The relevant role of the CTBT in the nuclear security architecture

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This paper divides into three main sections. In the first one, the international architecture for nuclear security is introduced. In the second, a brief geopolitical context is presented to understand the current geopolitical context and to define, in the third section, some challenges to world nuclear security. I added a very brief section of recommendations to the CTBTO.

1. International Architecture for nuclear security

The international architecture for nuclear security, following the AtomicArchive website (2023), is formed by 26 agreements reached from 1959 to 2017. I don´t include here The United Nations Organisation, but it is very relevant as a source of adapting resolutions on nuclear weapon issues. This architecture can be divided into three main components:

A) global multilateral treaties: **The Treaty of Non-Proliferation of Nuclear Weapons** (NPT) (1969 and 1995), **International Atomic Energy Agency** (IAEA)(1957), especially relevant in the safeguard international system; The **Comprehensive Test-Ban Treaty (CTBT)** (1996); The **International Convention for the Suppression of Acts of Nuclear Terrorism** (ICSANT) (2005) and The **Treaty on the Prohibition of Nuclear Weapons (TPNW)** (2017)

B) regional multilateral treaties, including those very relevant Treaties that created nuclear Weapon Free Zones (seven including **Mongolia´s nuclear-weapon-free status** of 1992**).**

C) bilateral and trilateral agreements and treaties. The more relevant agreements and treaties are the **Hot Line Agreement** and **the Limited Test-Ban Treaty** (1963 and became a global treaty), **Outer Space Treaty** (1967), **Seabed Treaty** (1971 and became a global treaty), **the Strategic Arms Limitation Treaty I** (SALT I) and the **Anti-ballistic Missile Treaty** (1972), The **Threshold Test Ban Treaty** and **Vladivostok Agreement** (1974), the [**Peaceful Nuclear Explosions Treaty**](https://www.atomicarchive.com/resources/treaties/pnet.html) (1976), **Strategic Arms Limitation Treaty II** (SALT II) (1979), The **Intermediate-Range Nuclear Forces Treaty** (1985), **Strategic Arms Reduction Treaty** (START) (1991), START II (1993), [**The Strategic Offensive Reductions Treaty**](https://www.atomicarchive.com/resources/treaties/sort.html) (2002) and the **New START** (2012).

I have added a brief account of these treaties and agreements in the annex.

At the bottom of this architecture, hundreds of NGOs, international organisations, scientists, faculties and citizens have contributed and can contribute currently to push an agenda aimed at constructing a world free of nuclear weapons. United Nations had enlisted more the 120 NGOs in 2010 that participate in UN activities. The CTBTO had engaged in its activities in different sectors of civil society.

Several scholars and diplomats, for example, Dahlman et. Al (2011), have pointed out the unique and powerful capacities and provisions provided by the CTBT to the CTBTO, not only in its powerful verification regime (the international monitoring system complemented with satellite, national and regional infrastructure, its system of In site inspection, its wide range of partnership with international organizations, such a WMO) but also his natural way to make synergies with science, technology and diplomacy at different levels, national, regional and global. It gives CTBTO relevant capacities to face the new challenges posed by science, technology and geopolitical trends we are living in today. In section 3, I will develop in more detail these CTBTO strengths and will make some recommendations to create *momentum*.

1. Some contextual elements to understand the current world nuclear situation

We live in a world characterised by uncertainties, a new nuclear race and a weakening of the international security architecture described in the previous section, and geopolitical instability. I would like to introduce a brief geopolitical conceptualisation aimed at understanding the current world situation. Three brief geopolitical elements are included: the situation in Europe, some elements of the geopolitical situation in the Middle East and North Africa, and the tensions at the Asia-pacific region.

The disintegration of the Soviet Union in 1989, represents an important geopolitical change toward a unipolar world in which the United States was the superpower. During the 90s and the first decade of 2000, we witnessed an expansion of the influence of the United States around the world. The emergence of Russia as a superpower during the last two decades and of China during the last are a clear indication of a world change toward a more multipolar and multilateral world. During this decade the relevance of India in the international arena is very clear. According to Bloomberg (2023) in 2028, China and India together will represent 35,5 % of the world growth contribution (China 22,6% and India 12,9%), compared with the 11, 3% of US.

The NATO (North Atlantic Treaty Organisation) was created in April 1949, in the context of the Cold War, to secure peace in Europe. In response to it, the Warsaw Pact was created in May 1955 by the Soviet Union to “establishing a mutual-defence organization". In 1991, after the dissolution of the Soviet Union, the Warsaw Pact ended.

There is a lot of discussion on the issue of if the US promised Russian President Gorbachev, during the negotiations on the reunification of Germany, that NATO will not expand to the east. According to former senator Bill Bradley (2009):

“When I spoke with Baker, he agreed that he told Gorbachev that if the Soviet Union allowed German reunification and membership in NATO, the West would not expand NATO 'one inch to the east.' But 'the east,' for Baker, meant East Germany — not Eastern Europe. The United States later dialled back Baker's offer even further, saying that legally, if Germany reunified, the White House couldn't promise no NATO expansion into East Germany. The final compromise was that no 'non-German' NATO troops could be in East Germany, but German troops were allowed. According to the American participants in the negotiation, NATO expansion east of Germany didn't even come up" (Bradley, 2009)

# But Gorbachev understood “not expand NATO ´one inch to the east´”, as “not expansion to the Eastern Europe”, according to this thesis, maybe because it made no sense for him to understand it as Baker thought. However, it is clear, from National Secure Archive, the declassified documents on “NATO Expansion: What Gorbachev Heard”, that Baker's thesis is incorrect. For example, referring to the "Document 2", we read:

# “The conversations before Kohl’s assurance involved explicit discussion of NATO expansion, the Central and East European countries, and how to convince the Soviets to accept unification. For example, on February 6, 1990, when Genscher met with British Foreign Minister Douglas Hurd, the British record showed Genscher saying, ´The Russians must have some assurance that if, for example, the Polish Government left the Warsaw Pact one day, they would not join NATO the next´” (National Security Archive)

Bradley argued in the same sense, that the former Bush respected this agreement, and continues:

“Then, of course, President Bill Clinton expanded NATO to the Czech Republic, Hungary, and Poland, and President George W. Bush pushed it even further in early 2004. Russia perceived these actions as threatening, and they remain a bone of contention today. As former Russian presidential candidate Grigory Yavlinsky once told me, “We Russians might not understand financial puts and calls, but we do understand tanks.” (Bradley, 2009)

According to Walker (2015), who defended Baker's interpretation of “one inch to the east”,

“Nevertheless, Russian foreign policy officials, the bulk of whom had served as Soviet officials, continued to suggest that NATO be disbanded, but if not, that it should at least refrain from moving forces further east or engaging in‘out of area´ of operations in Europe without Russian permission, notably in the Balkans, which by then was descending into violence.” (Walker, 2015: 2)

Of course, NATO expansion is consistent, and necessary, for the construction of a unipolar world order that emerged after the end of the cold war. Consistent with this, NATO had several expansions to the east: the first in 1999 with the Czech Republic, Hungary and Poland as members; the second one in 2004 with the incorporation of [Bulgaria](https://en.wikipedia.org/wiki/Bulgaria), [Estonia](https://en.wikipedia.org/wiki/Estonia), [Latvia](https://en.wikipedia.org/wiki/Latvia), [Lithuania](https://en.wikipedia.org/wiki/Lithuania), [Romania](https://en.wikipedia.org/wiki/Romania), [Slovakia](https://en.wikipedia.org/wiki/Slovakia), and [Slovenia](https://en.wikipedia.org/wiki/Slovenia). The third expansion took place in 2009 with the incorporation of Albania and Croatia. The next was the incorporation of Montenegro in 2017, North Macedonia in 2020, and more recently, Finland in 2023. Russia, again and again, has indicated that this expansion poses an existential threat to Russia. According to Loukianova Fink and Oliker (2020),

Russian concerns focus on the U.S. forces' ability to carry out a disarming or decapitating strike. They also extend to the possibility of U.S. and/or NATO air strikes on

critically important Russian targets, which could leave Russia with no option but

to resort to nuclear use. Meanwhile, U.S. planners' worst-case scenarios are of a

Russian preemptive limited nuclear strike undertaken for military advantage. (Loukianova Fink and Oliker, 2020: 38)

Russia invaded Ukraine, first in 2014 and obtained the annexation of Crimea, and we are facing a new phase of Ukraine´s war that started in February 2022, as a response to NATO expansion. Today the rhetoric from both sides, Russia and the West are threatening seriously the world peace.

The Middle East was another region of drastic changes caused by this unipolar geopolitical power construction and the challenges that this posed to the region during the 90s of the last century and two decades of this century. Rabinovich (2016) has written an interesting analysis of the relationships between the US and Russia in the Middle East since 1991. He recognises three phases in the US position on the Middle East (quoted in extenso):

**a. 1991–2001:** U.S. influence and prestige were at their highest peak when it was the sole superpower,

the liberator of Kuwait, and the orchestrator of an ambitious Israeli-Arab peace process.

**b. 2001–2008:** The U.S. position in the Middle East was under strain during the administration of George W. Bush as a result of 9/11 and post-9/11, the invasions of Afghanistan and Iraq, the war on terror, the failure of the effort to import and impose democracy, the sense of antagonism with large parts of the Muslim and Arab worlds, a faltering Arab-Israeli peace process.

**c. 2008–2015:** Barack Obama’s presidency began with an ambitious multipronged policy in the Middle East, seeking to dissociate the United States from former president Bush’s policies, end the tension with the Arab and Muslim worlds, bring an end to the Israeli-Palestinian conflict, build a new relationship with Iran and put an end to its military nuclear program, and bring democracy to the Arab world through persuasion. Obama did reach an agreement on a fifteen-year suspension of Iran’s military nuclear program but the larger issue of Iran’s disruptive regional policy remains open. Obama ended the bulk of the U.S. military presence in Afghanistan and Iraq, refused to become militarily involved in the Syrian civil war, and strained U.S. relations with the conservative Arab states with his response to the Arab Spring. His bid to resolve the Israeli-Palestinian conflict failed. The net effect of these developments, reinforced by the decline in the importance of Middle East oil and the talk of a pivot to the Asia- Pacific region, created a sense in the Middle East and elsewhere that the United States had lost both the interest and the will to invest in the Middle East. In this context, it is important to read carefully Obama’s recent profile in the Atlantic: the lengthy explanation of his Syrian policy, the disappointment with Arab politics, the dismissive attitude to Israeli Prime Minister Benjamin Netanyahu, and, in the present environment, the mild approach to Russian President Vladimir Putin (Rabinovich, 2016:2-3)

Concerning the presence of the Russia Federation in the Middle East, Rabinovich points out an increasing presence, starting from the first and second Putin´s mandate (from 2000 to 2008), so that, “Russia chose to seek a role in all Middle East issues, willing to pursue complex policies and interact with everyone, impervious to real and apparent contradictions in its own conduct" (ibid). Russia occupied the positions that the US left due to domestic politics. In this way, Russia played a relevant role in Iran´s nuclear negotiations, and in Libya. In this sense, as Russia emerges as a world's third superpower (following Dr. John Mearheimer), his role in geopolitics becomes more and more active. Other ramifications of this geopolitical situation affect North Africa and other parts of the continent.

Since the Trump Administration tensions between US and China are increasing. The sanction on Chinese products, the blocking of access to key technologies and components, especially, chips and electronic components, the proposed expansion of NATO to the Asia region, the strengthening of AUKUS and the new QUAD, and the seeking for allies to contain China are moving tensions to that region. The rhetoric changes on “one country, two systems” that was agreed upon in early 1980, during the negotiations between China and UK, referring to Hong Kong and Taiwan (and accepted by the US), is creating a new tension focus as China emerges as a superpower. The consequences of these tensions could be disastrous for the economy, the environment and the construction of a more peaceful world.

This very brief context provides the background to understand what happened during the last decades of our century. Two relevant aspects are briefly analysed here: the reviews of the NPT after 2000, and nuclear weapons activities during the last two decades.

1. NPT reviews

Provisions in the NPT, article, VIII establish the need for reviews of the Treaty every five years. In 1995 one of the most important results, as mentioned, was the indefinite extension of the NPT. In the 2000 NPT review, many agreements were reached and, it was clear the commitment and support of almost all state parties to the NPT and the vigour of the nuclear-weapon-free zones initiative. It encourages the efforts for creating a new nuclear-weapon-free zone in the Middle East; it deplores the nuclear tests of India and Pakistan but at the same time encourages the effort made by the two countries to agree in banning fissile materials for nuclear weapons. In general, this review was very optimistic about the construction of a better world in the new century.

However, this optimism starts backing off in the 2005 review of the Treaty. This meeting was a failure. It was unable of reaching agreements on basic issues such as conference procedures. The Japanese rapporteur in his very brief report, indicated,

“Two thirds of the Conference were spent in order to resolve these procedural issues due to differences of views between the Non-Aligned Movement states, centering on the Middle Eastern countries, on one hand, and the Western countries on the other hand. As a result, time for substantive discussion and for coordination on the language of the final document was extremely limited” (Ministry of Foreign Affairs of Japan, 2005)

We can observe here the changes in geopolitics, especially due to the intervention and new politics of the US in the Middle West and in Europe.

The new administration of the White House was imbued with some optimism for the next NPT review of 2010. Obama´s speech in Prague in 2009 was charged with symbolism, energy, and a positivist vision of the future, but at the same time, it was the seed of new world divisions as mentioned above. Obama promises a new START agreement with Russia, aimed at reducing the number of warheads and stockpiles in these two nations and, that,

Some argue that the spread of these weapons cannot be stopped, cannot be checked -– that we are destined to live in a world where more nations and more people possess the ultimate tools of destruction. Such fatalism is a deadly adversary, for if we believe that the spread of nuclear weapons is inevitable, then in some way we are admitting to ourselves that the use of nuclear weapons is inevitable. (…) the United States will take concrete steps towards a world without nuclear weapons. (…) to achieve a global ban on nuclear testing, my administration will immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty. (Obama, 2009: 3-4)

However, at the same time,

1. he indicates an extension of NATO cooperation:

“We must work together as NATO members so that we have contingency plans in place to deal with new threats, wherever they may come from. We must strengthen our cooperation with one another, and with other nations and institutions around the world, to confront dangers that recognize no borders. And we must pursue constructive relations with Russia on issues of common concern” (Obama, 2009: 3)

1. The US will continue maintaining its nuclear arsenal, “(a)s long as these weapons exist, the United States will maintain a safe, secure and effective arsenal to deter any adversary and guarantee that defense to our allies" (Obama, 2009: 4)
2. In connection with nuclear programmes outside the five nuclear countries, he mentions specifically North Korea:

Some countries will break the rules. That's why we need a structure in place that ensures when any nation does, they will face consequences (…) Rules must be binding. Violations must be punished. Words must mean something. The world must stand together to prevent the spread of these weapons. Now is the time for a strong international response now is the time for a strong international response, and North Korea must know that the path to security and respect will never come through threats and illegal weapons (Obama, 2009: 5).

“Illegal weapons” means “outside the NPT”, that is, countries authorized to have nuclear weapons. However, it is hard to claim that having nuclear weapons are legal anyway.

In the 2010 NPT review, some optimism prevails but not as strong as reaching a commitment to advance on the nuclear threat that represents the nuclear weapons to us. Meyer (2011) in his analysis of this review, adopts the comment made by one ONG representative, that assesses:

While hailed by many governments and news outlets as a success, the carefully crafted Final Document essentially preserves the status quo on nuclear disarmament and non-proliferation, reflecting reticence by both nuclear- and non-nuclear-weapon states to agree to meaningful new commitments (Meyer, 2011:9)

The next two reviews 2015 and 2022 were disappointing. No agreements were reached, and this reflects the complex geopolitical situation that we are living in now.

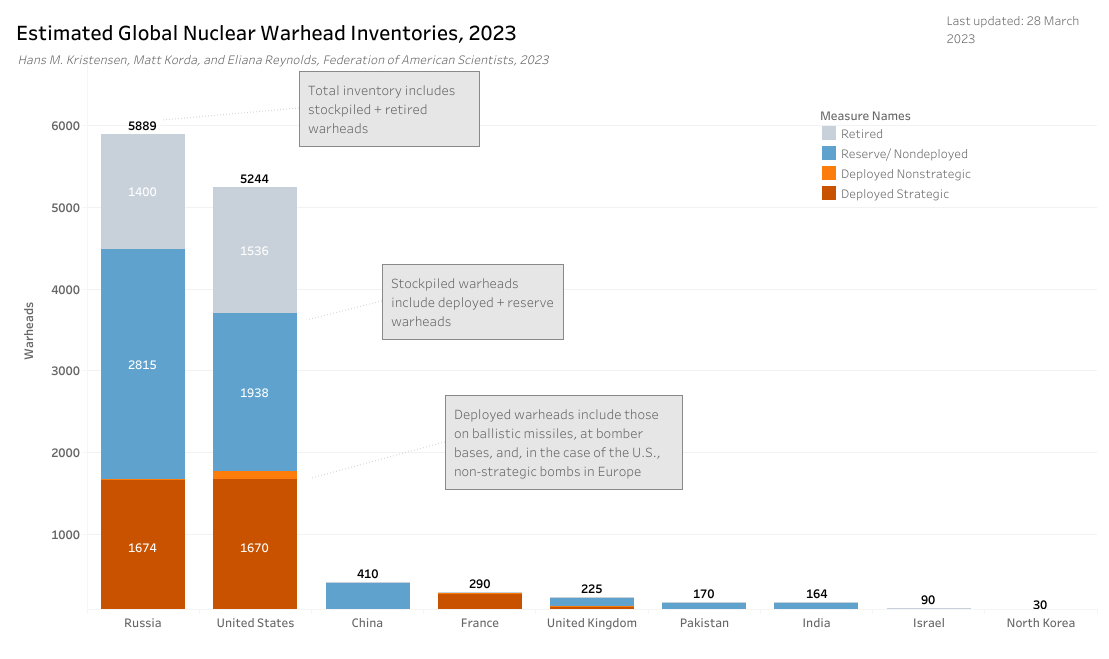
1. Nuclear weapons during the last two decades

The number of nuclear heads reached a maximum peak in 1986, the global inventory reached more than 70 000 heads in that year. Russia had about 40 000 and US about 30 000. At that time, the other nuclear states were France, the UK, China, India, Israel and Pakistan. Currently, one more country has nuclear weapons, North Korea. International pressure, treaties and other bilateral agreements made that in 2015, the global nuclear inventory was about 15,400 nuclear heads. In 2023 it was roughly 12,500. US and Russia have about 90% of the global inventory (FAS, 2023): the US has 5,244, Russia 5,889, China 410, France 290, UK 225, Pakistan 170, India 164, Israel 90 and North Korea 30. We observe modest progress in the elimination of nuclear weapons.

However, global inventory is relevant, but not as much as the following three issues:

1. The status of these nuclear warheads in each country. Here I adapt the categorisation introduced by Kristensen, Korda and Reynolds (2023), which groups the nuclear weapons into: retired, awaiting dismantlement; reserve, not deployed yet; deployed non-strategic, designed to be used in the battlefield ready to use; deployed strategic, designed to be used far from the war front to reach other strategic objectives, such as cities, fuel deposits or arms industries. The following figure shows the distribution of nuclear warheads according to these categories and authors:

Figure 1



1. Destruction capacity. Kristensen and McKinzie (2015) published an interesting paper in the *International Review of the Red Cross*, in which they estimate the destruction capacity of strategic nuclear weapons. According to them,

A 2001 study by scientists from the United States and India concluded that the use of only ten nuclear weapons on five Indian and five Pakistani cities (airburst) would kill 2.9 million people, with an additional 1.5 million severely injured. These were calculated as effects from airburst detonations over the cities, which create limited radioactive fallout. A follow-up study by the Natural Resources Defense Council (NRDC) on the effects of ground-burst detonations found that in addition to immediate deaths from blast effects and fires, the use of twenty-four ground-burst weapons on fifteen Indian and Pakistani cities would expose 22.1 million people to lethal radiation doses of 600 rem or more in the first two days after the attack. Another 8 million people would receive a radiation dose of 100 to 600 rem, causing severe radiation sickness and potentially death, especially for the very young, old or infirm (Kristensen and McKinzie, 2015: 567)

The REM (Roentgen equivalent man) is an old unit used in radiological protection and radiobiology to measure the damage or injury produced by radiation exposure. Currently, the Sievert (Sv) is used as a more standardised unit for the same purpose. 100 rem = 1 Sv in the international system of units.

Humanitarian effects would not be limited to blast effects, fires and radioactive fallout. A 2012 study by International Physicians for the Prevention of Nuclear War (IPPNW) found that detonation of as few as 100 nuclear weapons – less than 1% of the global nuclear weapons inventory – would disrupt the global climate and agricultural production so severely that the lives of more than 2 billion people would be in jeopardy.7 A large-scale nuclear war would have long-lasting consequences on a global scale that make any talk of winning such a war meaningless (Kristensen and McKinzie, 2015: 567)

As observed little progress has been made with this reduction of nuclear arsenal to preserve human beings and the environment.

C) Modernisation of delivery and nuclear arsenal

In this area is where we see no intention to advance toward the elimination of nuclear weapons by the nine nuclear weapon states. In the seventy-seventh session of the First Committee of United Nations that took place on October 14th, 2022, it is claimed: “Nine nuclear-armed countries had claimed the right to determine the life and death of everyone on Earth”. All these nine countries have plans for the modernisation of their vehicles and weapons arsenal. Of some of them, we have more information than others. For example, the US has published a detailed plan for the modernization of vehicles and nuclear arsenal to 2030 including a budget of $634 billion (Congressional Budget Office, 2021), classified into three main categories: “ballistic missile submarines and intercontinental ballistic missiles” (Strategic Nuclear Delivery Systems and Weapons, andTactical Nuclear Delivery Systems and Weapons), “nuclear weapons laboratories and supporting activities” and Command, Control, Communications, and Early-Warning Systems.

The other US-related aspect is the projection of deploying nuclear weapons in Europe by NATO. The US had deployed tactical nuclear weapons at six bases in five NATO member countries, Belgium, Germany, Italy, the Netherlands, and Turkey (Bryan Bender, [Paul McLeary](https://www.politico.com/staff/paul-mcleary) and [Erin Banco](https://www.politico.com/staff/erin-banco) (2022)),

On the Russian side, there is less official information on the modernization of vehicles and nuclear arsenal. Available information on Russia comes from the US Department of Defense, so the information provided should be nuanced or considered incomplete. In general, according to Woolf (2022) the planned exercise by Russia conducted on February 19, 2022 provides some information on Russian nuclear capacity:

During the exercise, Russia conducted test launches of many of the weapons that are described in this report. They included the Zirkon and Kinzhal hypersonic missiles, the Yars (SS-24) mobile, a Sineva SLBM, and air-launched cruise missiles launched from Tu-95 bombers. The exercise also included tests of the Kalibr sea-launched cruise missile and the Iskander ground-launched cruise missile. While Russia normally conducts major strategic exercises later in the calendar year, some analysts have speculated that it held this version amid its buildup of forces around Ukraine as a reminder, and warning, of its nuclear capabilities. (Woolf, 2022: 5)

In the case of the UK, as indicated in the report published by the UK Parliament of May 2023, we know that its modernisation started in 2006, with the replacement of submarines, and the “Trident strategic weapons system (…) developed in conjunction with the United States”, and the replacement of Mk4 nuclear warhead, among others.

The same can be claimed of China, North Korea, Israel, India and Pakistan. The largest budget for nuclear weapons and vehicles modernization comes from the US, which represented 44 % of the world nuclear modernization budget in 2021, China the next with 11,7%, Russia with 8,6 %, the UK with 6,8%, France with 5,9%, India 2,3 %, Israel 1,2%, Pakistan 1,1% and North Korea 0,64% (Statista, 2022).

However, one of the biggest current challenges is the use of computer simulations that, eventually makes that countries don´t need to carry out nuclear tests to develop new nuclear weapons. The US has a large history of using computer modelling for different nuclear weapons processes. As the US Department of State indicates, the US can do these computer simulations since 2012:

Since the end of U.S. nuclear explosive testing in 1992, investments in science-based Stockpile Stewardship have led to dramatic improvements in simulation capabilities. Computers have become at least a hundred-thousand times more powerful, and modern integrated design codes now more realistically capture the behaviour of real nuclear devices. As of December 2012, the National Nuclear Security Administration (NNSA) has the world's fastest supercomputer used for nuclear weapons simulations and modeling. The supercomputer, named Sequoia, is also the second fastest supercomputer in the world overall. As a result of these advancements, our modern, integrated nuclear weapon design codes have reduced a number of adjustment parameters, which previously required a nuclear explosive test to be calibrated. Weapons designers can now conduct hundreds of calculations to determine where the results are most sensitive to model uncertainties or fundamental data. This is a critical element to inform expert judgment and guide SSP experiments. (US Department of State, 2012).

US computer simulations capacities will increase in a significative way, according to TM, when, this year 2023, the supercomputer "El Capitan" by running nuclear weapons simulations of a more complex nature so, the "system will provide ´scientists and weapon designers the computational tools to explore the use of new materials and components, improve robustness and safety, reduce maintenance costs and reduce manufacturing and production costs" (TM, 2022)

At first glance, this alternative will pose a great challenge to the CTBTO to assure the nonproliferation of nuclear weapons.

1. The key role of CTBTO

# As mentioned above, CTBT has interesting provisions to adapt CTBTO to changes in conditions, in issues such as non-proliferation, world peace, security and disarmament; but also in working together with other international, regional and civil organisations to push issues of world interest.

# In the Preamble of the treaty, UN Assembly claims:

Recognizing that the cessation of all nuclear weapon test explosions and all other nuclear explosions, by constraining the development and qualitative improvement of nuclear weapons and **ending the development of advanced new types of nuclear weapons**, constitutes an effective measure of nuclear disarmament and nonproliferation in all its aspects (Emphasis added)

It is in the spirit of the Treaty that the CTBTO should be adapted to different situations in which underground nuclear tests were not required for the development of new nuclear armament. The consequences for the international community of the decision of the US, and maybe the other nuclear countries, to use computer simulations as part of the process of modernisation of the nuclear arsenal are large, among them, the probability of new forms of proliferation and a new nuclear race.

I understand that the basic obligations of the State Parties are limited to nuclear explosions. However, the construction of advanced nuclear weapons without nuclear tests poses a key limitation to accomplishing the goal of advancing toward nuclear disarmament. In this specific context, I read the provision in paragraph 26, f:

Consider and review scientific and technological developments that could affect the operation of this Treaty. In this context, the Conference may direct the Director-General to establish a Scientific Advisory Board to enable him or her, in the performance of his or her functions, to render specialized advice in areas of science and technology relevant to this Treaty to the Conference, to the Executive Council, or States Parties.

# The theory of deterrence indeed endorses the thesis that for a country to deter another country, this country has to show the means of defence that could be used in case of an attack from the other country. This means to show, in some way (military drills, publications, detonations in the desert), to other countries the new nuclear weapons that this country has. This seems a strong thesis against the probable risk for one country to continue improving its nuclear warhead without such exhibitions.

# However, from a historical perspective when one country advantages another country in nuclear weapons, a nuclear race is observed, and at the same time, a risk of proliferation of new nuclear warheads. And this is against our goal of reducing and eventually eliminating nuclear weapons, and against the defenders of the hypothesis of deterrence.

# Second, the assessment of the deterrence hypothesis should be done considering the information on the humanitarian and environmental impact of the use of nuclear weapons in a conflict. The International Committee of Red Cross and Red Crescent has studied in detail the humanitarian consequences of the use of nuclear weapons and the crisis that this will generate in different and relevant human activities (See the International Movement (2022) Red Cross Plan).

# Third, it is urgent to resume the diplomat road to find negotiated agreement on the most relevant and urgent problems of our age, including, climate change, world inequality, and water crisis, and to make that everyone benefits from science, technology and product development, issues of the Agenda 2030. This can be better reached if we promote understanding between countries, cultures and people.

# And fourth, it is important to resume and evaluate the achievements in human development and human security during the last decades aimed at deepening them as one of the most convenient for our generation and the coming ones. This paradigm, because of its universalism, should prevail over the proper interest of countries.

# Recommendations to the CTBTO

# Considering the provisions included in the establishment of the Preparatory Commission, article 7: “The Commission shall have standing as an international organization, authority to negotiate and enter into agreements, and such other legal capacity as necessary for the exercise of its functions and the fulfilment of its purposes.”, and the relevant role that the CTBTO had played in discussing themes of larger implications for the peace and security in the world, I want to do the following recommendations:

# To call for a Science and Technology Conference in which the challenges that the use of supercomputer simulation models poses to achieve CTBT and NPT goals and to propose technical recommendations if any

# To propose a plan, together with actors of the international architecture for nuclear security, in which civil society can be involved in specific actions aimed at resuming the road of nuclear weapon reduction and eventually eliminating these from our world, including the entering into force of the CTBT

# To make a call on the urgency of opening a door to diplomacy, the recovery of trust and strengthening our international system in a context of insecurity, threat, war and hopelessness. We have to learn from the past 70 years in which enormous signs of progress were achieved, diplomacy played a crucial role in establishing bridges and understanding between people. We want to live in a trusty and more predictable world with security and peace.

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Annexe:

1. The Global Multilateral Treaties

The first group of treaties includes the following important international tools:

- The **Treaty on Non-proliferation of Nuclear Weapons** (NPT), was adopted by United Nations in 1968 and entered into force in 1970. It is a very relevant international tool for negotiating different nuclear aspects such as non-proliferation, the safeguarding international system, the booster of pacific uses of nuclear technologies, partial ban agreements on disarmament and stimulating the creation of new regions free of nuclear weapons, among other relevant issues. Important progresses had made, especially during the first thirty years. During the last fifteen years, it was difficult to reach agreements on nuclear safety issues, as will be mentioned below.

- The Statute of the **International Atomic Energy Agency** (IAEA) was adopted by the United Nations Assembly in 1956 and came into force in 1957. It is relevant as part of the international architecture for nuclear security, because of the role that the international community assigned to it in Article III of the NPT. IAEA was created to promote the pacific uses of atomic energy. It received new responsibilities from the review of NPT of 1995 in which the NPT was extended indefinitely. IAEA reached the [comprehensive safeguards agreement](https://www.iaea.org/topics/safeguards-agreements) (CSA) which “enable the IAEA to verify the fulfilment of their obligation under the Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.” (IAEA). This agreement entered into force in 2021. On the other hand, article IV of NPT, calls to state parties to “further development of the applications of nuclear energy for peaceful purposes…”, and IAEA is a key facilitator of these applications.

- The third international tool of this architecture is the **Comprehensive Test-Ban Treaty** (CTBT) adopted by United Nations in 1996. It doesn´t enter into force yet, 27 years after adoption. Its scientific and technological infrastructure is capable to detect nuclear tests in different media, atmosphere, underground, water and outer space, with a small amount of fissionable material. Its data processing capacity makes it possible for all the countries to have trusty information on the activities carried out by a country in case it conducts a nuclear test. As pointed out by CND (2023):

"Until the CTBT enters into force, there is always the chance that nuclear weapons testing will be resumed by the nuclear weapon states to further advance their arsenals. Moreover, without such a treaty, other non-nuclear weapon states can carry out such tests with a view to developing a nuclear weapons capability." (CND, 2023: section CTBT).

* **The International Convention for the Suppression of Acts of Nuclear Terrorism** (ICSANT) was adopted in 2005. The Atomic Archive summaries the content of this convention as follows:

“Based on an instrument originally proposed by the Russian Federation in 1998, the Convention provides for a definition of acts of nuclear terrorism and covers a broad range of possible targets, including those against nuclear power plants and nuclear reactors. Under its provisions, the alleged offenders must be either extradited or prosecuted. It also encourages States to cooperate in preventing terrorist attacks by sharing information and assisting each other in connection with criminal investigations and extradition proceedings. The treaty requires that any seized nuclear or radiological material is held in accordance with IAEA safeguards, and handled in regard to the IAEA's health, safety and physical protection standards.”

* The **Treaty on the Prohibition of Nuclear Weapons**, was adopted by United Nations in July 2017 and entered into force in January 2021. Article 1, establishes seven prohibitions to state members: to produce and storage, to transfer nuclear devices, to receive nuclear devices, to use or threaten to use nuclear weapons to third parties, to assist or promote prohibited activities, to seek or receive assistance on prohibited activities, and to "allow any stationing, installation or deployment of any nuclear weapons or other nuclear explosive devices in its territory". Additionally, the state members that have not yet adopted the [comprehensive safeguards agreement](https://www.iaea.org/topics/safeguards-agreements) of the IAEA, should commence negotiations with this organisation within the next 180 days after the entry into force of the treaty, and in the case of those states that have or had nuclear weapon programmes, cooperate with the IAEA with the “purpose of verifying the irreversible elimination of its nuclear-weapon programme.”( Article 4).

Additionally, it is important to mention the Environmental Modification Convention (1977) in which the environmental impacts are considered and agreed to impose some limitations on the use of “environmental modification techniques”. This Convention was signed by 48 countries. In 1992 the Lisbon Protocol was signed by ex-soviet republics in which The Strategic Arms Reduction Treaty of 1991 was adopted.

1. The Regional Treaties

The most interesting regional response to the threats that posed the nuclear weapon race after the Cuban missile crisis of 1962, was to establish regions free of nuclear weapons, inspired by the Antarctic Treaty of 1959. There are five regional treaties. Additionally, Mongolia declared its territory free of nuclear weapons.

* **The Antarctic Treaty** (1959) was signed by the twelve countries involved in scientific activities in Antarctica during the year 1958-59: Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, United Kingdom, United States and URRS. According to the Secretariat of the Antarctic Treaty, “The US and Russia maintain a “basis of claim”” They agreed, article I, “Antarctica shall be used for peaceful purposes only”, and also that “All areas of Antarctica, including all stations, installations and equipment within those areas … shall be open at all times to inspection" (Art. VII) (Secretariat of the Antarctic Treaty, 2023).
* **Treaty of Tlatelolco** (1967). It is the first regional treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean in a populated area. It entered into full force in 2002 when all Latin American ratified the treaty. Currently, all the 33 countries of the region are members of the Treaty. As pointed out by United Nations (2023) this treaty "encompasses a surface of more than 20 million square kilometers (…) It homes to more than 600 million people.” This treaty represents a tremendous impulse and example for the worlds. However, article 18, establishes that “The Contracting Parties may carry out explosions of nuclear devices for peaceful purposes -- including explosions which involve devices similar to those used in nuclear weapons -- or collaborate with third parties for the same purpose, provided that they do so in accordance with the provisions of this article and the other articles of the Treaty…”. I will discuss it in our analysis of the CTBT.
* **The Treaty of Rarotonga** (1985) entered into force in 1986. The state parties are Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu. As indicated by United Nations (2023), “The geographic scope of the Rarotonga Treaty is vast, extending from the West coast of Australia to the boundary of the Latin American NWFZ in the east, and from the equator to 60 degrees south, where it meets the boundary of the zone established by the Antarctic treaty”
* **The Treaty of Bangkok** (1995), or the “Southeast Asia Nuclear Weapon-Free Zone” (SEANWFZ). It entered into force in 1997. The states party of the treaty are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. This treaty goes further from the other regional treaties in the sense that includes prohibitions for other mass destruction armament. As indicated by United Nations:

## The SEANWFZ Treaty includes two elements that go beyond other existing Nuclear-Weapon-Free Zone (NWFZ) agreements: 1) the zone of application also includes the continental shelves and the exclusive economic zones (EEZ) of the contracting parties; 2) the negative security assurance implies a commitment by the NWS not to use nuclear weapons against any contracting State or protocol Party within the zone of application.

* **The Pelindaba Treaty** (1996), or The African Nuclear-Weapon-Free Zone Treaty, entered into force in 2009. Includes 43 countries: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Chad, Comoros, Republic of Congo, Cote d’Ivoire, Democratic Republic of Congo, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, South Africa, Tanzania, Togo, Tunisia, Zambia, Zimbabwe. It has similar prohibitions to the other free nuclear weapons zone treaties.
* **The Central Asian Nuclear Weapon Free Zone Treaty** (2006) and entered into force in 2009, when the five countries, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, ratified it. This regional treaty is interesting, it includes the provisions established in the CTBT. Article 5, indicates

Each Party undertakes, in accordance with the CTBT:

(a) Not to carry out any nuclear weapon test explosion or any other nuclear explosion;

(b) To prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control;

(c) To refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion.

- **Mongolia´s nuclear weapon-free status** (1992). Mongolia 1992 declared its territory free of nuclear weapons as a single state. It is usual to use “zone” in connection with other states as in the other regional treaty. Because of this, as United Nations says:

“Thus, it was agreed to use the term “status” instead of “zone” and that the content of the status would be defined by the States concerned. During the talks, it was agreed that, to make the status credible, Mongolia’s security needed to be addressed in a broader context, including with respect to the country’s independence, sovereignty and territorial integrity, the inviolability of its borders, the independence of its foreign policy, its economic security and its ecological balance.”

1. Bilateral and Trilateral Treaties

# Several very relevant bilateral and trilateral treaties were agreed between the US and Russia (former USSR) and some of them, with the UK, starting in 1963 with the Hot Line Agreement and the Limited Test-Ban Treaty. The first one "seeks to reduce the risk of a nuclear exchange stemming from accident, miscalculation, or surprise attack" (Atomic Archive), while the second one, in agreement with the UK, prohibits nuclear tests in the atmosphere, underwater and outer space. This treaty became a global treaty and now 116 countries have signed and ratified it. In 1967 the trilateral Outer Space Treaty was signed by US, URRS and UK, to ban nuclear tests in outer space. The next was the Seabed Treaty (1971) between US, URRS and UK, and later 84 countries adopted it, prohibiting "emplacement of nuclear weapons or "weapons of mass destruction" on the ocean floor beyond a 12-mile coastal zone" (Atomic archive). In 1972 two important treaties are reached: The Strategic Arms Limitation Treaty I (SALTI) (an interim agreement of five years validity), and the Anti-ballistic Missile Treaty, agreed between US and USSR that imposes strong limitations on the deployment of launchers and missiles. In 1974, another two relevant treaties were agreed upon between US and USSR: The Threshold Test Ban Treaty which limits the nuclear weapon tests with a yield above 150 kilotons, and the Vladivostok Agreement which further limits the strategic offensive arms. In 1976 the [Peaceful Nuclear Explosions Treaty](https://www.atomicarchive.com/resources/treaties/pnet.html) was signed between the US and the USSR to impose limitations such as the Threshold Test Ban Treaty for peaceful nuclear explosions. In 1979, US and USSR agreed but didn´t ratify the SALT II. Both countries, separately agreed to comply with the provisions included in the treaty. In 1985, US and USSR reached the Intermediate-Range Nuclear Forces Treaty that limits the range of nuclear missiles to a maximum of 625 miles (1000 km). This Treaty made it possible for both countries to eliminate a very important number of nuclear weapons beyond that range. In 1991 The Strategic Arms Reduction Treaty (START) was agreed upon and made important progress in the nuclear weapons reduction arsenal. The START II, 1993 set goals to reduce the number of delivery vehicles and the number of warheads that can be transported. In [2002, The Strategic Offensive Reductions Treaty](https://www.atomicarchive.com/resources/treaties/sort.html) sets new goals of limiting the nuclear strategic warhead to 1 700 for the US and 2 200 for Russia; this goal should be achieved in 2012. Finally, in 2010 the New START was signed between US and USSR in which both countries will reduce, in seven years, significatively the number of strategic nuclear arms.