weapons be expanded to more limited conflicts, such as the 2008 war with Georgia—but this proposal was rejected. Ultimately the 2010 doctrine tightened [conditions under which nuclear weapons could be used](#). Whereas the 2000 document allowed for their use "in situations critical to the national security" of Russia, the 2010 edition limited them to situations in which "the very existence of the state is under threat." (Otherwise, the nuclear component of military doctrine remained fundamentally unchanged from 2000.)

Lessons acknowledged? Nuclear weapons command attention and generate fear. But their utility is limited. Outside the most extreme circumstances, the damage they can inflict is simply too great and horrible for the threat of using them to be sufficiently credible. Furthermore, nuclear deterrence is fundamentally a defensive strategy—capable of deterring attack but incapable of supporting a proactive foreign policy. The United States, because of its conventional military power, is able to pursue a proactive foreign policy, and this has long been the envy of Russia’s politicians and military leaders.

The 2000 version of Russia’s military doctrine characterized the limited use of nuclear weapons as a stopgap measure to be relied on only until Russia could develop a more modern conventional strike capability, similar to that which the United States possessed. Russia’s efforts to develop such a capability have been under way for more than a decade. Progress was slow at first due to chronic underfunding and the poor state of the Russian defense industry. The substandard performance of Russia’s conventional forces during the 2008 war in Georgia led many to dismiss the idea that Russia would ever match the United States in conventional capabilities. But Moscow learned lessons from its Georgian experience, and modernization efforts have intensified in the last five years.

Today, Russia can boast of a new generation of long-range air- and sea-launched cruise missiles, as well as modern short-range ballistic and cruise missiles and precision-guided gravity bombs. Theoretically, the cruise missiles could carry nuclear warheads, but their envisioned role is primarily conventional. Additionally, Russia’s GLONASS satellite constellation now enables precision targeting and communications across the globe. Russia has also begun developing a global strike capability, analogous to the US Prompt Global Strike initiative, in the form of a new intercontinental ballistic missile that the military has said is primarily intended to carry conventional warheads.

Military maneuvers conducted last year, known as West 2013, were apparently the first large-scale Russian exercises since 2000 that did not feature the simulated use of nuclear weapons. This hints that Moscow has gained more confidence in its conventional capabilities. As these capabilities continue to improve, Russia is likely to rely less on its nuclear weapons. But this shift will significantly alter the Eurasian security landscape.

If Russia becomes able to project military force in the same way that the United States has projected force in Kosovo, Iraq, and Libya, Moscow will likely become more assertive in its foreign policy. This will affect NATO policy in turn. The alliance, owing in large measure to US dominance in conventional military power, has been able in recent years to reduce (though not eliminate) its reliance on nuclear weapons. But if Russia begins to close the conventional weapons gap with the United States, some NATO countries might argue that nuclear deterrence should regain some of its former prominence.

Thus, though Russia's reliance on nuclear weapons, including their "limited" use, is not good for international security, the likely alternative will hardly enhance security either. To avoid a new arms race—one centered around conventional weapons, which are less terrifying but more usable than nuclear weapons—it makes sense to begin work now on arms control options that would cover modern conventional strike and defense assets. Unfortunately, the majority of the US Congress refuses to consider arms control arrangements for classes of weapons in which the United States currently enjoys an advantage. But as history has demonstrated, no technological advantage lasts forever. One hopes that those capable of averting a new arms race acknowledge history's lessons before it's too late.

[The US accidentally hit Hawaii with an EMP in the 1960s](#)

by [Alex Hollings](#) Oct 17, 2019

On July 9, 1962, the United States launched a Thor rocket armed with a [W49](#) thermonuclear warhead up to an altitude of around two hundred and fifty miles over the Pacific and detonated it. It took thirteen minutes for the missile to reach its predesignated altitude before the 1.45 megaton explosion illuminated the night sky for hundreds of miles in every direction. The missile, designated Starfish Prime, remains the biggest bomb ever detonated in space to this day.

Scientists were poised to study the effects of radiation at high altitudes on Johnston Island below. Twenty-seven smaller rockets were launched alongside Starfish Prime to measure the effects of the detonation, but none of them, nor the scientists involved, were prepared for what would occur as a result of the explosion.

The flash created by the explosion as seen through heavy cloud cover from Honolulu nearly 900 miles away. (WikiMedia Commons)

In the near vacuum of space, free electrons were hurled from the explosion in every direction and faced no atmospheric impedance. Instead, they formed a brief but powerful, electromagnetic pulse that caused power outages and other electrical issues on the Hawaiian Islands, nearly a thousand miles away. At least six satellites orbiting near the explosion were lost despite the distance seeming so insurmountable that the U.S. government hadn't even considered the likelihood of such damage occurring. Scientists had discovered that high altitude detonations of [nuclear weapons](#) could disrupt the flow of electricity in devices thousands of miles away from the point of detonation. Starfish Prime was not just a [nuclear weapon](#), it was a weaponized EMP (electromagnetic pulse).

"To our great surprise and dismay, it developed that Starfish added significantly to the electrons in the Van Allen belts," Atomic Energy Commission Glenn Seaborg [wrote](#) in his memoirs. "This result contravened all our predictions."

In the scope of threats to our way of life, few things should be more concerning than the prospect of a foreign nation using this method to cripple the infrastructure of the United States. If a 1.45 megaton bomb could knock out electronics a

thousand miles away, imagine what a warhead the size of the Soviet Tsar Bomba would do if detonated in low orbit above us. Its 50-megaton yield would render the entire U.S. power grid a thing of the past. Cars wouldn't start. Phones wouldn't work. The blackout would be all encompassing and permanent.

The threat of an EMP being detonated above us isn't only a Russian one. According to Dr. William Graham, who served as a [science advisor](#) to President Reagan and was a member of the Department of Defense's Science Board, the threat could easily come from North Korea or Iran.

Unlike strategic [nuclear](#) strikes that require elaborate targeting systems and rocket technology, an EMP strike would only need to reach high altitude airspace above the U.S. According to Graham, a rocket delivering a [nuclear](#) warhead could be fired from a simple container ship. In July of 2014, [ISIS](#) claimed that even they currently have one captured Scud missile in their possession that could theoretically do the job. North Korea's missile program could feasibly deliver the payload effectively even from [their own shores](#).

In 2008, a [federal commission](#) assigned to study EMPs and their possible damage to the infrastructure of the United States concluded that an attack on the American power grid could result in [killing](#) a whopping ninety percent of Americans over a twelve-month span. Our growing dependence on technology for things like communication, transporting goods, and extending the shelf life of supplies would result in Americans starving in the dark. The real damage would likely be self-inflicted as people grew desperate and started fighting among themselves. To a large extent, a single (large enough) EMP detonation could wipe the United States, as we know it, off the map.

The same EMP commission that determined potential casualty figures also reported that both Russia and China have "considered limited nuclear-attack options that, unlike their Cold War plans, employ EMP as the primary or sole means of attack."

Russia's cold war era "Fractional Orbital Bombardment System" program aimed to place [nuclear](#) warheads in orbit, where they could be detonated prior to entering the atmosphere and likely would not be detected until after already knocking out the majority of America's power grid. Senior Russian military personnel were reportedly recruited by North Korea to help develop their [nuclear](#) arsenal, and

although the missile testing gets the majority of the press, they state plainly that the North Koreans are developing their program with using [nuclear](#) EMPs in mind.

It seems likely then that World War III, if ever this world is unfortunate enough to see it, will almost certainly involve the use of EMP attacks.

The Potential Consequences of an EMP Attack on the U.S. Electric Grid

Spencer Rogers
February 25, 2019

Submitted as coursework for [PH241](#), Stanford University, Winter 2019

What is an EMP?

An electromagnetic pulse (EMP) is a burst of electromagnetic energy created by the rapid acceleration of charged particles. There are a number of different types of electromagnetic pulses, but this report will primarily focus on nuclear electromagnetic pulses resulting from a high-altitude nuclear burst. Three main phenomena take place in the wake of a high-altitude nuclear burst. First, the interaction between gamma rays and atmospheric air molecules produces a prompt EMP field, also referred to as E1. This EMP peaks at tens of kilovolts per meter in a few nanoseconds and lasts for a few hundred nanoseconds. E1 has a broad-band power spectrum of frequency content between 10 to 100 megahertz, which allows it to couple with general electrical and electronic systems, without regard for the length of the systems penetrating cables or antenna lines. An E1 induces currents ranging into the 1000s of amperes and any exposed systems may be disturbed or permanently damaged. [1]

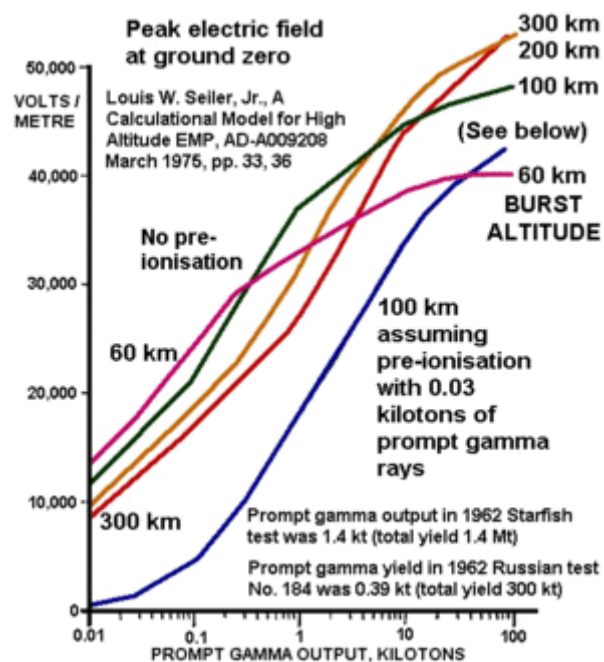


Fig. 1: Peak Electric Field at Ground Zero (Volts/meter) as a function of prompt gamma output (kilotons) from high altitude EMP tests. [4] (Source: [Wikimedia Commons](#))

An E1 induces currents ranging into the 1000s of amperes and any exposed systems may be disturbed or permanently damaged. [1]

Second, delayed gamma rays and neutron-induced currents produce the second component of the EMP field, referred to as E2. E2 lasts from microseconds to milliseconds, has a magnitude in hundreds of volts per meter, and spectral characteristics similar to naturally occurring lightning. [1]

Third, the distortion of the earth's magnetic field lines due to the expanding nuclear fireball and the rising of heated and ionized layers of the ionosphere, produce the third component of the EMP field, the late-time EMP, referred to as magnetohydrodynamic (MHD) EMP or E3. Changes to the magnetic field at the Earth's surface induce currents of 100s-1000s of amperes in long conducting lines, of a few kilometers or greater, that impair components of the electricity grid and connected systems. The combination of these three phenomena could severely jeopardize the sustainability of society as we know it if an EMP attack on the United States were successful. [1]

Potential Consequences of a Successful EMP Attack on the U.S. Electric Grid

In a recent assessment on the risks associated with an EMP, the Electromagnetic Defense Task Force (EDTF) of the United States Air Force noted that the occurrence of an EMP could have dire consequences for society as a whole and that, as of the report's release, the U.S. government has failed to mitigate the consequences of such an attack. [2] The U.S.'s concern over an EMP attack traces back to the Cold War, where the U.S. worried that the Soviet Union might look to knock out military communications and national command authority through an EMP attack generated by a high-altitude nuclear weapon, therefore eliminating the U.S. military's ability to respond to a nuclear attack. Though the U.S. military has taken steps to ensure that they would maintain national command authority and be able to operate after an attack, the U.S. government has failed to properly protect the electric grid and other critical infrastructure from the existential threat of an EMP attack. [2]

A successful EMP attack on the U.S. could lead to a nationwide blackout of the electric power grid and a shutdown of critical infrastructure reliant on the grid, including, but not limited to, communications, transportation, food and water supply, and sanitation. Such a shutdown could last as long as a year, and without such critical infrastructure, a large fraction of the America could die from starvation, disease, or the effects of general societal collapse. Furthermore, in a

worst-case scenario, all nuclear reactors in the affected region could be impacted, leading to as many as 60 meltdowns similar to Japan's Fukushima Daichi Nuclear Disaster. Without off-site electricity, these reactors would be reliant on on-site systems to prevent a meltdown, which could also be compromised in the event of an EMP attack. Without both off-site and on-site power, the risk of radioactive contamination to the continental United State drastically increases, further compounding the damage done by the attack. [3]

Recommendations to Mitigate the Threat of Such an Attack

Though the consequences of an EMP attack or a naturally occurring EMP event would be severe, there are a number of steps the United States can take to mitigate the risks associated with such an event. In its recent report, the Electromagnetic Defense Task Force (EDTF) of the United States Air Force provided recommendations on how to address vulnerabilities to the U.S. power grid and grid-dependent critical infrastructure. First, the task force recommends the immediate creation of a presidentially appointed executive agent to manage U.S. national infrastructure protection from the threat of an EMP. Furthermore, the EDTF advocate for the establishment of new standards to protect critical national infrastructure. [3] Finally, EDTF urges the government to take immediate action to implement cybersecurity for the electric grid and to prioritize the resilience of U.S. nuclear power, so that in the event of an EMP attack, the cooling systems of America's nuclear power plants operate unhindered, preventing catastrophic meltdowns. [3]

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[2] S. Reyes, "[Our Enemies Could Use Nuclear Weapons to Create EMP Attack](#)," The Hill, 25 Jan 2018.

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Iran's Electromagnetic Pulse attack threat

The Islamic Republic of Iran's Military Doctrine, plans, and capabilities for Electromagnetic Pulse (EMP) Attack. Report.

Dr. Peter Vincent Pry

May 10, 2022, 11:20 AM (GMT+3)

Washington's bipartisan consensus is that Iran does not yet have nuclear weapons or missiles capable of threatening the United States with nuclear attack. But some Israeli analysts and some highly credible U.S. experts disagree with the "consensus view."

Several senior Reagan and Clinton Administration national security officials warned in 2015 and again in 2021: "Regardless of intelligence uncertainties and unknowns about Iran's nuclear weapons and missile programs, we know enough now to make a prudent judgment that Iran should be regarded by national security decision makers as a nuclear missile state capable of posing an existential threat to the United States and its allies...The fact of Iran's...proximity to nuclear weapons necessitates that Iran be regarded as a nuclear missile state—right now... Iran probably has nuclear warheads for the Shahab-III medium-range missile, which they tested for making EMP attacks"

Iran has hundreds of medium-range and short-range ballistic missiles (MRBMs and SRBMs), more by far than any other nation in the Middle East. If armed with a nuclear warhead, any of these could be fused for high-altitude burst to make an EMP attack.

Iran has not demonstrated a military intercontinental missile equipped with a reentry vehicle capable of penetrating the atmosphere, accurate enough to strike a city. Yet a High-altitude Electromagnetic Pulse (HEMP) attack does not require a reentry vehicle or accuracy.

If North Korea, Iran's strategic partner, gives the IRGC a Super-EMP nuclear weapon, they would not have to wait for a "true ICBM" but could use a satellite to blackout North America and terminate the "Great Satan."

Iran's intentions to exploit HEMP offensively may be reflected in their efforts to protect at least some of their critical infrastructures from HEMP attack.

An official Iranian military textbook endorses nuclear HEMP attack against the United States, as well as deception measures to conceal nuclear weapons in violation of international agreements.

Iran has demonstrated sophisticated cruise missiles and drones, using over 20 to make highly precise and coordinated attacks on Saudi Arabia's oil processing facilities on September 14, 2019.

Such delivery vehicles could easily be armed with Non-Nuclear EMP (NNEMP) warheads.

NNEMP might be able to achieve results similar to a nuclear HEMP attack in blacking-out power grids, though the NNEMP attack would probably take hours instead of seconds.

If Iran acquires or develops nuclear HEMP attack capabilities, Iran's targets or that of its terrorist proxies will most likely be the populations of America and Israel.

The Islamic Revolutionary Guard Corps (IRGC) has access to all of Iran's weapons and is so fanatical that a scenario cannot be ruled out

For full report, click [here](#).

Dr. Peter Vincent Pry *is Executive Director of the EMP Task Force on National and Homeland Security.*

THE FOLLOWING IS A LIST OF EXCELLENT SOURCES FOR FURTHER STUDY ON THIS SUBJECT

This link is a 'must read' for anyone interested in a detailed study on the effects of nuclear attack on U.S. vs Russian cities:

[The effects of nuclear war](#)

By [United States. Congress. Office of Technology Assessment](#)

This is another very useful research tool in that it lets you choose the size of a weapon and the type of detonation, then simulate an attack on any city/cities within the U.S.:

[Nuclear War Map - U.S. Simulations](#)

The following is a link to a global nuclear war simulator:

[Nuclear War Simulator](#)

A nuclear conflict simulation and visualisation tool

This is a link to a nuclear fallout simulator:

[This nuclear-explosion simulator shows where radioactive fallout would go using today's weather](#)

This article is the result of worst-case scenario 'war game' simulation from 1988:

[The Effects of a Global Thermonuclear War](#) [4th edition: escalation in 1988](#)

by Wm. Robert Johnston last updated 18 August 2003

This paper addresses the medical implications of a nuclear war on the civilian population:

[The Consequences of Nuclear War: An Economic and Social Perspective](#)

Hal Cochrane, PH.D., and Dennis Mileti, PH.D.

Colorado State University, Fort Collins, Colorado

In the event of a Russian nuclear strike, this story lists some very likely targets inside the U.S.:

[US Nuclear Target List – and Safest Locations to Consider \(2021-Updated\)](#)

This is a story from the 'main stream' media addressing the same issue:

[The UN has said nuclear war is 'back within the realm of possibility.'](#) Here are the places in the US most likely to be hit in a nuclear attack.

This story is reported to be a Russian nuclear 'hit list' of U.S. targets:

[Russia releases nuclear 'hit list' of US targets – Pentagon is on it](#)

Here is an article for those who wish to know what they can do to increase their chances of survival in the event of nuclear attack:

[Here is How You Can Survive a Nuclear War!](#)

And another:

[What to do in a nuclear attack: As the world edges closer to doomsday, experts reveal their tips for survival](#)

- The threat of an apocalypse has been moved 30 seconds nearer to midnight
- The scientists behind the clock say the move is partly because of Donald Trump
- Now millions have been watching safety videos about surviving nuclear attacks
- The tips include packing an emergency supply kit and finding a safe place within 30 minutes of your work and home

Northrop Grumman Shows Off Shipping Container-Launched Anti-Radiation Missile Concept

The idea pairs a standard ISO shipping container with the latest and greatest anti-radiation missile technology.

China Building Long-Range Cruise Missile Launched From Ship Container

April 1, 2019

Expert: Iran ships a dry run for later nuclear/EMP attack; humiliate Obama

EMP attack could wipe out two-thirds of the US population within a year

New EMP warning: US will 'cease to exist,' 90 percent of population will die