

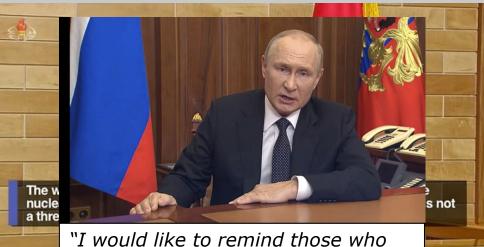
Oppenheimer, Nuclear Arms Control, and the US Modernization Initiative

Jason Ho

Disclaimer, and my interest

• I'm a visitor to this space.

- My expertise is in physics, not history, geopolitics, or theology
- Why talk about nuclear weapons?
 - Discussions around nuclear issues have been "reignited" within popular culture thanks to films such as *Oppenheimer*.
 - Norms are shifting around nuclear coercion and "saber-rattling"
 - Students are showing interest and curiosity--- so how do we talk about it Christianly?



make such statements regarding Russia that our country has different types of weapons as well, and some of them are more modern than the weapons NATO countries have. In Norf the event of a threat to the "Nu territorial integrity of our country from and to defend Russia and our him people, we will certainly make bigo use of all weapon systems wor available to us. 6:49 This is not a bluff." Vladimir Putin, September 21, 2022

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PHYSICISTS COALITION FOR NUCLEAR THREAT REDUCTION





Orders of Magnitude

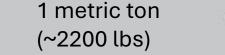


July 16, 1945 5:29:45 a.m. (Mountain War Time) Trinity Site, Alamogordo Test Range, Jornada del Muerto desert. Yield: 19 - 21 Kilotons



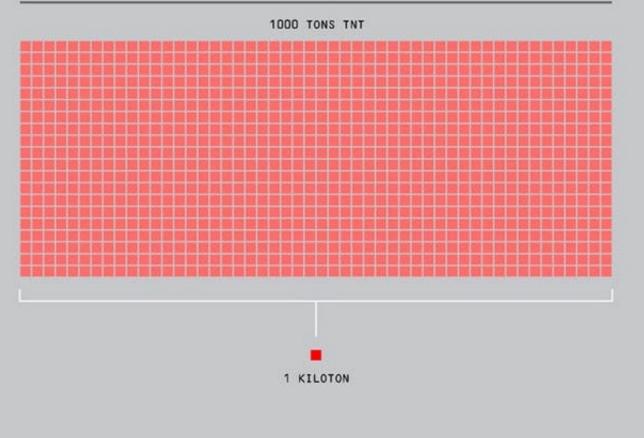
April 7, 1951 5:33:57 p.m. (Marshall Islands Time) Runit Site, Enewetak Atoll Yield: 81 Kilotons

NUCLEAR BOMB POWER



1 TON TNT

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■■■■■ = ○ = 11 tons (MOAB)

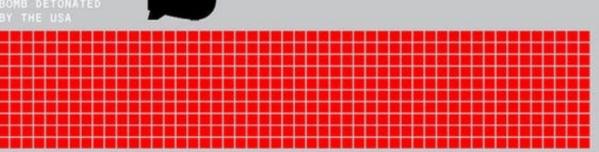
LITTLE BOY 15 KILOTONS BOMB DROPPED ON HIROSHIMA (USA)

FAT MAN 21 KILOTONS BOMB DROPPED ON NAGASAKI (USA)

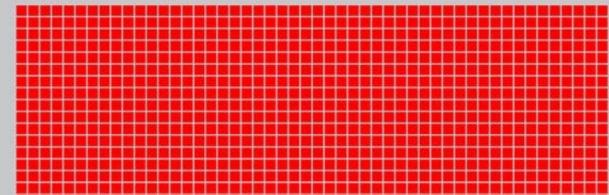
est. 226,000 killed

est. 129,000 killed

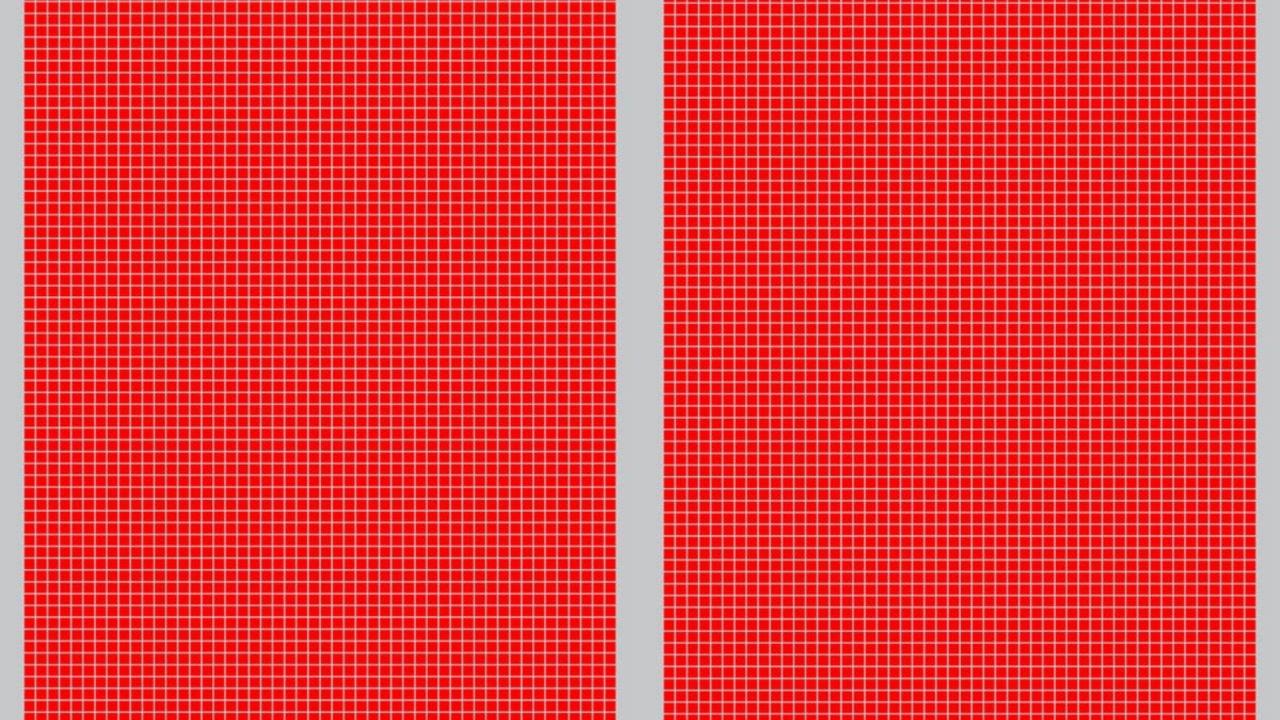
IVY KING 500 KILOTONS BOMB DETONATED BY THE USA

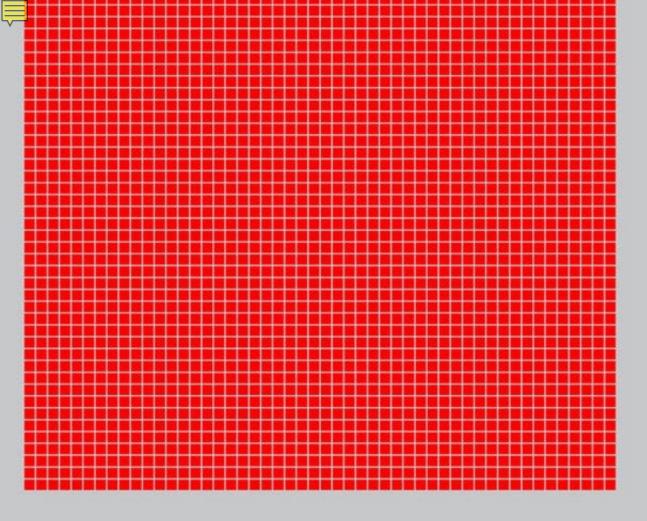


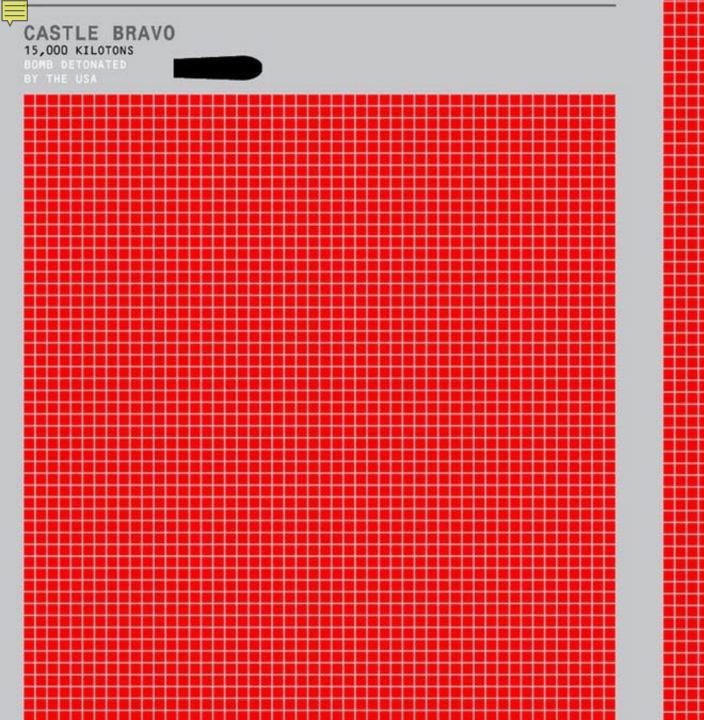
B53 9000 KILOTONS BONB DETONATED BY THE USA

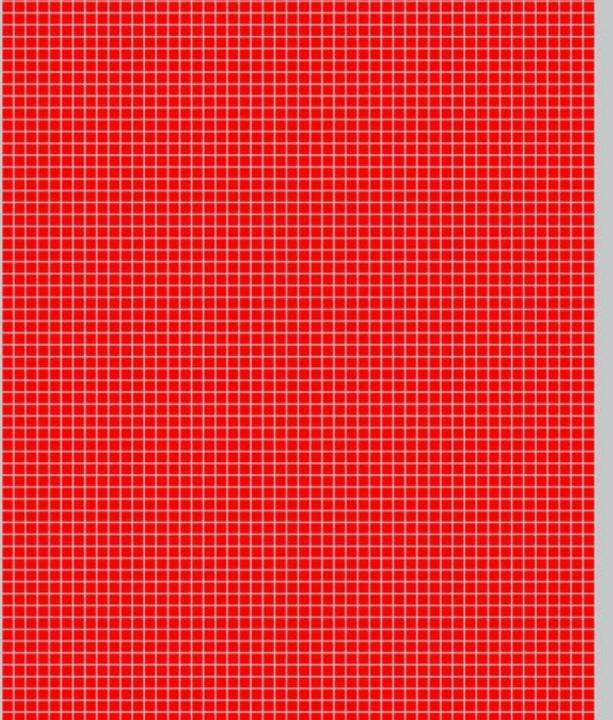


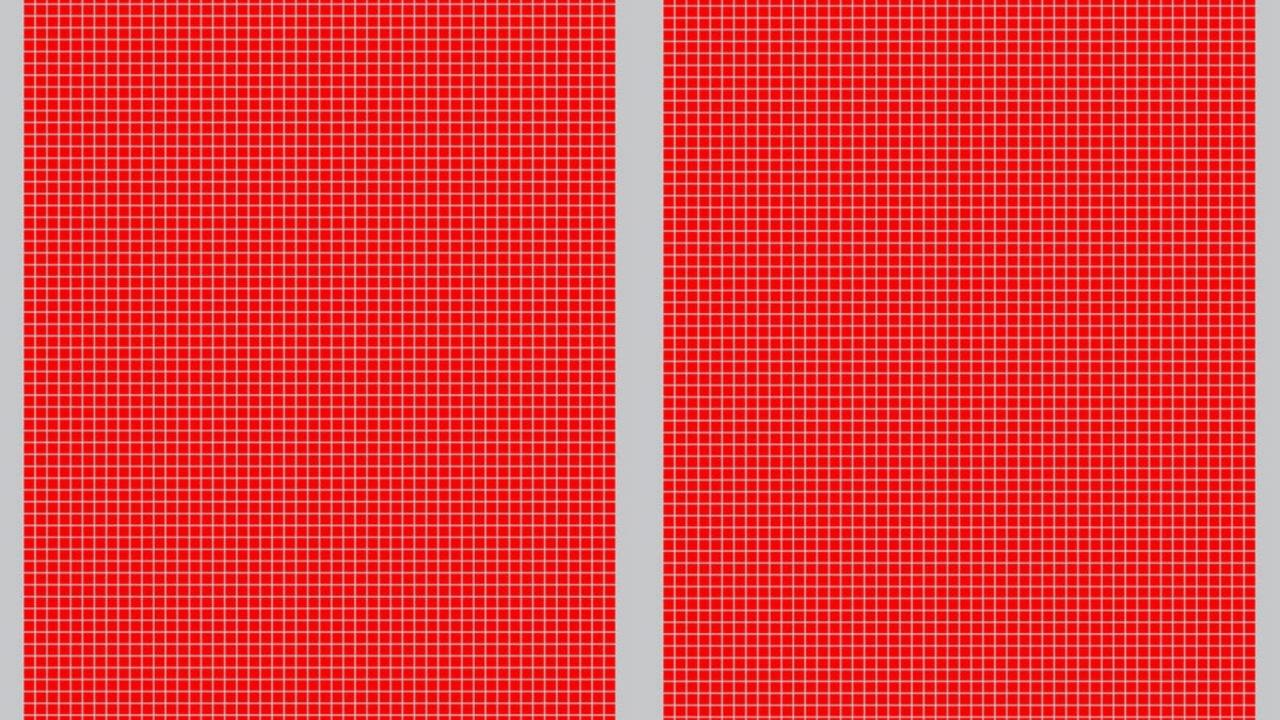
MAXIMILIAN BODE (tumblr.com)

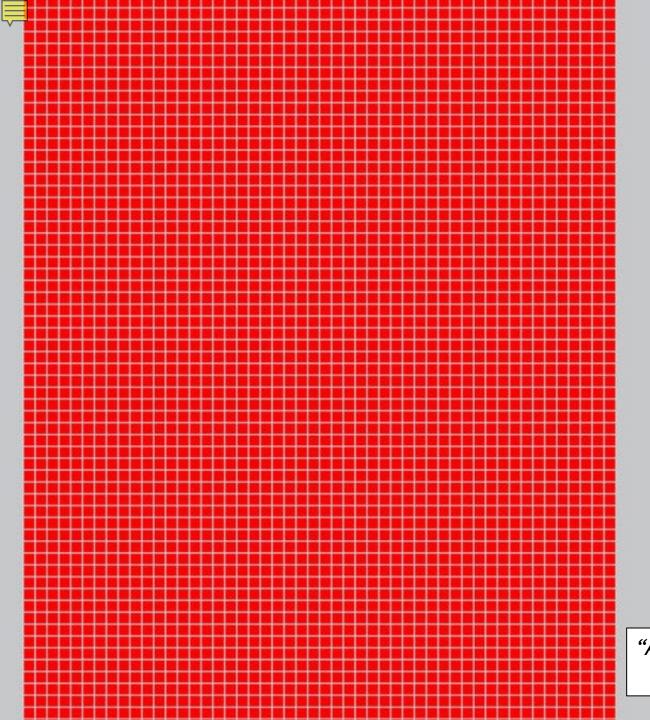








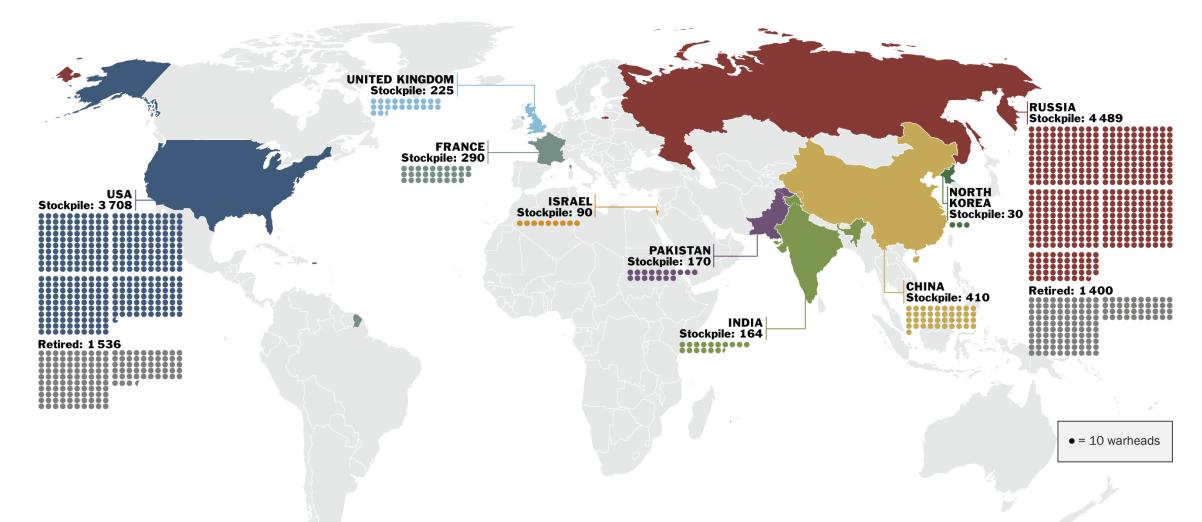




The **largest** nuclear weapon detonated was the "Tsar Bomba", a Russian bomb with a yield of **58,000 kt** (almost 4 times that of Castle Bravo).

"A nuclear war cannot be won and must never be fought." Ronald Reagan and Mikhail Gorbachev

GLOBAL NUCLEAR WEAPON NUMBERS, 2023



Notes: SIPRI revises its world nuclear forces data each year based on new information and updates to earlier assessments. The data for Jan. 2023 replaces all previously published SIPRI data on world nuclear forces. 'Stockpile' refers to warheads that are intended for use by the armed forces. 'Retired' refers to warheads that are retired from military service and scheduled to be dismantled but remain part of the overall inventory. As of Jan. 2023, SIPRI estimates that only Russia and the USA had significant numbers of retired warheads. Information about the status and capability of North Korea's nuclear arsenal comes with significant uncertainty. North Korea might have produced enough fissile material to build 50–70 nuclear warheads; however, it is likely that it has assembled fewer warheads, perhaps around 30. The boundaries and names shown and the designations used in this map do not imply any endorsement or acceptance by SIPRI.



Source: SIPRI Yearbook 2023.

The Nuclear Triad

- The "nuclear triad" is a military-force structure composed of three nuclear-capable pieces:
 - Land-based missiles
 - Bomber aircraft
 - Ballistic missile submarines
- These pieces form the structure of a "nuclear deterrent"
 - Dread and uncertainty is a feature, not a bug.

"But the triad as we know it was not the result of any sort of systematic plan. It simply evolved as the Air Force and the Navy (the Army was effectively prevented from competing in the strategic arena) built weapons in no small *measure to deny the budgetary* advantage to each other. As former Secretary of Defense James Schlesinger said almost a quarter century ago, the rationale for the triad is 'just a rationalization.'" Stephen I. Schwartz



"Nuclear weapons have always presented policy-makers with a paradox. On the one hand, they are the most destructive weapons ever devised by man and their use must be prevented; on the other hand, nuclear weapons are the most effective deterrent to such use."–General C. Robert Kehler



Bomber Fleet (B-52H and B-2A)

"Consisting of 46 nuclear-capable B-52H Stratofortress and 20 B-2A Spirit aircraft, the nation's bomber fleet is the most flexible leg of the triad, capable of providing massive firepower in a short time anywhere on the globe, even through the most advanced defenses."

US Department of Defense

- Normally 50 of the total 66 nuclear-capable bombers are deployed at one time, with about 300 deployed warheads.
- "Unlike ICBMs and SLBMs, bombers can be visibly deployed forward, as a signal in crisis to strengthen deterrence of potential adversaries and assurance of allies and partners." 2010 Nuclear Posture Review



Submarine-launched Ballistic Missiles (SLBMs)

"Fourteen Ohio-class SSBNs make up the most survivable leg of the nuclear triad. **Their stealth design makes finding an SSBN an almost impossible task**..." US Department of Defense

- Each submarine has a capacity of 20 SLBMs, with each SLBM carrying four to five nuclear warheads.
- 8-10 submarines are always on patrol at any given time
- SLBMSs have maximum range of ~7,500 miles; max speed ~18,000 mph
- "Strategic nuclear submarines (SSBNs) and the SLBMs they carry represent the most survivable leg of the U.S. nuclear Triad." 2010 Nuclear Posture Review



Intercontinental Ballistic Missiles (ICBMs)

"Up to 400 Minuteman III missiles make up the most responsive leg of the nuclear triad."

US Department of Defense

- 400 ICBM "Minutemen" Missiles in Wyoming, Montana, and North Dakota, each carrying a single warhead (with a capacity of up to three).
- Maximum range of 8,700 miles; max speed 17,500 mph
- "Single-warhead ICBMs contribute to stability, and like SLBMs are not vulnerable to air defenses." 2010 Nuclear Posture Review



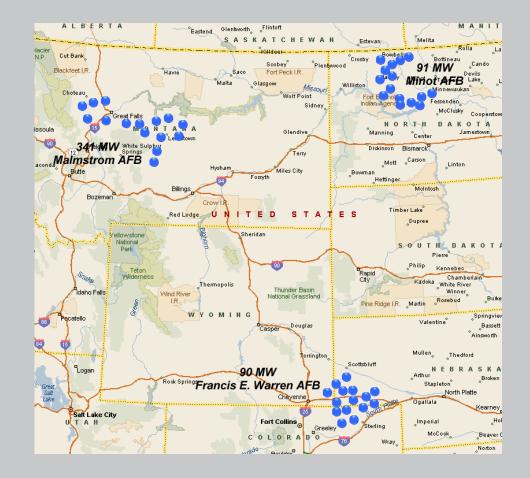
The "Nuclear Sponge"

"It's clear they are so buried out in the central US that **any enemy that wants to take us on is going to have to commit two, three, four weapons to make sure they take each one out**...In other words, the ICBM force provides a cost-imposing strategy on an adversary."

Former US Secretary of Defense Jim Mattis

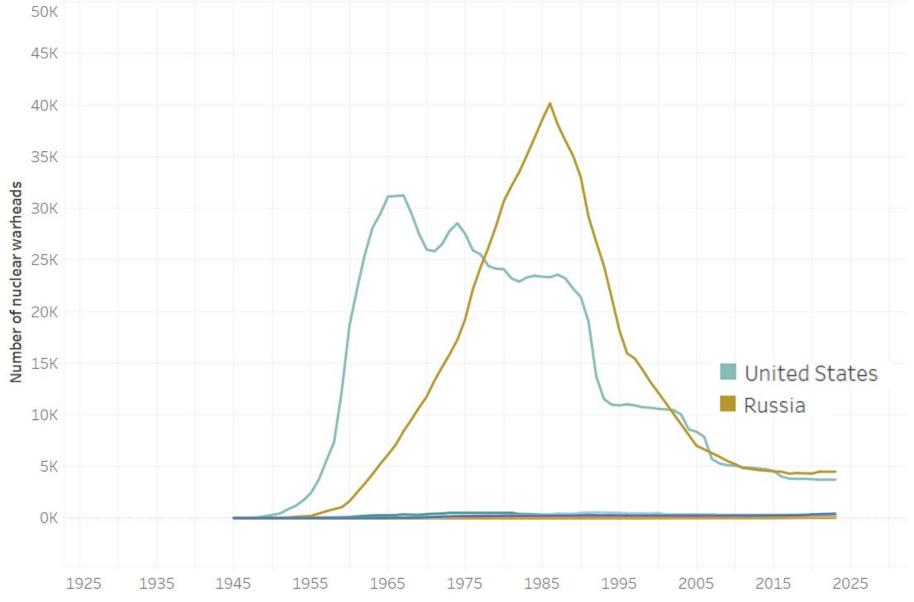
"With today's technology, **land-based missiles are an embarrassment.** They invite accusations of vulnerability to preemptive attack. Furthermore, while their vulnerability may be 'voluntary' in that they can be destroyed only if they sit still while enemy missiles detonate on or near them, the alternative- launch on warning-is widely regarded, at least publicly, as unattractive. Because of their vulnerability, the land-based missiles seem to give the entire deterrent force a bad name."

Thomas C. Shelling, 1987





World Nuclear Arsenal from 1945-2023



Year

Strategic Nuclear Arms Control Agreements

Bilateral Treaties between the US and USSR/Russia

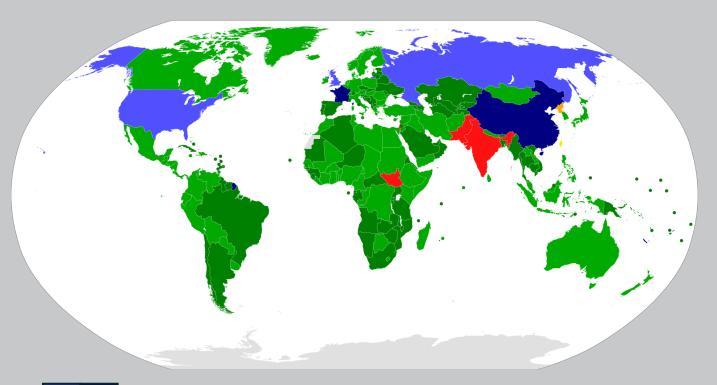
Treaty	Year in Effect	Status	Deployed Delivery Vehicle Limit	Deployed Warhead Limit
SALTI	1972	Expired	1764/2568	n/a
ABM	1972	Terminated (USA, 2002)	Limited ICBM defense systems	n/a
SALT II	Never entered into force	Never entered into force	2250	n/a
INF Treaty	1988	Terminated (USA, 2019)	Prohibits IR missiles	n/a
START I	1994	Expired	1600	6000
START II	Never entered into force	Never entered into force	n/a	3000-3500
START III	Never negotiated	Never entered into force	n/a	2000-2500
SORT	2003	Replaced by New START	n/a	1700-2200
New START	2018	Expires Feb 5, 2026; Russia suspended verification in 2023.	700	1550

Strategic Nuclear Arms Control Agreements

UN Treaties

Non-Proliferation Treaty (1970)

- 190 signatories
- non-nuclear-weapon states agree not to acquire nuclear weapons and the NPT nuclear-weapon states in exchange agree to share the benefits of peaceful nuclear technology.

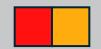




Nuclear-weapon state ratifiers + acceders



Nonnuclear-weapon state ratifiers + acceders



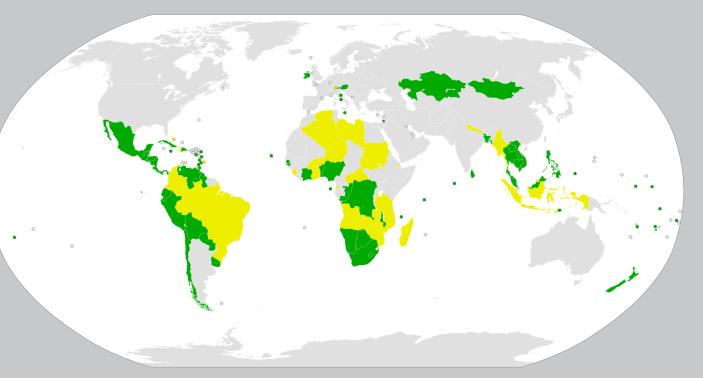
Nonparties or withdrawals

Strategic Nuclear Arms Control Agreements

UN Treaties

Treaty on the Prohibition of Nuclear Weapons (2021)

- 93 signatories
- "unambiguous political commitment" to achieve and maintain a nuclearweapon-free world





US Modernization Initiative

- Comprehensive \$2 trillion overhaul of nuclear forces initiated in 2010.
- Key Additions
 - Sentinel ICBM Program
 - Nuclear-Armed Sea-Launched Cruise Missiles (SLCM-N)
 - Plutonium Pit Production
- Other Costs
 - Maintaining existing triad
 - Upgrading command, control, and communications
 - Additional Ohio-class submarines
 - New strategic bomber



Summary

- Nuclear weapons define a new scale of weapon with the possibility of devastating effects.
- Nuclear deterrence has been the defensive strategy between nuclear powers since the beginning of the Cold War, leading to an unrestrained arms race.
- Arms control treaties have helped put limits on deterrence and reduce the overall threat of nuclear escalation.

Summary

- The last intact bilateral nuclear arms treaty between the US and Russia is set to expire in 554 days, and nuclear diplomacy is at an all-time low.
- Currently, the US is undergoing a massive modernization initiative of all three legs of its nuclear triad.



A Christian Response?



First, a deep breath.



Christ is returning to make all things new, and the weight of the world is not on our shoulders.

Christian Approaches to War

- Non-resistance
- Non-violence/Pacifism
- Just War
 - St. Ambrose, St. Augustine, St. Aquinas

The Challenge of Peace: God's Promise and Our Response

A Pastoral Letter on War and Peace by the National Conference of Catholic Bishops

May 3, 1983

"Fundamentally, we are saying that the decisions about nuclear weapons are among the most pressing moral questions of our age...**In simple terms, we are saying that good ends** (defending one's country, protecting freedom, etc.) **cannot justify immoral means** (the use of weapons which kill indiscriminately and threaten whole societies)."

- The context in which the just war tradition develops is a medieval one.
- Ambrose proposes the foundations of the JWT to *limit* violent action, and *limit* injustices.
- The JWT should not be framed as an adversary to nonviolence, but as differing in a matter of degree.

"Augustine was impressed by the fact and the consequences of sin in history - the "not yet" dimension of the kingdom. **In his view war was both the result of sin and a tragic remedy for sin in the life of political societies.** War arose from disordered ambitions, but it could also be used, in some cases at least, to restrain evil and protect the innocent." National Conference of Catholic Bishops

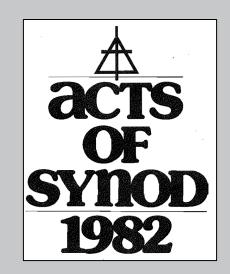
- Jus ad Bellem (criteria for why and when resorting to war is possible)
 - Just Cause: War is permissible only to confront "a real and certain danger"
 - **Competent Authority:** war must be declared by those with responsibility for public order
 - **Comparative Justice:** do the rights and values involved justify killing?
 - **Right Intention:** war can be legitimately intended only for the reasons set forth above as a just cause.
 - Last Resort: all peaceful alternatives must have been exhausted
 - Probability of Success
 - **Proportionality:** the damage to be inflicted and the costs incurred by war must be proportionate to the good expected by taking up arms.

- Jus in Bello (criteria for how a justified resort to force must be conducted)
 - **Proportionality:** The means used must not do more harm than the harm they prevent.
 - Discrimination: The means used must avoid harm against the innocent.

- 1625: Hugo Grotius incorporates aspects of JWT into international law
 - Grotius secularizes JWT, trading divine law for secular or natural law.
 - emphasizes requirements of *jus in bello* instead of *jus ad bellum*.
- Modern war is complicated, and the JWT really constrains it.

"In the process of translation or transposition from morality to law, many elements of the classical thought pattern are easily translated; the dignity of the noncombatant is definable in both frames of reference, as is the notion of a righteous cause. **Yet** there are significant changes in the tone. A moral principle is generally stated with a view to the restraint it seeks to exercise; the law is more often formulated in terms of how much it can permit." John Howard Yoder





III. Application to Nuclear Warfare

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10. Although a just war is in principle thinkable, and in the past was concretely possible, it is at least questionable whether, in view of the destructive power of modern weapons, it can any longer become actual. Any war which would scorch the earth, destroy all or the major part of the technical, cultural, and spiritual treasures of mankind, and annihilate the human race or leave alive only a maimed and wounded fragment of it, then a general thermo-nuclear war lies outside the traditional concept of a just war and must be judged morally impermissible.

13. Considering the extreme difficulty, if not the impossibility, of limiting nuclear weapons if war should break out, the church enjoins upon the nations of the world their duty to establish a framework of mutual agreement to scrap these weapons, and to do so without delay under international surveillance.

A Christian Response?

- Listen and dialogue with those who lived through the Cold War, and those that came after.
 - Jürgen Moltmann, Paul Ramsey, Karl Barth, Reinhold Niebuhr, John Howard Yoder, Oliver O'Donovan.
- Consider our Christian traditions of Just(ified) War and Nonviolence in the light of the *imago dei* and love of neighbor.
 - How does the secularization of the tradition change its focus? Will greater evils perpetuate through acts of violence?
- Seek to persuade our elected officials to prioritize nuclear diplomacy over a new arms race.

References

- Nuclear Notebook, Bulletin of the Atomic Scientists, https://thebulletin.org/nuclear-notebook/
- U.S.-Russian Nuclear Arms Control Agreements at a Glance, Arms Control Association. https://www.armscontrol.org/factsheets/USRussiaNuclearAgreements
- Nuclear winter revisited with a modern climate model and current nuclear arsenals: Still catastrophic consequences. A. Robock, L. Oman, & G.L. Stenchikov, J. Geophys. Res. **112** D13107 (2007) doi:10.1029/2F2006JD008235
- Nuclear winter responses to nuclear war between the United States and Russia in the Whole Atmosphere Community Climate Model Version 4 and the Goddard Institute for Space Studies ModelE. Coupe, J., Bardeen, C. G., Robock, A., & Toon, O. B., J. Geophys. Res. 124, 8522–8543 (2019). doi:10.1029/2019JD030509
- When War is Unjust: Being Honest in Just-War Thinking. John Howard Yoder, 1984, Augsburg Publishing House.
- The Catholic Bishops and Nuclear War: A Critique and Analysis of the Pastoral The Challenge of Peace, Judith A. Dwyer (Ed.), 1984, Georgetown University Press.
- The Challenge of Peace: God's Promise and Our Response: A Pastoral Letter on War and Peace by the National Conference of Catholic Bishops, 1983.
- The Just War Revisited. (2003) Oliver O'Donovan. Cambridge University Press.
- "Why Are We Rebuilding the 'Nuclear Sponge'?" Tom Z. Collina, Akshai Vikram, The National Interest. November 6, 2019. https://nationalinterest.org/feature/why-are-we-rebuilding-'nuclear-sponge'-94371
- "A Cheaper Nuclear Sponge" Steve Fetter, Kingston Reif, War on the Rocks. October 18, 2019. https://warontherocks.com/2019/10/a-cheaper-nuclear-sponge/
- "Abolition of Ballistic Missiles." Schelling, Thomas C. International Security, vol. 12, no. 1, 1987, pp. 179–83. JSTOR, https://doi.org/10.2307/2538923. Accessed 30 July 2024.