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The future of nuclear deterrence: an analysis of the strategies of major nuclear powers

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Abstract:

The change in the structure of international society towards multipolarity implies a greater global instability. Moreover, the emergence of several rival great powers means that nuclear non-proliferation is no longer in the common interest of the states that are capable of imposing it. As a result, the world is heading towards a new era of increased nuclear proliferation, in which these weapons will once again take centre stage in relations between states.

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Keywords:

Multipolarity, Instability, Deterrence, Nuclear non-proliferation, Nuclear weapons, Missiles, Great powers.

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Introduction

On 24th February 2022, Russian troops crossed Ukraine's borders: conventional warfare between states had returned to Europe and to the centre stage of international relations. For most of our fellow citizens, the events in Ukraine came as a surprise and a rude awakening to a reality deemed to have been left behind. Many analysts even declared that there had been a "change of era" in international relations. Yet the war in Ukraine is far from being an unforeseeable event, a "black swan". In reality, it may even be said that the war in Ukraine is only a visible symptom of the changes in international society: it is not an exceptional event, but probably the "official" beginning of an era of greater instability, in a process that has been a long time in the making.

On the nuclear side, this structural change will have far-reaching consequences that will, in fact, change many of today's dynamics in the field of international relations. It is necessary to remember that we already live in a "nuclear world". It is impossible to understand current events without the presence and distribution of nuclear arsenals. To take two contemporary examples, the West's response to Russia's invasion of Ukraine is extraordinarily cautious, characterised by parsimony in the delivery of arms to Ukraine and restrictions on their use. Such behaviour would be inexplicable if Russia were not a nuclear power. Likewise, Iranian policy towards the events in Palestine would most likely be much more forceful if Israel were not a nuclear power, or if Iran already had a nuclear arsenal of its own. Similarly, international relations involving great states are mediated by the existence and distribution of nuclear weapons.

The advent of nuclear weapons and the rapid spread of nuclear technology led to extremely pessimistic forecasts about the spread of nuclear weapons, such as that of President Kennedy, who, in 1960, predicted that by the 1970s there would be some twenty nuclear states[1]. The development of the current nuclear non-proliferation regime, articulated around the Nuclear Non-Proliferation Treaty (NPT) of 1968, was a remarkably effective check on these provisions. In fact, since its adoption, in addition to the five "nuclear states" enshrined in the NPT, only three non-signatory states (India, Pakistan and Israel) have acquired a nuclear arsenal, one had nuclear weapons and destroyed

[1] In the third televised debate between the Democratic candidate (later President) John F. Kennedy and the Republican candidate Richard Nixon (13 October 1960), Kennedy predicted that by 1964, there could be as many as twenty states in possession of nuclear arsenals(Carnegie Endowment for International Peace, 2003).

them (South Africa), and only North Korea and Iran (which is party to the NPT) have developed or are developing nuclear weapons.

However, the NPT's success was due to a very specific circumstance: the two Cold War superpowers had a common interest in preventing nuclear proliferation. The development of the concepts of "first strike"[2] and "second strike"[3] led to an uncontrolled growth of nuclear arsenals, which created the aptly described situation of "mutual assured destruction" (MAD). The numerous exercises conducted by both superpowers at the time highlighted the very high possibility of a limited nuclear conflict (using tactical nuclear weapons) escalating rapidly into a global thermonuclear war with consequent MAD. Thus, even a local nuclear conflict between allies of the two different "blocs" into which the world was divided at the time could end up triggering the dreaded MAD. Consequently, both superpowers used all their resources and influence to prevent other states (allies or enemies) from acquiring nuclear weapons. This non-proliferation policy was a common interest of both superpowers.

Efforts to prevent proliferation followed the classic "carrot and stick" approach , combining coercive measures (from sanctions to suspending alliances, including the withdrawal of military protection granted until then), and incentives (such as the promise of technological assistance for civilian applications of nuclear energy or even promises of nuclear protection, "extended deterrence"[4], in case of aggression). The NPT further promised that accession would prevent rival states from acquiring nuclear weapons and that nuclear-weapon states would begin a process of disarmament. The tools of the treaty were basically control of fissile materials and restrictions on access to nuclear technology, which at that time was a field of knowledge restricted to very few states (practically, to the five nuclear states authorised by the NPT). To make the regime more attractive, these nuclear-weapon states included guarantees of non-use against non-nuclear weapons in their doctrines of nuclear weapons use, (explicitly or implicitly, as in the case of "no first use" (NFU) policies, in which they renounced the possibility of being the first to use a nuclear weapon in a conflict).

[2] A pre-emptive nuclear strike aimed at destroying a rival's nuclear arsenal.
[3] An attack in response to a first strike, intended to nullify any advantage gained in that attack. In general, it was aimed at destroying the enemy population and industry.
[4] The concept of "extended deterrence" applies to a situation in which a nuclear-weapon state commits to using its nuclear arsenal in defence of an ally. The US is the only country that has offered this commitment to its NATO allies, plus Japan, South Korea and Australia (Bunn, 2010).

Today, however, all foundations of the non-proliferation regime are in crisis: there is no longer a common interest in preventing nuclear proliferation among the system's major powers which, moreover, have increased in number with the addition of China, along with the possibility of other states achieving global power status (this may be the case of India in the medium term). Likewise, the guarantees promised by the NPT are in question: North Korea has obtained nuclear weapons and Iran is in the advanced process of doing so, thanks to technological assistance obtained under the nuclear non-proliferation regime. The US, Russian and Chinese policies of modernising (and in the case of China, expanding) their nuclear arsenals belie their promises of disarmament. Moreover, Russia's threats to use nuclear weapons within the context of the Ukraine conflict (including modifying its nuclear weapons doctrine to that effect) would invalidate another pillar of the regime (if this possibility were to materialise, the nuclear non-proliferation regime would be "mortally wounded"). Moreover, nuclear technology is now almost a century old and progress has made states such as Malaysia and Turkey suppliers of nuclear technology. On the other hand, the International Atomic Energy Agency (IAEA) has significant problems in conducting its inspections in states such as Iran and North Korea. There are also suspicions that Kim Jong-un's regime may trade in fissile material (as it has done before with ballistic missile technology). In any case, ever since Pakistani scientist Abdul Qadir Khan got hold of uranium hexafluoride centrifuge technology and offered it to the highest bidder, it has been increasingly difficult to control fissile materials. Overall, both the security pillars of the nuclear non-proliferation regime and its control tools have cracked, to the point of making it hardly viable.

A more unstable world

The structure of international society, a concept that includes all existing states and the relations between them, is defined according to the number of "poles" present at any given time. This gives rise to three basic types of structure: unipolarity (a single dominant pole), bipolarity (two poles) and multipolarity (several poles). These structures rarely appear in their "pure" state, usually combining elements of at least two of these basic models.

Traditionally, the number of poles of power in international society is determined by the number of major actors in the system and the distribution of military power between them (Snyder and Diesing, 1977: 419-420). Thus, in a multipolar system, there are more than two great powers (poles) with similar military powers and whose rivalry dominates the dynamics of the system. For a long time, the assessment of a state's power has been reflected in terms of its military capabilities. This reductionist definition of power has been debated following the coining of the term (in the midst of the Cold War), especially in this globalised world, where relations of dependence and cooperation between states go far beyond purely military and diplomatic or even strictly economic aspects. Thus, it is now considered that the power of states can be measured in several different spheres (economic, military, political and demographic) and that their relative power depends on how each of them combines their resources to compete in the international society as a whole (Waltz, 2010: 88-89). Thus, the status of a great power would be dictated by the aggregate power of the state; that is, by the sum of its physical size, population, resource endowment, military strength, political stability and competence in the management of its resources of all kinds. This definition includes objective elements, but also subjective ones (such as competence) or elements that are difficult to assess (such as political stability), which can lead to errors of assessment.

However, after the end of the Second World War, there was a huge loss of power and influence of the European powers. From this conflict arises a world with two poles, i.e. a bipolar structure with two "superpowers" (states whose relative power is much greater than the rest). Historically, the bipolar structure has been a very unstable one (Allison, 2018). However, the advent of the nuclear weapon and the development of huge nuclear arsenals made war prohibitive: any conflict between the superpowers could escalate into a global nuclear war and no possible political gain could compensate for the destruction inherent in an all-out nuclear war. Consequently, nuclear bipolarity proved surprisingly and unexpectedly stable and the history of international society in this period is a testament to the explanatory aptness of the "paradox of stability-instability" (Snyder, 1965: 184-201): the nuclear weapon prevented major conflicts between nuclear powers (which could lead to MAD), but favoured the emergence of multiple minor conflicts, since the two superpowers had the guarantee that the other would not resort to retaliation that could lead to the outbreak of an all-out nuclear war.

The unexpected collapse of the Soviet Union seemed to give way to a situation of unipolarity, in which the United States emerged as the sole power in the international system: a new structure, "unipolarity", thus appeared. In this situation, the US serves as the "gendarme" of international society and thus enjoys an unrivalled military capability. Indeed, the swift and decisive defeat of Saddam Hussein's Iraq in 1991 seemed to usher in an era of absolute US dominance. However, its successive failures in post-war Iraq (after the 2003 invasion) and Afghanistan (after the fall of the Taliban regime in 2001) revealed the real limits of US military power. Moreover, China's rise as a result of the process of economic globalisation has made it a serious geopolitical rival to the United States. At the same time, other powers, such as India, Brazil and South Africa, have increased their relative power and appear to continue to do so. On the other hand, a much more assertive Russia is openly showing its opposition to US dominance. All of these factors have led to the widespread belief that the world is (or is heading, in the near future) towards a situation of multipolarity (Dickinson, 2009).

In other words, the structure of international society is changing from unipolarity to multipolarity. In terms of stability, this change has highly important consequences. Firstly, the existing literature on the subject suggests that war is more likely in multipolarity than in bipolarity for three basic reasons (Mearsheimer, 2003: 338-346):

- There are more potential dyads of conflict in a multipolar society than in a unipolar one. In a unipolar world, the power of the hegemonic state is so great compared to other powers that it has the capacity to deter any operation (especially military ones) that goes against its interests. In a multipolar world, however, such a power differential may not be enough to deter other great powers of similar status (let alone a coalition of rivals). Consequently, minor powers are more vulnerable to the use of force by great powers (it is difficult to find allies powerful enough to ensure their security) and they also have more freedom to fight each other (individual major powers are less able to coerce other states).
- Multipolarity favours power imbalances, which become likely as the number of great powers increases, as it leads to greater possibilities for alliances against each other. These alliances will also be more unstable because they consist of great powers that are essentially rivals of each other.

– The existence of multiple strategic actors makes it easier to commit miscalculations in anticipating possible behaviours of any one of them. There are greater possible combinations of alliances and rivalries, making it difficult to predict how individual states may ally with different powers and to calculate the resulting distribution of power. On the other hand, the great powers that will emerge in the future will be from very different cultural backgrounds than Western ones, which will make it even more difficult to understand how they view the world.

Overall, in the long run, a multipolar structure will become progressively more unstable. In addition to the above reasons, in multipolar models, competitors will seek to exploit any advantage to get rid of potential opponents (advantages that will appear more or less frequently, due to miscalculations by one of them). Existing major powers will also try to prevent the emergence of new competing states, which may lead to new conflicts. The combined effect of all of these factors in the long run will be the progressive disappearance of competitors (Deutsch and Singer, 1964: 390-406). In a well-researched historical example (the Roman expansion across the Mediterranean), this structure ends up as a multipolar model where one great power is stronger than the others (Rome), an advantage that progressively increases and generates a world in permanent conflict.

As mentioned above, there is no "pure" model. Academic theory makes two difference cases for multipolarity, balanced multipolarity and unbalanced multipolarity (Mearsheimer, 2003: 338-346). In the first case, there would be a certain balance of power between great powers (this would be the case of the world that emerged after the Peace of Westphalia in 1648 or after the Congress of Vienna in 1815). This structure may evolve in two directions: a division into rival "blocs" or increased cooperation on common interests.

Indeed, multipolarity could lead to a division into two blocs of allied powers. This may be the case when there are major differences in the dominant social values of the various great powers within the system. In this way, culturally related powers would align themselves against the rest, leading to the creation of "blocs". Other powers could be grouped into a more or less cohesive bloc not because of ideological or cultural affinity, but in application of the principle of "balance of power" (Waltz, 2010: 117-121). Today, this could be the case of democratic powers (led by the United States) versus autocracies (China and Russia). This situation is potentially more unstable than pure bipolarity, as

there are important links connecting each block and yet there are multiple decision-making centres (which increases the chances of miscalculations). An example of this situation would be the European policy of alliances prior to World War I, with the rivalry between the Triple Alliance and the Triple Entente, which meant that the political interests of one of the "minor" members of one of the alliances (the Austro-Hungarian Empire) ended up dragging its allies into the war, out of purely national and, in principle, limited interests. In general, a conflict between two powers from rival blocs could lead to widespread conflict, not only because of commitments made in potential alliances, but also because of the fear that the defeat of one of the alliance members would weaken the alliance as a whole vis-à-vis the rival bloc. This historical experience (albeit limited) demonstrates that this type of multipolarity is potentially unstable.

In the second case, that of increased collaboration (in principle, more desirable), all poles of the system feel involved in maintaining the stability and effectiveness of international institutions. This situation arises when major powers share similar (or at least compatible) cultural values. In this kind of multipolarity, alliances would not be as strong, but would vary on a case-by-case basis. The European accord created after the Congress of Vienna in 1815 and which lasted until 1823 (and, in an attenuated form, until the Crimean War) could be an example of this kind of multipolarity. In general, this situation has had a significant presence in history following abnormally violent conflicts (the Thirty Years' War before the Peace of Westphalia or the Napoleonic wars before the Congress of Vienna) and has lasted until the death of the generation that lived through those conflicts (until the wars of Louis XIV at the end of the 17TH century in the case of the Peace of Westphalia, and until the Crimean War in 1853 in the case of the European accord). That is to say, even with the presence of a cultural community and common interests, multipolarity ended in conflict.

Moreover, the hypothetical good relations between the major powers discussed in the second case do not necessarily imply a more secure environment for the rest of the states within the system. As in the above example of the European accord, great powers may be tempted to establish a world government, imposing their interests (which may be common to them, but perhaps not to all states) on the rest (e.g. the case of the Greek war of independence, in which the powers that were part of the European accord decided that Greece should be independent, so they fought and defeated the Ottoman Empire).

Unbalanced multipolarity occurs when a system of great powers contains a possible main actor, a power stronger than the others. In this case, the stronger state has the capacity to alter the balance of power, even by force, and, at the same time, the fear it arouses tends to lead to an anti-hegemonic coalition (in accordance with the aforesaid "balance of power" principle). The ultimate effect is a significant risk of armed conflict. Thus, unbalanced multipolarity would be the most unstable structure.

In general, unbalanced multipolarity is a transitional phase with two possible evolutions: in one, it would lead to unipolarity (when a rising power aspires to be hegemonic), while in the other it would lead to balanced multipolarity (the case of a declining hegemonic power that cannot avoid losing relative power). In the second case, the great power would be forced to maintain its position with diminishing resources, while the increasingly unfavourable comparison of military capabilities would diminish its coercive power (and thus the constraints it may impose on the decisions of other states) and encourage new challenges. In other words, unbalanced multipolarity would be a transitory, open-ended and, in any case, remarkably unstable situation.

This process is not sudden, but expands over a long period of time. During this interval of evolution, states in international society have become progressively aware of the decline in their security environment. And, consequently, their natural reaction has been to try to improve their security. The world is therefore in a process of rearmament that began around the year 2000, when these trends were becoming evident.

As a result of the above, it may be concluded that the world is in a moment of change in the structure of international society, between a unipolarity (imperfect and in the process of disappearing) and an unbalanced multipolarity (currently present, in the process of consolidation), although with two clearly prominent powers: the United States in apparent decline and a China in permanent ascent (although the US has better prospects than is apparent [Friedman, 2010] and China has more problems than may be perceived [Frías Sánchez, 2019]). Both powers seek allies to consolidate their position. The US claims the membership of states with which it shares culture and values, while China seeks to lead all those dissatisfied with US hegemony. As a result, the world may find itself in a situation that combines elements typical of a Thucydides trap (a declining power witnessing its hegemony being challenged by a rising competitor) with others derived from the situation of a world divided into two antagonistic blocs (Allison, 2018).

From bipolar to (at least) tripolar deterrence

The limited experience of nuclear deterrence is limited to bilateral relations between rival states. During the Cold War, the huge US and Soviet nuclear arsenals virtually cancelled out the effects of French, British or Chinese arsenals. In practice, it was the colossal size of these arsenals that made MAD possible, and with it, stability. As a result, nuclear disarmament agreements (one of the NPT's commitments) were largely based on bilateral agreements between the United States and the Soviet Union. In fact, the intermediate-range missile reduction treaties (INF Treaty of 1987) and the Strategic Arms Reduction Treaty (START I) (1991), the Strategic Offensive Reductions Treaty (SORT) (2002) and New START (2010) were strictly bilateral treaties, which did not bind other states.

Cold War nuclear strategy revolved around the two key concepts of first strike and second strike described above. The risk of premature destruction of the nuclear arsenal was evident from the early years of the nuclear age and such an attack was called a first strike.

The way to avoid a first-strike attack is to acquire the capability to avoid the complete destruction of one's own nuclear weapons or delivery vehicles or both at the same time, in order to retain sufficient remaining nuclear capability to respond effectively to a first-strike attack. This retaliatory attack was called the second strike. The existence of a credible second-strike capability is the most effective way to deter a first strike.

Second-strike capability means having the ability to launch one's own nuclear weapons before they are destroyed in their silos (in the case of ground-based ballistic missiles) or at their air bases (in the case of bombers) or, additionally, to have mobile weapons that are difficult to detect and therefore to destroy. Ballistic missile submarines are most commonly used. Another common measure is to expand one's nuclear arsenal to make it more difficult to completely destroy it in a first strike. During the Cold War, both superpowers sought to maintain this second-strike capability by continually building up their nuclear arsenals (to avoid complete destruction in a first strike) and maintaining their nuclear weapons at a very high state of alert (it takes about thirty-three minutes for a ballistic missile to fly from Central Asia to the United States or vice versa, so that time was available to make the decision to launch the weapons and carry out these launches). In the case of submarine-launched missiles, the time could be much shorter, depending

on the location of the submarine. Consequently, both superpowers developed nuclear "attack" submarines whose mission was to continuously pursue enemy missile submarines and destroy them if necessary before they launched their weapons. Nuclear propulsion was required precisely for these missile submarines, allowing them to spend months underwater, which would have been beyond the scope of diesel-powered electric submarines. To detect ballistic missile launches as early as possible, both superpowers deployed ground-based sensors and satellites, and set up a permanent and very rapid nuclear decision-making system.

During those years, the People's Republic of China (PRC) remained on the sidelines of these strategic developments. Indeed, until quite recently, nuclear weaponry was of no combat use for the Chinese leadership, who viewed it purely as a deterrent against a nuclear threat.

As a result of this view of nuclear weapons (and its own economic limitations), China's nuclear policy has traditionally been based on the view that the mere existence of nuclear weapons and the adoption of basic first-strike protection measures are sufficient to achieve deterrence (the minimum deterrence model). In this sense, the PRC's traditional nuclear policy corresponded to that of a regional power, isolationist in most major conflicts and not seeking to attract the hostile attention of either of the two Cold War superpowers. This policy made a virtue out of necessity, given its limited economic resources and consequently modest strategic aspirations.

As a result, the PRC adopted a very restrictive policy on the use of its nuclear arsenal: it had a nuclear arsenal of relatively small size (about 300 thermonuclear warheads), with a low alert level (warheads were generally stored separately from missiles, requiring several hours to assemble; many of its missiles were liquid-fuelled, which in turn required hours to bring them to launch condition), a declared policy of no first use of nuclear weapons in conflict (NFU) and an explicit commitment to not use them against non-nuclear-weapon states.

However, as its ambitions have grown, China has cultivated a deliberate ambiguity regarding the use of nuclear weapons, revealing multiple exceptions to its stated NFU or non-use policy against non-nuclear-weapon states. Thus, Taiwan would not be considered a non-nuclear state since it is not even recognised as a state, but as a region

of the PRC. Japan may be considered a nuclear state, as it houses US nuclear weapons (although it does not control the use of these weapons). China could use nuclear weapons in areas it considers its own territory, such as Arunachal Pradesh, an Indian territory claimed by China, and which would therefore not violate its first-use policy as an "internal" matter. Likewise, China considers the South China Sea to be part of its sovereign territory, so in principle, the use of nuclear weapons in these waters (disputed with all coastal states and the US) would not violate its NFU policy. These numerous exceptions imply, in practice, a significant lowering of the threshold for the use of nuclear weapons: there are numerous cases in which the PRC could use its nuclear arsenal in the first place, even if it did not suffer a nuclear attack from another state, which was the original philosophy of the NFU policy.

In reality, China's nuclear arsenal, in its current configuration, is highly vulnerable to a first-strike attack, as until very recently, it consisted of liquid-fuelled, ground-based ballistic missiles and nuclear-capable bomber aircraft. In both cases, both silos and bases are fixed installations, conspicuous, and therefore well known to potential enemies. With warheads removed from its missiles, missiles without fuel and bombs separated from aircraft, the use of its nuclear weapons would require China to make a series of preparations that would take many hours. These conditions made China particularly vulnerable to a first-strike attack.

However, the PRC's current economic prosperity, technological advances and political ambitions are fundamentally changing its traditional policy on nuclear weapons.

As a result, China is making a major effort to acquire this second-strike capability, working on a number of different aspects:

- By significantly modernising and expanding its nuclear arsenal (in a first phase up to 1,000 warheads, from the current Western estimate of around 500) and equipping it with new means that will give it greater capabilities (replacing older liquid-fuelled missiles with more modern solid-fuelled missiles, which can be launched almost immediately).
- Increasing its immediate response capability (called launch on warning) by deploying a certain number of missiles (not disclosed) always equipped with nuclear warheads and ready to be launched.

- Commissioning a launch warning system (to detect ballistic missile launches from anywhere on the planet) which requires a complex network of sensors (many of them on satellites), communications, command and control centres and associated procedures capable of detecting a first-strike attack and ordering the launch of Chinese nuclear weapons before they are destroyed (Stefanovich, 2019). For the time being, China has officially renounced the launch-on-warning (nuclear strike) policy (Kulacki, 2019), but in practice it has acquired this capability (as it has all the elements required to carry it out: warheads, missiles, command and control systems and a wide range of satellite and ground-based sensors), although it has confirmed its commitment to its traditional NFU policy. However, this does not dispel the aforesaid doubts regarding the exact meaning of this policy.
- Commissioning and maintaining a permanent deployment of nuclear-powered ballistic missile submarines (it currently has six, each capable of carrying twelve ballistic missiles, although they are relatively easy to spot (they make much more noise than their Russian or US counterparts), which makes them vulnerable. This restricts their sailing waters to areas close to the Chinese coast, where they can be protected (to some extent) by land-based means.

For China, the acquisition of a second-strike capability implies a “vertical” process of nuclear proliferation[5], expanding its nuclear arsenal, providing it with new capabilities, shortening its response time and improving its readiness. This process runs decidedly counter to nuclear non-proliferation agreements and represents a new source of erosion of the nuclear non-proliferation regime.

China's willingness to build up its nuclear arsenal to a certain parity with the United States means that Cold War nuclear bipolarity is now a devilish three-way game, in which no player has any guarantee that the other two could not ally against it at any given moment. Consequently, each side aspires to have sufficient nuclear forces to absorb a first strike from its two potential adversaries, while retaining sufficient nuclear weapons to strike back at both enemies. In other words, each of the three strategic actors would require a nuclear

[5] Two types of proliferation may be distinguished: "horizontal" proliferation, which corresponds to an increase in the number of nuclear-armed states, and "vertical" proliferation, which implies an enhancement to the capabilities of existing nuclear arsenals (Garrido Rebolledo, 2009a: 1).

arsenal equal in size to the sum of those of its two potential rivals (Krepinevich, 2022). Clearly, this leads to an unstoppable nuclear arms race that is very similar to the worst years of the Cold War, and involving enormous risks.

The only solution to this situation is the adoption of tripartite agreements between the three powers involved. However, China refuses to engage in any such negotiations until it achieves a nuclear arsenal sufficient to guarantee its security vis-à-vis the Americans (and Russians). As a result, the world will witness a process of nuclear proliferation in the PRC in the coming years, with unknown consequences for other states that consider themselves threatened by China's expansionist policy (India, but also Japan, South Korea, Australia, the Philippines, Indonesia and Malaysia).

For its part, the United States has been gradually modifying its view of nuclear armaments in recent years, in line with the changing global situation. From the end of the Cold War until the beginning of the last decade, it had possessed a notable advantage in conventional military capabilities over other potential rivals. As a result, it no longer believed the nuclear arsenal was required, and so it became less of a priority in the US defence model, i.e. it was no longer necessary for the US to use its nuclear arsenal to nullify any adversary's conventional advantage. Previously, it had been the other way around; it was the existing nuclear arsenals that could nullify the US conventional advantage, which was impossible to neutralise by other means. Consequently, the imposition of nuclear non-proliferation policies and negotiations aimed at reducing existing nuclear arsenals served to reinforce the conventional military superiority of the United States. This policy was reflected in the *Nuclear Posture Review 2001*[6] (NPR 2001), which significantly reduced the role of nuclear weapons in overall US strategy and prioritised conventional capabilities. The 2001 NPR marked a fundamental departure from US Cold War nuclear policy by establishing a deterrent based on conventional forces, missile defences, and the ability to rapidly generate new capabilities if needed. These three measures were referred to as the "new triad", to underline the abandonment of the traditional concept of the "nuclear triad". In reality, the 2001 NPR greatly reduced the role of nuclear weapons, to the point of being absent in the "new triad". This shift in focus noted in the 2001 NPR was confirmed in the subsequent National Security

[6] For a summary, see: http://www.defense.gov/news/jan2002/d20020109npr.pdf.

Strategy 2006 (United States Government, 2006), where the priority accorded to the nuclear arsenal continued to decrease: as evidence, this strategy contains only one paragraph devoted to nuclear forces, while the 1988 strategy - the last of the Cold War - devoted twenty-six to them (Tertrais, 2007). In the same vein, the 2010 National Security Strategy (United States Government, 2010) also contained a single paragraph dedicated to the need to maintain nuclear weapons - a need that it also made conditional on their "continued existence"[7]- while stating at the outset that "the spectre of nuclear war has lifted"[8]. This disinterest in nuclear arsenals was condensed in the phrase uttered by a senior official in the Obama administration in 2006, "the White House is allergic to the word 'nuclear'" (Tertrais, 2007: 12), and led to the underinvestment characterising the US nuclear arsenal, despite approving the construction of Columbia-class nuclear-powered ballistic missile submarines (SSBNs) (a programme inherited from the service life extension studies for Ohio-class SSBNs predating President Obama's arrival in the White House) and the development of the B-21 Raider bomber (an aircraft with nuclear or conventional capability; in fact, its predecessor, the B-2 Spirit, has been very active as a conventional bomber).

In its first term, the Trump administration was much more assertive in its confrontation with China, which resulted in a certain revitalisation of the nuclear arsenal. Thus, the National Nuclear Security Administration's Life Extension Program (LEP) (Kristensen, 2011) - dedicated to the comprehensive rebuilding of existing warheads that are scheduled to remain active - was boosted, accelerating its work and the number of warheads to be upgraded (such as the installation of the W-87 warheads of the cancelled MX missiles on Minuteman IIIs, Cold War systems that still constitute the entire US ground-based ballistic missile force today).

The first relevant document in this field from the first Trump administration was the 2017 National Security Strategy (United States Government, 2017), which explicitly mentioned the return of “great power competition”, using a much more combative tone than in previous editions since the end of the Cold War and specifically citing China as a possible future rival. The document acknowledged that the competitive advantages of the US

[7] "*[...] Our military must maintain its conventional superiority and, as long as nuclear weapons exist, our nuclear deterrent capability[...]*" (United States Government, 2010: 14).
[8] "[...] The specter of nuclear war has lifted [...]" (United States Government, 2010: 1).

Armed Forces were disappearing, a statement on which the 2018 National Defence Strategy was based. The expressed return to "great power competition" and concerns regarding China, together with the admission of a progressive loss of US military superiority, are merely means of acknowledging that the US has lost the conventional arms superiority it enjoyed since the end of the Soviet Union. As a result, the brief interval in which the US was interested in reducing global nuclear arsenals, the only tool available to its rivals to compensate for US conventional superiority, came to a close. In this regard, the Nuclear Posture Review 2018 (NPR 2018) (United States Government, 2018) is relevant, as it noted the need to thoroughly modernise the weapons systems and industrial and command and control structures that make up the US nuclear arsenal. A salient feature of the 2018 NPR is that it does not limit deterrence to other nuclear states, but expands the role of the US nuclear arsenal to deterrence against non-nuclear threats; that is, it specifically rejects the "no first use" policy, understands that the nuclear arsenal should provide a wide range of use options, for which it seeks to develop low-yield, combat-usable nuclear weapons, and intends to win in a nuclear war, should one occur. Other measures in the field of nuclear armaments linked to concerns about China's rise were the withdrawal from the 1987 INF Treaty or the expressed wishes to bring China into the New START Treaty[9], evidence of a change in US foreign policy orientation.

For its part, the Biden administration published its National Security Strategy in 2022 (United States Government, 2022), in which it re-emphasised the key role of nuclear weapons in the US defence system. Cting the need to deter two advanced adversaries (Russia and China) and reusing the term "nuclear triad" in its original sense, at the same time expressing a desire to reduce the role of nuclear weapons as a guarantee of security, the US demonstrates a willingness to modernise all components of its arsenal: weapons, command systems, communications and infrastructure.

In the same vein, in August 2024, it was announced that President Biden had issued a Nuclear Employment Guidance that would address growing Chinese capabilities as well as how to deal with multiple enemies with nuclear arsenals (possibly China, Russia and North Korea) (Sanger, 2024).

[9] The official name is the *Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms*.

The relative loss of US power vis-à-vis its nuclear rivals (Russia and China, but also North Korea and perhaps Iran) has led to nuclear weapons returning to the forefront of US nuclear policy which, based on global developments, looks set to continue for a long time to come.

Russia's nuclear arsenal is discussed in more detail in a later chapter of this document. However, it is important to note that Russia has some important limitations that condition the effectiveness of its nuclear arsenal. A nuclear arsenal is not limited to a certain number of nuclear warheads. In reality, without safe delivery vehicles, the real value of these warheads is zero. And it is in the field of nuclear delivery vehicles that Russia has notable shortcomings vis-à-vis its US rival and, in the future, possibly also compared to China.

Of the three components of the "nuclear triad", ballistic missiles face limitations imposed by the US Ballistic Missile Defence (BMD) system (US Congressional Research Service, 2024), which, despite its current limited capabilities, is in a constant process of improvement. This implies that, in a few years, the effectiveness of Russian ballistic missiles as nuclear delivery vehicles will not be as great as it is today. Russian nuclear bombers are more or less modernised versions of the older Soviet Tupolev Tu-95 and Tu-160 aircraft. The chances that these aircraft could overcome US air defences are extremely small. Finally, Russia's economic difficulties and limited access to advanced electronic components mean that Russian nuclear missile submarines are lagging behind their US rivals in technological terms (Nuclear Threat Initiative, n.d.), making them increasingly vulnerable to US nuclear attack submarines tasked with tracking them permanently and, in the event of conflict, destroying them before they launch their missiles. As a result, Russia is developing new delivery vehicles to compensate for the limitations of current ones. These delivery vehicles range from nuclear torpedoes to nuclear-tipped cruise missiles with intercontinental range or hypervelocity missiles. These new vehicles present significant challenges to current defences, but are still technological developments at a fledgling stage.

In any case, nuclear warhead torpedoes are opted for based on the fact that a large part of humanity lives in areas close to coasts (Reimann *et al.*, 2023) and that there are currently no effective underwater defences against this type of weapon. For their part, hyper-fast missiles benefit from the difficulty of anti-aircraft systems to detect such fast

targets and from the physical difficulties of surface-based missiles to intercept targets moving at such speeds in a timely manner. However, the commissioning of directed-energy weapons, which are much less affected by these drawbacks, may be expected to mitigate their effect in a relatively short time (Guest, 2023).

As for intercontinental nuclear cruise missiles, the technical difficulty lies in the need to equip them with a propulsion system that can provide a range of thousands of kilometres (hence Russia's alleged use of a nuclear propulsion stack). In any case, they are difficult to detect (they fly at very low altitudes, seeking to blend into the terrain) and to destroy (precisely because they are protected by terrain features), but they are still vulnerable to some extent to air defences, so they will never be a completely reliable delivery vehicle.

China is in a similar situation to Russia. However, while Russian military technology is in decline, that of the Chinese is booming. This implies that China may seek to develop weapons systems capable of overcoming US defences without resorting to less conventional vehicles, which is the only solution left to Russia. Consequently, China may be expected to continue with incremental improvements to its existing missiles, bomber aircraft and nuclear submarines, seeking to outperform its American (and Russian) rivals in these fields.

US defensive systems (BMD, its anti-aircraft defences, and its nuclear attack submarines) are in relatively short supply. The easiest way therefore to deal with them is to overwhelm them with more targets than they are able to destroy. Russia and China will therefore be interested in the emergence of new rivals that can force the Americans to disperse their limited defensive resources. Thus, a North Korea or an Iran with nuclear delivery vehicles capable of reaching the US or its allies pose a threat that forces the US to deploy defensive measures, the larger the nuclear arsenal of these smaller nuclear powers, the more powerful they become. In other words, preventing nuclear proliferation is no longer an interest shared by all major powers.

The rise of China as a rival to the United States will also have a major impact on the internal dynamics of the Atlantic Alliance. During the Cold War, NATO allies shared the perception that the Soviet Union was an obvious threat to their freedom. Moreover, trade ties between Western countries and those of the socialist bloc were very limited: the division of the world was as much political and military as it was economic. However, the

case of China is different. Since the process of globalisation began, China has become the main trading partner of many Western states, while compared to Soviet armoured divisions, there are not hundreds of Chinese ones deployed on Europe's borders today. In other words, the Chinese military threat is neither evident nor imminent, as was the case of the Soviet threat, nor can the West afford to isolate itself from one of its main trading partners without consequences, especially for some Western states that are the most dependent on the Chinese market (Germany, for example) (Eurostat, 2024). This implies that the Alliance's union is less solid regarding China than it was regarding Russia.

On the other hand, European expeditionary military capabilities are much more limited than those of the US, as a result, the "tyranny of distance" has a much greater impact on the chances that partners of the European Alliance may engage in military activities in the Indo-Pacific. This points to a certain “role-sharing” between the US and other NATO members, with the Americans moving away from direct military involvement in European security (a role that should be taken over by the Europeans) to focus on the rivalry with China. However, the credibility of European deterrence is much lower than that provided by the United States. The US nuclear arsenal is essential for effective deterrence against a nuclear state such as Russia, which the limited French and British capabilities (with their particular conditions of use in support of other allies, unknown today) can hardly compensate for. Consequently, the continuation of US "extended deterrence" vis-à-vis its European NATO partners is foreseeable, but a strengthening of the practice of nuclear sharing, described in later sections, is also likely.

The loss of common interests

As noted, in this divided world, avoiding nuclear proliferation is not necessarily a shared interest: the revisionist powers of the system seek to overload the hegemonic power with threats in order to force it to share dwindling defence resources. That is, for the United States' rivals, the emergence of new nuclear powers opposed to the United States is a way of forcing it to divert military resources to other threats, thus decreasing the resources it can devote to opposing their policies. Indeed, it is difficult to argue that North Korea could have acquired nuclear weapons without China's consent or that Iran's nuclear

programme would have been possible without the technical cooperation of Rosatom, the Russian state nuclear company.

However, there are additional reasons beyond the simple fragmentation of the world or increased instability that may lower the interest of great powers today in limiting the nuclear proliferation of other states (so-called "horizontal proliferation"). In fact, the division of the world into blocs is not new and was the main feature of the Cold War. In practice, however, there were only two partners, whose main common interest was to avoid an all-out nuclear war. The main tool to avoid nuclear war was MAD.

When the term came into widespread use, the two Cold War superpowers assumed that stability rested on an "exchange of hostages" (Schelling, 1960: 239) in the sense that both superpowers were taking each other's populations "hostage" by guaranteeing their destruction in the event of nuclear conflict. Consequently, stability required that no measures be taken to prevent the destruction of one's own population, such as the building of shelters for example, rather, the deployment of missile defence systems above all. The 1972 Anti-Ballistic Missile Treaty (ABM Treaty) was born out of this conviction, and it limited these weapons to the defence of one target per superpower and to a maximum of one hundred missiles. This treaty lasted until 2002, when the US withdrew from it, as part of the development of its ballistic missile defence system (BMD programme), later extended to its NATO allies (US Congressional Research Service, 2024). Consequently, the emergence of the US ballistic missile defence system poses a major threat by eliminating the functioning principle of MAD and rendering it ineffective as a stabilising element.

The deployment of a US ballistic missile defence system directly affects the policies of the United States' nuclear non-proliferation rivals. Russia and China (but also North Korea or Iran in due course) are likely to tolerate or even support access to nuclear weapons for any other US rival, if this access forces the Americans to expand the coverage of their missile defence system to defend against attacks from other regions of the world. Thus, the US missile defence system is an additional factor encouraging Russian and Chinese support for specific nuclear proliferation processes: any air defence system (and the "missile defence shield" is but one of them) can become overwhelmed if it is simultaneously confronted with more weapons than it can combat. Due to the special characteristics of ballistic missiles, the means of deployment for their interception are

dependent on the geographical origin of the missiles. When there are several geographic origins, the system must divide its means of interception amongst all of them, which reduces the system's ability to deal with a concentrated attack from any one origin. Consequently, access to nuclear weapons by states considered adversaries of the United States (but not of Russia or China) would force the Americans to increase the complexity and cost of their missile defence system or spread out the available resources, thus making it incapable of nullifying Russia's large nuclear arsenal or China's future nuclear arsenal.

As explained above, it is true that the emergence of new nuclear states would increase the risk of a more or less limited nuclear conflict, but the fear that this could lead to a nuclear conflict between great powers seems to have been reduced in the absence of formal alliances linking major nuclear powers to the new states that are currently developing nuclear weapons. But this may change if more states begin to develop nuclear weapons.

The deployment of nuclear weapons in non-nuclear states

States with nuclear arsenals do not always keep these weapons on their sovereign territory. Moreover, whenever possible (depending on their means), they usually distribute their nuclear weapons into three groups, according to the delivery vehicles (the so-called "nuclear triad"). In application of this concept, the delivery vehicles for nuclear weapons may be divided into three groups: bomber aircraft (which provide a key advantage: once a nuclear bombing operation is launched, they can return without carrying it out, should the adversary's behaviour change; in this sense, manned nuclear bombers are a key element in the escalation of deterrence measures and the quasi "last warning" in the event of a major crisis. Additionally, their versatility and rapid targeting make them the weapons of choice for possible battlefield use of nuclear weapons), land-based ballistic missiles (very powerful and permanently available, but may be located), and warships and submarines capable of delivering nuclear missiles (more difficult to locate at sea - especially submarines - but available for limited periods of time). The aim of this distributed delivery system is to reduce the nuclear arsenal’s vulnerability to a possible first strike.

As a result, there are nuclear weapons permanently stationed in international waters (on nuclear submarines, but also on surface ships) and sometimes these ships and submarines enter the waters of non-nuclear states or even dock in their ports. This means that non-nuclear-weapon states may sometimes harbour nuclear weapons on their territory and could therefore be targeted with a nuclear attack by a rival of the state that owns said ships.

The Cold War rivalry between nuclear superpowers also led them to permanently deploy nuclear weapons on the territories of their allies. In principle, the weapons were in the possession and under the control of the armed forces of both superpowers, even if the units with these weapons were deployed on the sovereign territory of other states. In the case of NATO, the US went a step further by inaugurating the practice of nuclear sharing: The US supplied nuclear weapons to some of its allies (within the NATO framework or through bilateral agreements), which in theory remained under US control and their launch required the authorisation of the US, even if it was left to the armed forces of the state that had received the nuclear weapons. The logic of nuclear sharing was not so much in response to a military need (the US had and still has plenty of delivery vehicles) as to a US desire to share responsibility for a nuclear strike with its allies. Within this scheme, the US Air Force safeguards nuclear weapons in peacetime and delivers them to allies who share this scheme in the event of a launch. Currently, Germany, Turkey, the Netherlands, Belgium and Italy have US nuclear weapons on their territory (B61 gravity bombs) and have aircraft adapted to deliver these weapons (Dual Capable Aircraft or DCA), which have avionics designed to withstand the "electromagnetic pulse" inherent in a nuclear explosion[10].

Nuclear sharing blurs the line between NPT-authorised nuclear states and non-nuclear states under the nuclear sharing system. At what point can a non-nuclear state that is capable of delivering nuclear weapons within a few hours, be considered a nuclear state?

In reality, the "transfer" of nuclear weapons in the framework of nuclear sharing was a violation of the NPT and of US federal law itself. Consequently, and in order to ensure US control over these weapons (in addition to other security considerations), the US designed security systems to prevent these weapons from being activated without the

[10] Germany's recent purchase of F-35 aircraft is aimed precisely at replacing its obsolete Panavia Tornado DCA. In Europe, only the French Rafale aircraft has this capability (Defence Security Cooperation Agency, 2022).

express authorisation of the US authorities. These devices were named Permissive Activation Links (PAL). Initially, they were electromechanical devices that locked certain essential components of the warheads, which were unlocked by security keys. Over time, these PALs have become more sophisticated, with alphanumeric codes and security mechanisms that block the weapons in the event of an attempt to enter the wrong code. Other security measures include the need for two different people to enter the unlock codes separately, to prevent a single person from activating a nuclear warhead. Other safety mechanisms are linked to the expected physical behaviour of the warhead: the environmental sensing devices (ESD). They only allow a warhead to be activated when used in the intended delivery vehicle (e.g. in a ballistic missile, they measure the acceleration of the launch and that of the trajectory; if the values do not correspond to expected figures, the explosion is not permitted). Thus, ESDs prevent a warhead designed for a ballistic missile or aircraft bomb from being prematurely detonated in the event of the delivery vehicle being shot down, from being used by a terrorist group or, in the event of capture, from being adapted to an enemy delivery vehicle or detonated *in situ*. The activation codes of the PALs and the parameters of the ESDs remain with the US authorities. In theory, the weapons involved in nuclear sharing could not be used in any way without US authorisation.

The United States has sought to export its PAL technology to other states with nuclear weapons, with the aim of making nuclear arsenals more secure and reducing the risks of unintended or terrorist use of nuclear arsenals. However, not all states with nuclear weapons rely on this system. Pakistan, for example, does not believe that the activation codes provided by the US authorities are actually valid or that the PALs could not somehow be remotely blocked. Consequently, there are significant doubts about the modes of activation of the warheads of most states with nuclear weapons. In fact, according to eyewitness accounts, nuclear bombs on British aircraft in 2007 had a mechanical security mechanism that used a key, similar to a padlock.

The practice of nuclear sharing seemed to be a relic of the Cold War (in fact, Germany, Belgium, Italy or the Netherlands had no plans to relieve their existing Cold War DCA fighter-bombers). However, the new international situation once again highlights the need for Western allies to share responsibility for the use of nuclear weapons. It remains open to interpretation, though, whether states harbouring such nuclear weapons could be

considered by their rivals as "de facto nuclear states" and thus become legitimate targets of a nuclear attack.

Russia, Ukraine and proliferation

Ever since Russia's military failure in its invasion of Ukraine became apparent, there have been regular reports of Russia's possible use of nuclear weapons as a means to break the deadlock on the battlefield and allow President Putin to achieve his goals, or at least prevent complete failure.

Without going into the possibilities of Russia's use or non-use of nuclear weapons in the context of the war in Ukraine, it is interesting to analyse what effect such use would have on the nuclear non-proliferation regime. As mentioned above, one of the commitments underpinning the nuclear non-proliferation regime is that states with nuclear weapons undertake to not use these weapons against states that do not possess them. If a nuclear state, shielded by its nuclear arsenal, were to attack a non-nuclear state, it would demonstrate that there is no defence against a nuclear-armed state other than to acquire a nuclear arsenal of its own. In other words, such an attack would invalidate any argument against nuclear proliferation.

The Ukrainian case also has a special feature: For a brief period, Ukraine had been a *sui generis* nuclear state, with a considerable arsenal of nuclear weapons (the third largest in the world at the time, after the US and Russia) which remained within its territory as a "legacy" of the defunct Soviet Union (although the Commonwealth of Independent States and later Russian Armed Forces always maintained control and custody of these weapons, so that Ukraine never really had them, even though they were deployed on its territory). US and Russian interest in minimising the number of authorised nuclear states led the United States in 1991 to recognise the new states of Belarus, Ukraine and Kazakhstan on the condition that they surrender of all nuclear weapons to Russia, as the international legal successor to the Soviet Union, assuming all of its rights and obligations (from embassies, treaties and permanent seats on the Security Council to foreign debt and the nuclear weapons themselves). Subsequently, the US pushed for the adoption of the 1994 Budapest Memorandum on Security Assurances. Under this agreement, Ukraine ceded its nuclear weapons to Russia. In exchange, Russia, the United States

and the United Kingdom undertook to guarantee Ukraine's security against any threat or use of force against the territorial integrity or political independence of the new Ukrainian state, other than in self-defence (Article 2 of the Memorandum). Later, China and France offered similar guarantees.

There is little doubt that had Ukraine retained its nuclear arsenal in any way, the Russian invasion of 2022 would most likely not have taken place. The unfolding events in Ukraine and the inoperability of the memorandum is evidence of the ineffectiveness of international agreements in the face of actual behaviour by nuclear powers, calling into question the validity of "extended deterrence", which was one of the attractions of joining the nuclear non-proliferation regime for the allied powers of any state with nuclear weapons.

However, despite repeated warnings from the Russian leadership and the adverse course the Ukrainian war has taken at many points, Russia has not used nuclear weapons. Although we cannot know for certain why Russian leaders decided not to use their nuclear weapons, it is interesting to mention the concept of the "nuclear taboo" (Tannenwald, 2005: 5-49). This concept is taken from Schelling (1960: 20-22), that the first use of nuclear weapons is an "unthinkable option", an idea that would be at the basis of MAD as an element of stability and considers the "nuclear taboo" to be a shared belief that prevents such first use, a *de facto* existing norm, a tradition, a "rule of prudence". According to this theory, the "nuclear taboo" would be largely responsible for the non-use of nuclear weapons since 1945, by including a number of practices, institutions and shared expectations (in a constructivist approach) when designing deterrence strategies, which have also served to discourage nuclear proliferation. The main argument for such an intrinsic ban on the use of nuclear weapons would lie in the repugnance they arouse in international public opinion, which would lead to a universal repudiation of the state using them.

However, in many cases of nuclear proliferation processes, the public response has been rather lukewarm. Examples include the weak global public reaction to the North Korean nuclear tests of 2006 and 2009 or the exceptional treatment granted by the Nuclear Suppliers Group to India in the trade of nuclear materials (Potter, 2012). Moreover, revisions of the nuclear weapons doctrines of various states with nuclear weapons are

continually lowering the threshold of threats that would trigger a nuclear response (Vyas, 2024).

Historically, it is possible to record actual intentions to use such weapons in various crises, such as the Cuban Missile Crisis in 1962, the Yom Kippur War in 1973, or the lesser-known Quemoy-Mutsu crisis in 1969, in which Soviet leaders considered the nuclear option (Potter, 2012: 15) or similar intentions by Indian leaders in the 1999 Kargil crisis.

There are, however, other cases that do seem to support the theory of the "nuclear taboo": those in which non-nuclear states have attacked nuclear states without nuclear deterrence having prevented the conflict (i.e. in which the non-nuclear aggressor states were confident that they would not be attacked by nuclear means, i.e. they could have relied on the "nuclear taboo") and in which nuclear weapons have not been used. Such cases would be China versus the United States in the Korean War, North Vietnam versus the US in Vietnam, Argentina against the UK in the Falklands War, and the Iraqi Scud missile attacks against Israel in 1991. What these cases have in common with previous ones is the non-use of nuclear weapons (which could reinforce the validity of the "nuclear taboo"), but also the fact that in these latter cases, no vital interests of the nuclear states were threatened (Fitzpatrick, 2009).

It may be argued that, while we cannot be certain that the "nuclear taboo" is still in place, it may be reasonably assumed that, in the absence of an existential threat to a nuclear state, it is highly doubtful that the current NFU trend would be broken.

However, the case of the Ukrainian war is more complex. In Russian history, a major military defeat has been followed by a more or less violent change of regime. This was the case in the Russo-Japanese war of 1905 (with the seizure of the Winter Palace), the defeat in the First World War (Bolshevik revolution), or the withdrawal from Afghanistan in 1989 (fall of the Soviet Union). Indeed, a resounding failure by President Putin to defeat Ukraine could lead to the downfall of his regime. Faced with this risk, the West's belief that Russia will not use nuclear weapons, based on an appreciation of Russia's interests as a state (which suggests that Russia would not benefit from the launch of a nuclear weapon) could be misguided in the face of the Putin regime's need to avoid a defeat that could bring about its violent end. However, there is very little knowledge regarding the

actual stability of the current Russian regime, therefore there is no evidence that a defeat in Ukraine would threaten the stability of Putin's government.

Europe and nuclear armament

It is becoming increasingly clear that the world today is a nuclear world. In reality, deterrence against a nuclear power is only acquired by having one's own nuclear arsenal or, alternatively, by receiving guarantees from an ally with such an arsenal. However, the actual effectiveness of such “extended deterrence” raises multiple doubts and, in any case, subordinates possible decisions to the approval of the ally providing the guarantee. Not surprisingly, there are voices arguing that if Europe is to be one of the poles of the future world, it must have a nuclear capability (Dezcallar, 2024). However, two EU member states (Austria and Ireland) have signed and ratified the Treaty on the Prohibition of Nuclear Weapons (International Campaign to Abolish Nuclear Weapons, 2022), making it even more difficult than usual for the EU to acquire this capability.

Apart from European states where US nuclear weapons (W61 bombs) are deployed under NATO control (Germany, Italy, the Netherlands, Belgium and Turkey), there are two nuclear states in Europe: France and the United Kingdom. Although there are similarities between them in the nuclear field, there are also major differences. The main similarity is the composition of their nuclear arsenal: France has some 290 fusion warheads, deployed primarily on Le Terrible class nuclear submarines, with sixteen M51 missiles per ship (although they can use older M45s), each with six to ten warheads between 110 and 300 kt. In addition to these submarines, it maintains some fifty air-launched nuclear warheads with its Rafale fighter-bombers. Since its deployment during the Cold War, the French nuclear arsenal was intended to deter the Soviet Union from attacking France with nuclear weapons[11]. In no way was it intended to destroy the Soviet Union, but it was intended that the price of a nuclear attack on France would be so high as to dissuade the Soviet leadership from considering such an option. Since the end of that conflict, the nuclear arsenal has been the basis of French deterrence, to the extent that the French term *dissuasion* itself is only applied to nuclear deterrence.

[11] In reality, it was born out of France's fear of German rearmament after the reconstitution of the German Bundeswehr in 1955 (Gavín Munté, 2005).

Britain's nuclear arsenal consists of some 225 nuclear warheads. Like the French, it relies essentially on its four Vanguard-class nuclear submarines, with sixteen Trident II D5 ballistic missiles, armed with a variable number of W76 warheads (up to eight per missile), which are in the process of being replaced by W88s (each missile can carry up to fourteen). British submarines typically carry between 40 and 48 nuclear warheads of just over 150 kt. The purpose of the British arsenal was the same as that of the French: to make a Soviet nuclear attack on the UK so costly that it would deter the Soviet leadership from carrying it out (Baylis, 2005: 53-65). Interestingly, the formula appeared to work: the Warsaw Pact's attack plans specifically excluded France and the UK from a large wave of nuclear strikes (Mizokami, 2016).

Among the main differences is that France is independent in its nuclear technology: its missiles and warheads are in-house developments and it is sovereign in their employment, modernisation and maintenance. This is not the case of the UK, which has been using US missiles and warheads since the withdrawal of British-designed W177 warheads in 1998 and requires technical support from the US Navy to operate, maintain and modernise its nuclear weapons. In return, the cost of the French nuclear deterrent is much higher than that of the British.

The United Kingdom is no longer a member of the European Union, leaving France as the only nuclear power within the Union. In May 2024, President Macron offered - not very categorically, in fact - the French nuclear arsenal as a guarantee of security for the Union as a whole (Bassets, 2024). Macron's offer replicates a similar one made by then President Chirac in 2006 (Arteaga, 2006) and has similar drawbacks. In principle, one might suppose that this offer somehow turns the EU into a nuclear power. However, there are too many indeterminate points that make this offer rather unsound: there is no "European" decision-making procedure for this arsenal, which is purely French, nor any guarantee of its use for the benefit of another EU member state other than the personal decision of the French president at the time, in a situation that points to great future political instability in post-Macron France.

The future of British defence in the post-Brexit era is still difficult to define, but it is doubtful that the UK would offer similar guarantees to the French for a European Union to which it no longer belongs.

As for France's offers, doubts regarding "extended deterrence" emerge once again. During the Cold War, it was questioned whether the United States would risk a Soviet nuclear bombing of New York to avenge Berlin, Rome or any other European city. Similarly, the French willingness to risk Paris to avenge Tallinn or Warsaw, especially with a limited nuclear arsenal, may be questioned.

In the event that the European Union were to create some kind of nuclear tool (which would imply the withdrawal of Austria and Ireland from the Nuclear Weapons Ban Treaty, as well as overcoming a foreseeable backlash of public opinion), it would be necessary to create decision-making mechanisms fast enough to prevent a successful first strike (which excludes consultation and consensus, the basis for the functioning of the Union) and to grant the mechanisms and power to launch a nuclear strike to a specific authority. These are not minor obstacles.

Conclusions

The nuclear dimension of the future world will deepen. The new structure of international society implies the disappearance of many shared interests and, with them, the existing brakes on nuclear non-proliferation processes. Unstoppable scientific progress means that technological brakes are also disappearing, which also favours the development of nuclear weapons even by medium-technology states.

Some of the processes underway pose serious risks to the current nuclear non-proliferation regime: access to nuclear weapons by NPT states that have also benefited from technological assistance for peaceful uses of nuclear energy (North Korea and Iran), and tolerance of military nuclear proliferation processes in India, Pakistan and Israel show that the "universal condemnation" that was envisaged for states that did not adhere to the NPT has not prevailed over the specific interests of the major powers. In other words, nuclear non-proliferation has turned out to be a lesser interest than US, Russian or Chinese bilateral interests with Pakistan, India or Israel.

Likewise, the processes of upgrading and expanding China's nuclear arsenal (which could lead to another "vertical proliferation" of US or Russian nuclear arsenals) discredit the NPT's nuclear disarmament pledges. If Russia were to also use a nuclear weapon in the context of the conflict in Ukraine, the entire nuclear non-proliferation regime would

collapse. Above all, there always remains the conviction that if Saddam Hussein, Gaddafi, Bashar al-Assad or Zelenskyy had nuclear weapons, their fate would probably be very different, as the case of Kim Jong-un has shown.

There is a tendency in Europe to overlook the nuclear dimension of international relations. And yet it is impossible to understand today's world without perceiving the role played by nuclear weapons in it. Aspirations of "European strategic autonomy" without a European nuclear arsenal are utterly illusory. At least for any issue involving a major dispute with one of the nuclear powers. In other words, without a European nuclear arsenal, the continent will always be dependent on an ally that does have such a nuclear arsenal and is willing to grant guarantees of extended deterrence (with all the caveats inherent in this concept). Within the current European political situation and with public opinion greatly reluctant to acquire this type of weaponry, this possibility remains highly improbable today.

However, the future seems to point to a world with more nuclear states and, consequently, a greater role for these weapons and their associated strategies.

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