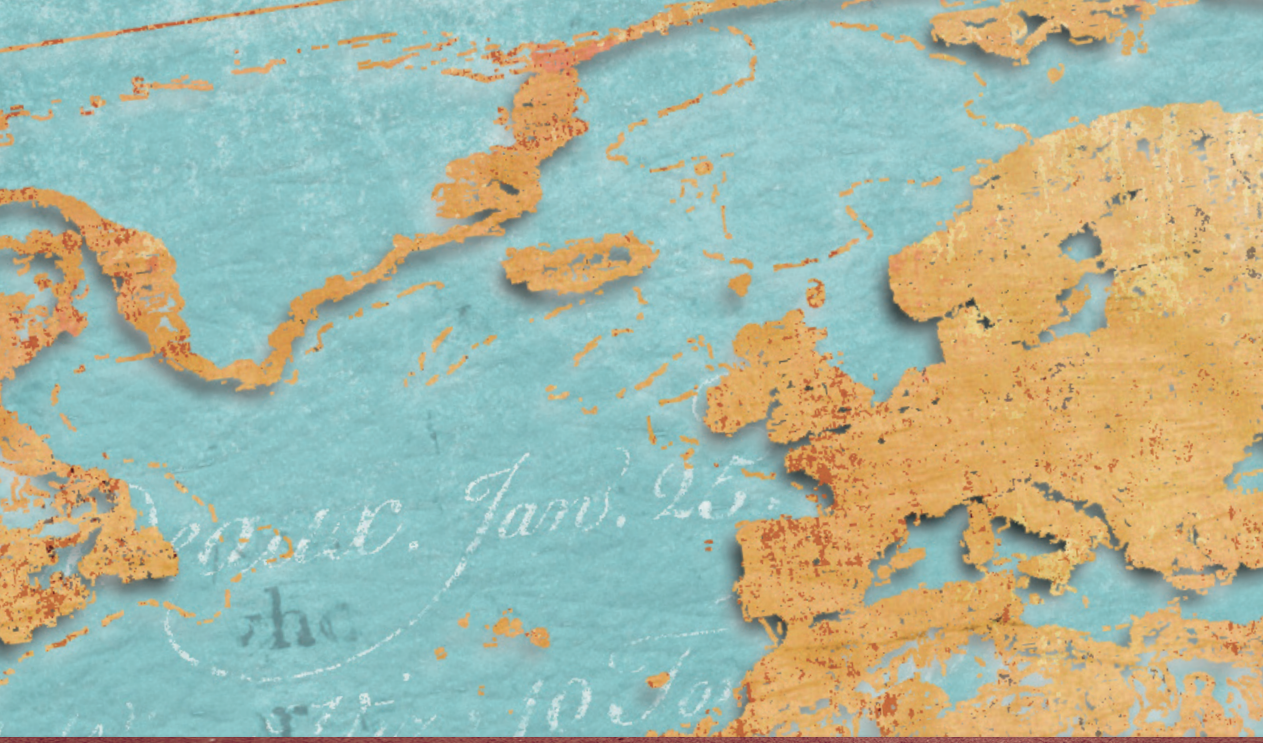

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Global Nuclear Panorama

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MINISTERIO DE DEFENSA

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List of Acronyms

ABM:	Anti-Ballistic Missile Treaty
AI:	artificial intelligence
ALBM:	air-launched ballistic missile
ALCM:	air-launched cruise missile
ASEAN:	Association of Southeast Asian Nations
AUKUS:	Australia-United Kingdom-United States Agreement
BMD:	Ballistic Missile Defence
BWC:	Biological Weapons Convention
C4ISR:	command, control, communications, computers, intelligence, surveillance and reconnaissance
CD:	Conference on Disarmament (Geneva)
CEND:	Creating an Environment for Nuclear Disarmament
CMC:	Central Military Commission (China)
CTBT:	Comprehensive Nuclear-Test-Ban Treaty

CTBTO:	Comprehensive Nuclear-Test-Ban Treaty Organisation
CWC:	Chemical Weapons Convention
DCA:	dual-capable aircraft
ESD:	environmental sensing device
EW-ISR:	early warning, intelligence, surveillance and reconnaissance
FMCT:	Fissile Material Cut-Off Treaty
GICNT:	Global Initiative to Combat Nuclear Terrorism
GUMO (12th):	12th Main Directorate of Nuclear Weapons (Russia)
HEU:	high-enriched uranium
IAEA:	International Atomic Energy Agency
ICBM:	intercontinental ballistic missile
IMS:	International Monitoring System
INF:	Intermediate-Range Nuclear Forces Treaty
IPNDV:	International Partnership for Nuclear Disarmament Verification
IRGC:	Islamic Revolutionary Guard Corps
ISR:	intelligence, surveillance and reconnaissance
JCPoA:	Joint Comprehensive Plan of Action
Kt:	kiloton
LCM:	land cruise missile
LEU:	low-enriched uranium
MAD:	Mutually Assured Destruction
MIRV:	Multiple Independent Re-entry Vehicle
Mt:	megaton
MTCR:	Missile Technology Control Regime
NFU:	no first use (of nuclear weapons)
NPDI:	Non-Proliferation and Disarmament Initiative
NPR:	Nuclear Posture Review
NPT:	Treaty on the Non-Proliferation of Nuclear Weapons

NSG:	Nuclear Suppliers Group
NSS:	National Security Strategy
NTI:	Nuclear Threat Initiative
NWFZ:	Nuclear Weapon-Free ZONE
OLEP:	Operational Life Extension Programme
OPANAL:	Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean
P5:	format of the meeting of the five permanent members of the UN Security Council
PAL:	permissive action link
PLA:	People's Liberation Army (China)
PLARF:	People's Liberation Army Rocket Force (China)
PRC:	People's Republic of China
PSI:	Proliferation Security Initiative
PSI:	Proliferation Security Initiative
QSD:	Quadrilateral Security Dialogue
RVSN:	Strategic Missile Forces (Russia)
SI:	Stockholm Initiative on Nuclear Disarmament
SLBM:	Submarine-launched ballistic missiles
SODCIT:	Strategic Operation for the Destruction of Critical Infrastructure
SORT:	Strategic Offensive Reductions Treaty
SSBN:	ballistic missile submarine
SSGN:	guided missile submarine
SSN:	attack submarine
START:	Strategic Arms Reduction Treaty (START)
SV:	Land Forces (Russia)
TCS:	Trilateral Cooperation Secretariat
TEL:	Transporter erector launcher
THAAD:	Terminal High Altitude Area Defence
TPNW:	Treaty on the Prohibition of Nuclear Weapons

UN:	United Nations
US Navy:	United States Navy
USAF:	United States Air Force
VKS:	Aerospace Forces (Russia)
VMF:	Russian Navy (Russia)
WGU:	weapons-grade uranium
WMD:	weapons of mass destruction

Introduction

Vicente Garrido Rebolledo, PhD

This Strategy Notebook, devoted to the analysis of the global nuclear panorama, is both derived from and continues the 2020 publication titled *Non-Proliferation and Nuclear Arms Control at a Crossroads* (Strategy Notebook No. 205), and seeks to update, assess and conduct an in-depth study of the changes to the international nuclear architecture in recent years, highlighting new power dynamics, the evolution of the nuclear strategies of major powers, and the current state of international forums, treaties and initiatives that make up the nuclear non-proliferation regime[1]. A regime that, despite being more than six decades old (its cornerstone, the Nuclear Non-Proliferation Treaty or NPT, entered

[1] According to John Ruggie (1983), who introduced the concept in 1975, «an international regime is a set of mutual expectations, rules and regulations, plans, organisational energies and financial commitments that have been accepted by a group of state». This definition was later built upon by other authors, adapting it to different models of international regimes depending on the specific field of regulation. Regarding the nuclear non-proliferation regime, the starting (and now widely accepted) definition is that of Stephen Krasner, for whom an international regime is a «set of implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations». For Krasner (1983), international regimes are made up of «intervening variables standing between basic causal factors on the one hand, and outcomes and behaviour (of actors) on the other».

into force in 1970) and the crisis of obsolescence in recent years, is still fully valid and in effect.

Since the publication of the previous work, the nuclear world has undergone significant changes. Russia's invasion of Ukraine in 2022 has marked a turning point in international relations and exposed Europe's vulnerability to external military aggression. This conflict has demonstrated how the world's leading nuclear power (in quantitative terms, Russia possesses the largest arsenal of nuclear weapons, with 4380 warheads and another 1200 retired and intact warheads awaiting dismantling for a total of 5580) (Kristensen *et al.,* 2024a) can use its atomic arsenal as an element of political coercion, thus escalating tensions and posing a challenge to global stability. Moreover, Russia's ability to deploy nuclear weapons in allied territories, such as Belarus, and the possibility of using short- and medium-range missiles in Europe illustrate how technological and geopolitical barriers have been eroded, further complicating non-proliferation efforts.

Additionally, technological progress and the increased nuclear capabilities of countries such as China, together with the persistence and modernisation of North Korea's nuclear programme, or the emergence and technical improvement of Iran's programme, underline the need to strengthen the international response to new challenges and actors.

This *Global Nuclear Panorama*, divided into five chapters, addresses a key geostrategic dimension of international relations that is not always paid sufficient attention by different experts. The contents of each chapter are outlined below, with comments on their relevance and the contributions of each author.

The first chapter by Brigadier General Carlos Frías Sánchez, PhD in Peace and International Security from the UNED, and Director of the Army War and Leadership College, provides a (much-needed) preliminary conceptual analysis of the «future of nuclear deterrence» based on the strategies of major nuclear powers. The chapter highlights how the transition from a unipolar world dominated by the United States to a bipolar or even tripolar one, with the emergence of China and other powers, has increased global instability.

Alliances and rivalries are more fluid and less predictable in a multipolar world, thus increasing the risk of miscalculation and inadvertent conflict. Moreover, the growing rivalry between the United States, China and Russia is reshaping a new era of nuclear

proliferation, marked by a gradual increase in nuclear arsenals and growing distrust and competition between the major players, with direct consequences for the future of arms control and negotiations forums. This structural change also has profound implications for nuclear deterrence, as the proliferation of nuclear weapons becomes a key tool for great powers in their quest for security and power.

However, the role of nuclear weapons as an indispensable element of deterrence and opposition to an adversary on the international stage is not as obvious as it might seem, nor do specialists agree about their usefulness. In 1986, global nuclear arsenals reached an all-time high of over 70,300 warheads (compared to 12,121 in 2024) (Kristensen *et al*., n.d.). At the height of the nuclear escalation, the American neo-realist political scientist Kenneth Waltz (1981 and 1995) provocatively stressed that the proliferation of nuclear weapons would increase the likelihood of achieving world peace, as nuclear weapons limit armed conflict, and went so far as to argue that «the more nuclear weapons, the better». This argument is undoubtedly highly questionable and contrary to the founding principles of the nuclear non-proliferation regime and the NPT, whose negotiation was based on the need to limit the number of nuclear-weapon states to those that already possessed nuclear weapons at the time of adoption of the treaty[2].

The reasons why a state decides to acquire nuclear weapons are related to its strategic culture, the perception of national (in) security, political and strategic interests, and the «international prestige» conferred by having such arsenals, although there is a great deal of debate on this last aspect which extends beyond the academic sphere, precisely due to the international condemnation and rejection provoked by their possession, owing to the risks of their possible use, either intentional or accidental. However, the international community faces a major conceptual vacuum regarding nuclear weapons, as there is no sole definition in international treaties, i.e. a definition universally accepted by all states. Unlike chemical and biological weapons which are defined in the two spe-

[2] The NPT only considers a state to be a nuclear state if it «has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967» (Art. IX.3); hence the difference between a *de jure* nuclear state, which is a party to the treaty (the five permanent members of the UN Security Council, but not due to their status as such), and a *de facto* nuclear power, which is not a party to it, together with an unrecognised nuclear state (India, Pakistan and North Korea, as well as Israel, a special case, since it has never conducted a nuclear test).

cific conventions that regulate them, the 1992Chemical Weapons Convention (CWC) (entry into force in 1997) and the 1972 Biological Weapons Convention (entry into force in 1975) respectively, the NPT does not provide a definition of nuclear weapons. The P5, or *de jure* nuclear states under the NPT (the United States, the Soviet Union/Russian Federation —as the sole heir to the rights and obligations of the former, including its status as a nuclear power—, the United Kingdom, France and China, in chronological order of access to nuclear weapons), established an informal working group in 2011 to agree on a definition of the main terms related to nuclear weapons. The most recent edition, published in 2022, contains as many as 227 key terms relating to nuclear weapons, nuclear deterrence, disarmament and non-proliferation, but, curiously, the very term «nuclear weapon» is not defined in its latest glossary (P5 Working Group, 2022).

Carlos Frías also examines the challenges of nuclear deterrence within a context of technological modernisation, where hypersonic capabilities and artificial intelligence (AI) systems are transforming traditional nuclear doctrines. Moreover, nuclear technology, now almost a century old, has become more accessible, posing new challenges for proliferation control. The ability of states such as Malaysia or Turkey to supply nuclear technology illustrates, in the view of General Frías, how the technological barrier has been eroded, further complicating non-proliferation efforts.

The relevance of this analysis is underpinned by current conflicts and tensions, which demonstrate the central role of nuclear weapons in contemporary international relations. Carlos Frías contextualises the current and future challenges in the field of nuclear security, providing a comprehensive view of power dynamics and deterrence strategies. His reflections ask us to consider the implications of this structural change for international security and underscore the fact that multipolarity not only increases the number of actors with nuclear capabilities but also complicates the dynamics of deterrence.

The second chapter, by Luis V. Pérez Gil, PhD, an analyst at the Spanish Institute for Strategic Studies (IEEE), offers an exhaustive analysis of the evolution of Russia's nuclear doctrine and strategic capabilities within the context of the war in Ukraine and global tensions. This chapter underlines the relevance of nuclear weapons in Russia's national security strategy and shows how they have been instrumental in maintaining its great power status.

Over the past two decades, Russia has increased and upgraded its nuclear arsenal thanks to its economic recovery prior to the start of the war in Ukraine. With President Putin's political impetus and direct involvement in said effort, Moscow is in the latest phase of a process of modernising its nuclear forces, both strategically and tactically, to replace Soviet-era weapons with newer systems. In December 2022, the Russian Defence Minister General Sergey Shoigu (2022) reported that modern weapons and equipment accounted for 91.3% of Russia's nuclear triad, an increase of 2.2% over the previous year. As pointed out by Pérez Gil, the modernisation programme based on known technologies and industrial capabilities inherited from the Soviet era has progressed well and has succeeded in replacing 88% of the combat systems inherited from the Soviet era. Currently, these forces total an estimated explosive power of 455.09 megatons (Mt), equivalent to 25,282 atomic bombs similar to the one used at Hiroshima.

Russia uses its nuclear arsenal not only as a deterrent, but also as a political and strategic tool to influence the global balance of power. The aim of Russian nuclear deterrence is to achieve inaction or non-intervention by the United States or NATO —or both at the same time— in the war in Ukraine, thus avoiding direct confrontation with its adversaries. In this sense, despite the numerical superiority of troops, capabilities and technological means of the Atlantic Alliance allies in relation to Russia, nuclear deterrence (understood as the possibility, however slight, that Moscow may use nuclear weapons in the theatre of operations or against one of the adversaries, who could respond in the same terms) fulfils its objective: discouraging aggression, even if it could be achieved by other means (retaliatory deterrence)[3]. In doing so, Russia would neutralise both the first strike and the second strike by one of the opponents. However, the cause of the dispute must be vital to the aggressor for it to go so far as to use nuclear weapons against another nuclear adversary, which implies that the level of damage it is willing to assume is also

[3] Glenn Snyder (1960) distinguishes between two types of deterrence, by denial or by retaliation. In the first case, achieving the objectives of aggression is unworkable or comes at a great cost (which minimises gains); in the second, the punishment (the possibility that the adversary will respond with the use of nuclear weapons) discourages direct armed attack, even if the objective may be achieved by other means (maximising costs).

very high[4]. In addition to this (subjective) importance attributed to the cause of the conflict, another highly relevant factor would be societies' resistance to punishment through the use of nuclear weapons, the estimation of which is very complex and, in any case, always approximate.

A comparative analysis of the evolution of Russia's nuclear doctrine since 1993 shows that Moscow has opted for greater reliance on its nuclear forces which means that it can even threaten to use them in regional conflicts, such as in Ukraine[5]. This means that Moscow has adopted the «escalate to de-escalate» strategy[6], in which it threatens to use nuclear weapons if it is losing a conflict against NATO in order to persuade the United States and its allies to withdraw from the conflict or, at least, not to intervene directly against Russian armed forces. Indeed, in war games and field exercises, Russian troops have simulated the transition from conventional to tactical nuclear weapons as an experiment to frighten adversaries (Sander and Broad, 2022).

In 2010, Russian nuclear doctrine underwent a significant revision, departing from the 2000 version, demonstrating greater flexibility regarding the use of nuclear weapons and a clearer identification of strategic objectives. Russia's 2010 nuclear doctrine (similar to that of 2014) states that:

> «[…] the Russian Federation reserves the right to utilise nuclear weapons in response to the utilisation of nuclear and other types of weapons of mass destruction against it and (or) its allies, and also in the event of aggression against the

[4] In the 1960s, the United States estimated the threshold of «unacceptable damage» for the Soviet Union at a loss of 20-25% of the population and 50% of its industrial capacity (Paret, 1991).

[5] For example, the 1997 *National Security Concept of the Russian Federation* permitted the use of nuclear weapons «in case of a threat to the existence of the Russian Federation as an independent sovereign state»(Sokov, 1999); the 2000 nuclear doctrine expanded the circumstances under which Russia could use nuclear weapons to include «in response to attacks with weapons of mass destruction against Russia or its allies», as well as in response to «large-scale aggression using conventional weapons in situations critical to the national security of the Russian Federation» (Sokov, 1999).

[6] The «escalate to de-escalate» strategy is a military doctrine that involves the threat or limited use of nuclear weaponry in a conflict in order to deter an opponent and de-escalate rather than escalate hostilities; this strategy suggests that the tactical use of nuclear weapons at an early stage in a conflict could lead to a controlled escalation of the conflict, which would persuade the adversary to stop or withdraw and thus avoid all-out war. It is important to note that it is a highly controversial strategy and has been debated in academia, politics and the military (Erästö and Topychkanov, 2020).

> Russian Federation involving the use of conventional weapons when the very existence of the state is under threat» (Carnegie Endowment for International Peace, 2010).

This formulation is also retained in Provision 27 of the 2014 nuclear doctrine, which states that «the decision to use nuclear weapons must be taken by the president of the Russian Federation» (Mills, 2022).

On 2 June 2020, Russia published a short document (only twenty-five provisions) updating the 2014 nuclear doctrine under the title *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence*[7]. Although some analysts claim that the document does not make any significant additions to the contents of the 2014 nuclear doctrine (a claim that this publication does not share), the importance of its publication lies in the fact that the new document clarifies Russia's nuclear policy and its ability to respond to or deter a potential adversary (inevitability of retaliation in case of aggression against Russia or its allies). The document also explains certain key concepts of Russian nuclear doctrine such as «escalate to de-escalate», which are analysed by Luis Pérez Gil in his chapter.

Likewise, Russia's nuclear doctrine, updated in November 2024, reflects a more aggressive and flexible stance towards the possible use of nuclear weapons, especially in the context of conventional conflicts, such as the one in Ukraine, Pérez Gil points out. The updated doctrine does not exclude the use of nuclear weapons in response to conventional aggression and underlines the importance of deterrence by punishment. It also introduces new scenarios that may trigger a nuclear response, such as aggression by a non-nuclear state with the support of a nuclear state or a critical threat to the sovereignty and territorial integrity of Russia or its allies (Belarus). According to Pérez Gil, this flexibility in the nuclear weapons doctrine, coupled with advanced technology and the modernisation of its nuclear arsenal, allows Russia to adapt to different conflict scenarios and maintain an aggressive and deterrent position *vis-à-vis* its adversaries.

The third chapter by Manuel Herrera Almela, PhD in Law and Social Sciences from Rey Juan Carlos University and director of

[7] The document is published in English by the Russian Ministry of Foreign Affairs as *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence.* Available at: https://archive.mid.ru/en/web/guest/foreign_policy/international_safety/disarmament/-/asset_publisher/rp0fiUBmANaH/content/id/4152094.

the non-proliferation and disarmament research programme of the British American Security Information Council (BASIC), deals with the «Nuclear Panorama in the Indo-Pacific: a region in constant upheaval», characterised by its geopolitical importance and growing tensions, and home to several states with nuclear capabilities, which increases the challenges for maintaining stability and security in the area.

This chapter examines the main factors driving nuclear proliferation in the region, including strategic rivalries (competition between China and the United States, as well as between India and Pakistan); the military modernisation of the region's nuclear arsenals and delivery systems (which increases the capabilities and sophistication of their forces); and alliances and partnerships, such as AUKUS (of which Australia, the United States and Pakistan are members), with a significant impact on regional nuclear dynamics.

As noted above, the modernisation and expansion of China's nuclear capabilities (the only *de jure* nuclear state in the region, according to Article X.3 of the NPT) raises concerns about the lack of transparency and increasing assertiveness of its foreign and security policy. By way of example, China possesses an estimated five hundred nuclear warheads, with plans to increase their number to over one thousand by 2030 and potentially to 1500 by 2035 (40% of the current US arsenal, estimated at 3700 warheads, of which 1770 are deployed) (Kristensen *et al.*, 2025), while it is engaged in a process of continuous technological modernisation, developing new intercontinental ballistic missile (ICBM) silos and upgrading its ballistic missile submarines and nuclear-capable aircraft, as well as working on air-launched ballistic missiles (Kristensen *et al.*, 2024b). All of this with a parallel expansion of its plutonium and highly enriched uranium production capacity to support this growth, making it a global nuclear power.

North Korea's nuclear and ballistic missile programme remains the biggest challenge to the non-proliferation regime today, while threatening regional stability in Northeast Asia. After more than three decades of provocations and cyclical crises, its military nuclear (and eventually ballistic missile) programme has proven to be the best survival tool of the North Korean regime and the Kim dynasty. The origins of North Korea's nuclear programme date back to the 1950s, and it was not until the mid-1980s that the international community became aware of Pyongyang's proliferation intentions. However, it was not until its sixth and, to

date, last nuclear test on 3 September 2017 that North Korea was deemed to have passed the technological threshold necessary to be considered a *de facto* nuclear power, capable of manufacturing and detonating a nuclear warhead with a thermonuclear yield and, ultimately, also capable of effectively deterring the international community from military intervention. There are currently no diplomatic or pressure measures (not even the international sanctions that have been applied to the country for more than three decades) that can force North Korea to abandon its nuclear programme. However, any assessment of the objectives pursued by the North Korean regime with these programmes (deterrence and a suitable delivery vehicle for a nuclear weapon) is especially complicated due to the country's strong isolation from the outside world (underpinned by the *juche* ideology, based on national self-sufficiency) and the eminently propagandistic nature of any communication from the regime, so that any official communiqué or statement requires a subtle interpretation.

Manuel Herrera's chapter analyses the importance and limitations of the US nuclear umbrella for the stability of the Korean peninsula and the wider Indo-Pacific region. The US-South Korea-Japan alliance has been key to stability on the Korean peninsula; extended US deterrence, including annual military exercises and force projection, demonstrates a joint capability and readiness to respond to North Korean aggression. However, in the author's view, the failure to deter North Korea's hostile military provocations has damaged the credibility of this deterrence.

The author also discusses the possibility of establishing a nuclear-weapon-free zone (NWFZ) in Northeast Asia as a solution to tensions in the region. However, the main obstacle would not come from North Korea, but from China, as establishing a NWFZ would not appear to advance Beijing's regional security requirements.

The author also addresses the complex nuclear dynamics between China, India and Pakistan, highlighting the challenges to regional stability. The strategic nuclear trilemma between the three states represents a delicate stability in South Asia. These complex relations and asymmetrical conventional and nuclear capabilities increase the risk of uncontrolled nuclear escalation. Coupled with the lack of dialogue and divergent threat perceptions between these countries, these circumstances further complicate the current security situation, which is favourable to their interests. Additionally, territorial disputes (Kashmir, Aksai Chin

and Arunachal Pradesh), terrorism-related issues, or the intervention of major powers (United States and Russia) influence regional politics, further complicating the situation and generating regional tensions. In conclusion, it is essential to foster cooperation and dialogue between China, India and Pakistan to better manage nuclear crises in South Asia, and to adopt risk reduction measures that promote regional stability.

Finally, Herrera Almela reflects on the trilateral partnership or AUKUS agreement (publicly announced on 15 September 2021), which seeks to boost Australia's military capabilities via the acquisition of nuclear-powered submarines with US and British technology. The obvious (though not explicitly stated) intention of the agreement is to counter Chinese influence in the Indo-Pacific. The author reflects on the possible implications of the agreement for nuclear proliferation and stability in the region. Recent reports have questioned the sustainability of the US Navy's industrial plan to support the submarine programme (United States Department of State, n.d.a.). The possibility of including other countries in specific projects under AUKUS's Pillar II, such as Japan (Vergun, 2024), has also been discussed.

In the fourth chapter entitled «Iran-Israel Antagonism within a nuclear context», Emilia José Peña Ruiz, PhD in Social and Legal Sciences from Rey Juan Carlos University and Navy Lieutenant, focuses on the combative relationship between the two countries, especially within the context of nuclear proliferation, and how the Iranian nuclear programme and Israel's geostrategic position generate a highly volatile security environment, where conventional and nuclear deterrence play a central role. It also explores the influence of external powers, such as the United States and Russia, on regional power dynamics.

Emilia Peña uses game theory to explain how interactions between these two states have evolved from a *game of chicken* (used to analyse situations where two state actors find themselves in a situation of conflict that could escalate into a destructive confrontation if neither of them gives in), where rational decisions may lead to irrational and dangerous outcomes. Game theory helps explain how strategic decisions can lead to situations of high risk and potential mutual destruction (Sánchez-Cuenca, 2019).

The Middle East is a region characterised by constant conflict and geopolitical tensions. Its security depends not only on the absence of armed conflict, but also on threat perceptions and the accu-

mulation of military and nuclear power by states in the region. Emilia Peña notes that the mutual threat perception between Iran and Israel has led both countries to increase their military and nuclear capabilities. This phenomenon is known as the «security dilemma», wherein one state's efforts to enhance its security generate insecurity in others, thereby creating a vicious cycle of power accumulation. The Iran-Israel rivalry and its nuclear implications have the potential to trigger an arms race in the Middle East, especially in Saudi Arabia (which has repeatedly stated its intention to develop a full civilian nuclear programme and hinted at the possibility of using this technology for military purposes if required by circumstances, although neither option has so far advanced beyond rhetoric) (Herrera, 2023) and Turkey (which, despite being a party to the NPT, has also shown interest in developing nuclear capabilities) (Novshadyan, 2021). Within this context, the author notes that the relationship between Iran and Israel is marked by a security dilemma and an arms race exacerbated by nuclear proliferation and the application of game theory, specifically, the game of chicken. The *fatwa,* dictated by Iran's supreme leader on banning nuclear weapons, is viewed with scepticism.

Emilia Peña examines several future scenarios, including the possibility of Iran achieving full nuclear capability, which could further destabilise the region. Diplomatic options and the importance of international agreements such as the 2015 Joint Comprehensive Plan of Action (JCPoA)[8] to mitigate tensions and avoid a regional arms race are also discussed.

In her chapter, the author also discusses other theoretical and doctrinal issues related to the evolution and new dynamics of nuclear deterrence within the contemporary context. She highli-

[8] The agreement and the roadmap, agreed between Iran and the International Atomic Energy Agency (IAEA), established the basis for the start of verification and monitoring of Iran's commitments to the peaceful use of nuclear energy. The JCPOA was endorsed in full (as Annex A) to the Security Council Resolution 2231 (2015), adopted on 20 July 2015, whereby the Security Council «endorses the JCPOA and calls for its full implementation within the timeframe foreseen therein». The IAEA is responsible for verifying Iran's compliance with its commitments under the JCPOA. Its results are communicated by means of regular reports by the Director General to the Board of Governors in parallel to the Security Council. It also provides information on financial matters and the IAEA's consultations and exchanges of information with the Joint Commission, established by the JCPOA. The agreement entered into force on Adoption Day, i.e. 18 October 2015, ninety days after the adoption of Resolution 2231. Available at: http://www.un.org/es/comun/docs/?symbol=S/RES/2231%282015%29 (para. 1).

ghts two key points: firstly, nuclear deterrence has been a crucial factor in maintaining peace between great powers since 1945, as the threat of mutually assured destruction (MAD) has prevented direct conflicts between the United States and the Soviet Union during the Cold War; secondly, the incorporation of new technologies such as cyberspace, artificial intelligence and quantum computing is changing the landscape of nuclear deterrence. These technologies can affect strategic stability and the credibility of nuclear threats. Moreover, deterrence is no longer solely a bilateral issue between great powers, given that nuclear proliferation in countries such as North Korea and Iran and the nuclear ambitions of other regional actors is creating a more complex multilateral deterrence environment. Peña Ruiz therefore discusses the importance of anticipating and preparing for highly improbable but high-impact events, known as «black swans» (Taleb, 2008). Anticipating these potential events is crucial for security and stability, while ignoring them can lead to catastrophic consequences. However, the highly unpredictable nature of these «black swans» makes them inherently difficult to predict, although it is possible, to some extent, to reduce this uncertainty through analysis and preparation. The chapter therefore suggests that states adopt a proactive and flexible stance, be prepared for the unexpected, and develop mitigation strategies to deal with high-impact events.

This strategy notebook closes with a chapter on «Future prospects for the nuclear non-proliferation regime» by Carlos Aragón Gil de la Serna, Deputy Director-General for Non-Proliferation and Disarmament Affairs, and Raquel Sanz Pascasio, Head of Nuclear Affairs at the Spanish Ministry of Foreign Affairs, European Union and Cooperation (MAEUEC). The chapter analyses the deterioration of the international security situation and its negative impact on the nuclear non-proliferation and disarmament architecture, especially since the start of Russia's war of aggression against Ukraine in 2022, which has provoked a regime crisis and reversed the trend towards disarmament, making it difficult and in some cases impossible to reach agreements. It should be remembered that nuclear weapons have been an integral part of the current war in Ukraine since the beginning of the conflict, not in a physical way, but as a threat deliberately introduced by Russia to shape the conflict and remind the world that this was a confrontation with a great power possessing sufficient military (and nuclear) power to take on the world's biggest power, the United States, and its NATO allies, implying that, if necessary, Russia

could seriously weaken it, even if it was ultimately defeated. As Mearsheimer (2003) points out, a retaliatory or second-strike capability is a prerequisite for nuclear powers, which determines the configuration of the nuclear arsenals of these great superpowers and, in discourse, is reflected in their doctrines and strategies on nuclear armaments.

The chapter highlights current and future challenges to the nuclear non-proliferation regime, as well as possible scenarios and solutions. The international security situation has become fragile and unstable due to conflicts such as Russia's aggression against Ukraine, the Middle East conflict (at the time of writing, Israel and Hamas agreed to a ceasefire in Gaza), uncertainties regarding the future of the JCPOA with Iran, the threat posed by North Korea's nuclear and ballistic missile programme and tensions in Taiwan, all of which, according to the authors, have contributed to the deterioration of inter-state relations and balance in multilateral forums. This has led to institutional crises and lack of progress on disarmament, which is especially visible in key treaties such as the NPT or forums such as the Conference on Disarmament (CD) in Geneva, the only multilateral body with the capacity to adopt binding legal instruments on disarmament but deadlocked for decades by the impossibility of adopting its own programme of work. Other factors have also contributed to uncertainties and crises of confidence in the regime: the non-entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) adopted in 1996, from which Russia withdrew its ratification in November 2023, adding yet another state to the eight that are yet to ratify it; the stalemate in the negotiation (not started) of the Fissile Material Cut-Off Treaty (FMCT) and the suspension in 2023 of the implementation of the New Strategic Arms Reduction Treaty between the United States and Russia (New START)[9], the only bilateral

[9] The Treaty of Measures for the Further Reduction and Limitation of Strategic Offensive Arms, also called New START, was signed in Prague on 8 April 2010 by Presidents Barack Obama and Dmitry Medvedev, replacing the 1991 START I Treaty in its commitments. Although widely used by the media, in legal terms it is not appropriate to refer to the new agreement as the START III Treaty, since its predecessor, the START II Treaty, did not even enter into force. President Putin signed the resolution on the ratification of the latter, together with the extension protocols and agreements related to the ABM Treaty, on 4 May 2000 (Agreed statement on clarification of certain provisions of the ABM Treaty, adopted between the United States, Russia, Belarus, Kazakhstan and Ukraine in 1997). However, the United States only ratified the START II Treaty in 1996 (and not the full package of measures, which was never submitted to the Senate for consideration). Russia's withdrawal from the START II Treaty, which

disarmament treaty between the two powers, which, if not extended, will expire in February 2026. Finally, the authors refer to the divisions generated by the 2017 adoption (at the United Nations General Assembly) and the 2021 entry into force of the Treaty on the Prohibition of Nuclear Weapons (TPNW), signed by 94 states and ratified by 73, none of them nuclear, whose approach and weaknesses are addressed in the chapter. The TPNW emerged as a response by some non-nuclear states (led by the «disarmament ideologues» Austria, Mexico and Ireland), disillusioned by the lack of progress on «general and complete» disarmament as defined in Article VI of the NPT. This is the first time in the diplomatic history of the United Nations that a global treaty banning nuclear weapons has been negotiated, undoubtedly on a grand scale but with an uncertain outcome. Its approach is based on the humanitarian disarmament processes that have led to substantial progress in eliminating some conventional weapons (such as anti-personnel mines or cluster munitions) and has resonated with civil society and public opinion. The TPNW seeks to establish a ban that would, for the first time, place nuclear weapons outside international law and initiate a groundswell of opinion that would influence possessor states and ultimately lead to some «defection» within this small group.

The authors also refer to other factors contributing to the weakening of the nuclear non-proliferation regime, including the emerging challenges to international export control regimes — especially by China within the NPT review conferences and the UN General Assembly, and against the Nuclear Suppliers Group, NSG— and new technologies, such as AI and hypersonic systems, which, as realities yet to be regulated, pose new challenges to the non-proliferation architecture.

In response to the stagnation of traditional non-proliferation and disarmament treaties and forums, in recent years more flexible, or less formal and institutionalised, «variable geometry» initiatives have emerged which question the traditional balance of power and opt for a variable geometry while maintaining existing institutions. These initiatives are analysed by the authors in their chapter: the «Non-Proliferation and Disarmament Initiative» (NPDI), the «International Partnership for Nuclear Disarmament

declared it null and void, came the day after the unilateral withdrawal of the United States from the 1972 ABM Treaty on 13 June 2002. As a result of this withdrawal from START II, its successor, the START III Treaty, was never even adopted.

Verification» (IPNDV), «Creating an Environment for Nuclear Disarmament» (CEND), and the «Stockholm Initiative for Nuclear Disarmament» (SID), of which Spain is a member.

Against this backdrop, the authors present three possible scenarios for the evolution of the institutional non-proliferation and disarmament architecture, each of which considers various factors, actors, elements of the regime and the feasibility of measures to be adopted (or not): 1) a return from the abyss (an imminent nuclear crisis could prompt a new effort to strengthen the non-proliferation architecture); 2) deepening the crisis (continuation of the crisis could lead to the collapse of the institutional system and further nuclear proliferation); and 3) crisis management (the most likely, but also the most fragile scenario, in which a minimal institutionality to manage the crisis and the «taboo» on the use of nuclear weapons would be maintained).

In any case, the authors conclude that it is essential to preserve the current nuclear non-proliferation regime through realistic and progressive proposals in order to avoid its collapse, which would have devastating consequences for international peace and security.

Taken together, this *Global Nuclear Panorama* provides a comprehensive and up-to-date overview of contemporary nuclear challenges. The chapters presented not only study changes in nuclear strategies and capabilities but also highlight the importance of preserving and boosting multilateral frameworks to avoid a new era of uncontrolled proliferation. This book is, therefore, an essential reference work for the comprehension of the 21st century nuclear world, one marked by uncertainties, emerging rivalries and the urgent need for international cooperation.

It also fills an important gap in this field of studies published in Spanish. And it is not only the relevance of this language that must be recognised, but also Spain's commitment, having participated and worked actively in agreements, forums and new international initiatives to strengthen the non-proliferation regime.

Spain has signed and ratified the main international treaties on non-proliferation and disarmament (not only nuclear) and actively participates in the relevant organisations and forums. In particular, it has been a State Party to the NPT since 1987, to the 1997 Chemical Weapons Convention (CWC; it was the first EU State to sign and ratify it in 1994), and the 1972 Biological Weapons Convention (BWC). Spain signed the CTBT in 1996 and ratified it in 1998, and the Spanish National Seismic Station, located at

Sonseca (Toledo) is included in the network of 321 monitoring stations capable of detecting nuclear explosions using seismological, infrasound and radionuclide techniques.

Spain's participation in international export control regimes for dual-use items and technologies should also be highlighted: the Zangger Committee, the Nuclear Suppliers Group or NSG, the Australia Group (with reference to chemical substances, biological agents and related equipment that could serve as weapons precursors), the Missile Technology Control Regime (MTCR) and the Wassenaar Arrangement.

Spain also participates in two operational measures of great relevance in the fight against proliferation. Firstly, the 2003 Proliferation Security Initiative (PSI), which is a global effort to prevent the trafficking of weapons of mass destruction, their means of delivery and related materials to and from states and non-state actors, with an emphasis on interdicting trafficking as an anti-proliferation mechanism. Secondly, the Global Initiative to Combat Nuclear Terrorism (GICNT), an initiative launched jointly by the presidents of the United States and Russia in 2006, whose basic objective is to develop international cooperation within the framework of preventing nuclear terrorism. From 2010 to 2013, Spain acted as technical coordinator of the initiative within the framework of the Implementation Assessment Group.

Furthermore, Spain has played a prominent role in the field of non-proliferation and disarmament in recent years, leading forums and initiatives of international relevance (Garrido, 2017a: 219-348). These include Spain's presidencies (in the framework of its membership as a non-permanent member of the United Nations Security Council during the 2015-2016 biennium) of the three Security Council committees directly related to the non-proliferation of weapons of mass destruction (WMD): the 1540 Committee, established on the basis of Security Council Resolution 1540 (2004) of 28 April 2004 (which obliges states, *inter alia*, to refrain from providing any form of support to non-state actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use WMD and their means of delivery) (Garrido, 2016)[10]; the 1718 Committee, established by Security

[10] It should also be noted that, during Spain's rotating presidency of the United Nations Security Council, Resolution 2325 was adopted on 15 December 2016, which renewed and strengthened the mandate of the 1540 Committee. The resolution received broad international support, with 71 states co-sponsoring it.

Council Resolution 1718 (2006) of 14 October 2006 in response to North Korea's first nuclear test on 9 October 2006 to monitor sanctions against North Korea[11]; and the 1737 Committee, established by Security Council Resolution 1737 (2006) of 23 December 2006 to monitor the implementation of sanctions against Iran over its nuclear programme and, in particular, Iran's refusal to suspend its uranium enrichment programme[12].

It is also worth highlighting Spain's commitment during the 2015 NPT Review Conference when it chaired the II Subsidiary Committee, focused on facilitating negotiations on regional issues, with especial focus on the creation of a zone free of weapons of mass destruction in the Middle East. This issue has been a topic of debate and stalemate for many years and Spain's election to the committee chair reflected the international community's confidence in its ability to build consensus and mediate in difficult situations. Despite diplomatic efforts and intense negotiations, the 2015 Review Conference failed to adopt a consensus outcome document; differences over the establishment of the Middle East WMD-free zone and other critical issues prevented a final agreement. However, Spain's work within the framework of the II Subsidiary Committee was widely recognised by NPT States Parties and by the presidency of the Review Conference. Spanish diplomats demonstrated their ability to lead and facilitate negotiations in a complex and challenging environment (Garrido, 2015).

In September 2020, Spain assumed the Chairmanship of the First Committee of the United Nations General Assembly, which

[11] In 2016, Spain co-sponsored the Security Council Resolution 2270 of 2 March 2016, which significantly expanded sanctions against North Korea in response to its nuclear and ballistic missile tests. This resolution reinforced the embargo on arms and items for the development of weapons of mass destruction programmes, as well as financial sanctions and the embargo on luxury goods.

[12] During its Chairmanship of the 1737 Committee, Spain played a key role in monitoring and implementing these sanctions. In 2016, Spain was appointed as a Facilitator of the JCPOA, thereby assuming responsibility for verifying and monitoring Iran's compliance with its commitments on its nuclear programme. This work did not stop with the lifting of sanctions but continued with the coordination of efforts to ensure Iran's compliance with its obligations under the JCPOA. Several economic and financial sanctions relating to its nuclear programme were lifted in 2016 following the signing of the JCPOA; however, the agreement provides that certain sanctions relating to the proliferation of weapons of mass destruction and arms embargoes will remain in place. Here, the sanctions agreed by the UN and the EU do not necessarily go hand in hand. Under the JCPOA, the UN arms embargo expired in October 2020, while the EU arms embargo expired in October 2023 (Spain 2022).

deals with disarmament and international security issues. This Committee is one of six main committees of the General Assembly and is dedicated to producing reports on its area of work which are then submitted to the assembly plenary. Spain's election to the Chair of the First Commission coincided with the 75 session of the UN General Assembly. The Permanent Representative Ambassador of Spain to the United Nations, Agustín Santos Maraver, was appointed under the silence procedure, a measure adopted due to the COVID-19 pandemic, and which avoided the need for a face-to-face vote. During its presidency, Spain focused on several key issues, including nuclear non-proliferation, nuclear disarmament and the prevention of an arms race in outer space. Additionally, Spain promoted dialogue and international cooperation to address new threats arising from the development of advanced technologies, such as AI and hypersonic systems. One of the outstanding achievements of the Spanish presidency was the promotion of transparency and accountability in disarmament efforts. Spain advocated the creation of standardised periodic reporting mechanisms and peer reviews to assess states' compliance with disarmament commitments. This initiative sought to increase confidence between states and strengthen the non-proliferation regime. Additionally, Spain worked to revitalise the Conference on Disarmament. Through its leadership in the first committee, Spain promoted, among others, the resumption of negotiations for the adoption of the FMCT and the universalisation of the CTBT. Spain's presidency was also noteworthy for focusing on the humanitarian dimension of disarmament by promoting the incorporation of the humanitarian consequences of the use of nuclear weapons in disarmament discussions, which contributed to raising awareness of the devastating impacts of these weapons. This humanitarian approach was welcomed by many states in the Global South and civil society.

At the national level, the National Security Strategy 2021 (ESN21)[13] in force recognises proliferation as a «significant threat» to national security and discusses the need to address it as an integral part of national security policy and Spain's commitment to international peace and stability. As a specific second-level strategy, the National Strategy against the Proliferation of Weapons of Mass Destruction is being prepared by the Specialised Committee

[13] Royal Decree 1150/2021, of 28 December 2021, approving the National Security Strategy 2021, *BOE,* no. 314, 31 December 2021. Available at: https://www.boe.es/eli/es/rd/2021/12/28/1150

on the Non-Proliferation of Weapons of Mass Destruction[14] and is to be approved by the National Security Council. This is the first Spanish strategy in this area, which takes up the updated challenges of the first European Strategy against the Proliferation of Weapons of Mass Destruction of 2003 (Council of the European Union, 2003) and considers the implications of Russia's aggression against Ukraine and the tensions that it is creating not only for the non-proliferation regime, but also for multilateralism.

All of the above reveal the importance Spain attached to issues related to the non-proliferation of weapons of mass destruction and disarmament, a phenomenon that affects not only its security but also global stability. As explained above, Spain works and participates in international initiatives to control and verify compliance with non-proliferation treaties, build consensus on disarmament (for example, through the Stockholm Initiative for Nuclear Disarmament), and prevent nuclear weapons and their associated technologies from falling into the hands of terrorist groups.

I am honoured that CESEDEN and the IEEE have once again entrusted me with the chairmanship of this working group. It has been my good fortune to have had a group of analysts with an extensive professional background and solid knowledge of the nuclear non-proliferation regime, its architecture, actors and main challenges. I would like to express my gratitude to the military institution that has promoted the drafting and publication of this strategy notebook, as well as to all those who have collaborated in it and have made leading it an easy and pleasant task for me. I hope that the result (limited in length, but broad in scope and deep in content) will be useful to readers and contribute to understanding on the nuclear world we live in and the nuclear panorama we face.

[14] The Specialised Committee on Non-Proliferation of Weapons of Mass Destruction is a support body of the National Security Council whose objective is to assist the president in directing national security policy on non-proliferation. It was established by Order PRA/29/2018 of 22 January 2018 publishing the Agreement of the National Security Council on creating and regulating the Specialised Committee on the Non-Proliferation of Weapons of Mass Destruction, *BOE,* no. 20, 23 January 2018. Available at: https://www.boe.es/eli/es/o/2018/01/22/pra29

Chapter One

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

Carlos J. Frías Sánchez, PhD

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.

Keywords

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

Introduction

On 24 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 many believed had 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 fact, it could be be argued that the war in Ukraine is only a visible symptom of the changes in international society. It is not an exceptional occurrence, but rather the «official» beginning of an era of greater instability, part of 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 are already living 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

[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).

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 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 real risk of a limited nuclear conflict (using tactical nuclear weapons) escalating rapidly into a global thermonuclear war with the 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

[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).

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).

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 an 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 be trading 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.

1 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 (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, a world arises 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 in which the United States emerged as the sole power in the international system: a new structure, «unipolarity», appeared. In this situation, the United States serves as the *gendarme* of international society and thereby 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 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 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 more 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 any 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 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 *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, 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 disappea-

ring) 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 United States has better prospects than is apparent [Friedman, 2010] and China has more problems than may be perceived [Frías, 2019]). Both powers seek allies to consolidate their position. The United States 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).

2 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 Treaty (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 three hundred 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 not to 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 United States) 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 several different aspects:

- By significantly modernising and expanding its nuclear arsenal (in a first phase up to a thousand warheads, from the current Western estimate of around five hundreds) 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

[5] Two types of proliferation may be distinguished: «horizontal» proliferation, which corresponds to an increase in the number of nuclear-armed states, and «vertical» pro-

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 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 involves 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 mantained 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 United States 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

liferation, which implies an enhancement to the capabilities of existing nuclear arsenals (Garrido, 2009a: 1).

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 US overall 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 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 revitali-

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

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).

sation 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 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 United States has lost the conventional arms superiority it enjoyed since the end of the Soviet Union. As a result, the brief interval in which the United States was interested in reducing global nuclear arsenals, the only tool available to its rivals to compensate for their 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 both the weapons systems and the industrial, 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 include 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 was 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.

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

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. Citing 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).

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 for 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 United States to disperse their limited defensive resources. Thus, a North Korea or an Iran with nuclear delivery vehicles capable of reaching the United States —or its allies— pose a threat that forces them 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. However, while compared to Soviet armoured divisions, there are not hundreds of Chinese divisions 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 United States and, 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 United States 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, still 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.

3 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 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 United States 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 their 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 rival, if this access forces the United States 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 to the United States (but not to Russia or China) would force the United States 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.

4 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 United States went a step further by inaugurating the practice of nuclear sharing: The United States 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 United States, 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 their 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 can deliver 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 control over these weapons (in addition to other security considerations), the United States designed security systems to prevent these weapons from being activated without the express authorisation of 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 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

[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).

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.

5 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 not to 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 United States 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 United States 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-Matsu 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 United States in Vietnam, Argentina against the United Kingdom 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.

6 Europe and nuclear armament

It is becoming increasingly clear that the world today is a nuclear world. In fact, 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 European Union 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.

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 United Kingdom 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 United Kingdom, 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.

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

In May 2024, President Macron offered —not very categorically, in fact—- the French nuclear arsenal as a guarantee of security for the European 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 European Union 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 United Kingdom 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.

Chapter Two

Russia's nuclear power: new approaches to capabilities and doctrine of use

Luis V. Pérez Gil, PhD

Abstract

Russia's nuclear doctrine in June 2020 highlighted the importance of nuclear weapons in the country's security strategy, both in their role as a deterrent against major powers and in the event of a large-scale conventional conflict. Two years later, this hypothesis became a reality when the Russian Armed Forces failed in their attempt to seize Ukraine by surprise and the military operation became a full-blown war in which the nuclear threat has been regularly wielded to block the direct participation of NATO countries. If this scenario were to occur, nothing excludes the possibility of a nuclear conflict, as openly proposed by the new update of that doctrine approved by the Russian president on 21 November 2024.

Keywords

Russia, Nuclear weapons, Doctrine of employment, War in Ukraine, Nuclear conflict.

Introduction

Nuclear weapons constitute a national security guarantee of the countries that possess them because, from the moment they gain access to the military atom, they enjoy immunity. They are also an incentive for world peace because they prevent wars between great powers, as they act as an inhibitor of confrontation between them[1]. The basis for their effectiveness is the fear of catastrophic damage and, in that sense, nuclear weapons displayed their essentially deterrent nature during the Cold War in which the United States and the Soviet Union never came into direct conflict. But this is also the case in the post-Cold War era, where new forms of warfare (asymmetric, unrestricted, multi-domain) and technologically advanced weapons have failed to displace the overwhelming supremacy of nuclear weapons. Their fundamental condition is that they disable aggression between great powers and do not even require the leaders of the powers that possess them to be intelligent, because they impose rationality, whether this is understood as the result of a cost-benefit calculation or as the result of good sense or prudence in the face of an insurmountable fear.

As discussed in this strategy notebook, as many as nine countries possess nuclear weapons, but only two can completely destroy the other —and the rest of the nations— if that rational barrier were to be overcome. As a reminder that nuclear weapons are there and ready to do their job, the two major powers regularly conduct exercises for their use. In Putin's Russia, this exercise is called *Grom* (the Russian word for thunder), and its purpose is to certify the functioning of order-transmitting systems in the event of a massive attack on the country.

But such exercises are sometimes conducted at times of tension in order to send a strategic political message-to other major powers[2]. This response is based on the permanent readiness of strategic nuclear forces, consisting of the famous nuclear triad,

[1] This is Waltz's thesis as propounded in *The Spread of nuclear weapons: A Debate Renewed*. However, other authors such as Glenn Snyder (1961) point out that, while this is true, they create a sense of impunity sufficient to encourage waging war against non-nuclear powers. This, for example, would be the case of Russia versus Ukraine.

[2] Since 2012, this exercise has been conducted every year in October as the culmination of the annual training plan, with two significant exceptions: in May 2014 it was brought forward amid tensions caused by Russia's annexation of Crimea, and in 2021 it was postponed to 19 February 2022, five days prior to the invasion of Ukraine. In all

to unleash full-scale nuclear power on the country whose leaders would have erred in that power calculation[3]. From the Russian perspective, in a great power confrontation, the result would be the first and last case of use, since only a dead world would be left after a massive nuclear response[4]. This is, in essence, the rationale for the MAD strategy, which was born during the Cold War, but which remains relevant today. The *Grom* exercise is therefore of paramount importance to ensure the functioning of deterrence by sending a clear signal about the readiness and willingness to use nuclear weapons when its president deems it absolutely necessary.

For this reason, when the New START treaty was about to expire on 8 April 2010, the first step taken by the new Biden administration was to negotiate a five-year extension[5]. However, with this extension, the Kremlin leadership achieved several objectives: one, to extend its validity to the maximum period foreseen in the treaty itself without going through parliamentary procedures; two, not to include China in any agreement, as this would only serve to downgrade its own position; and three, not to touch upon the issue of tactical nuclear weapons, where there is an imbalance in favour of the Russian side. Thus, New START will remain in force until 5 February 2026 if neither party denounces it earlier.

As noted in Chapter One, this is the last of a set of international treaties, agreements and declarations known as «disarmament agreements» that ended the Cold War and formed what theorists refer to as the strategic stability regime. Moreover, it is part of

instances, all members of the strategic nuclear triad have participated, and on some occasions, elements of t tactical or theatre vectors have also been involved.

[3] Although political leaders are extremely rational when confronted with the nuclear weapons dilemma, a misinterpretation of the other side's position cannot be excluded. Such episodes were present in the Cold War, the most dangerous of which occurred during the NATO exercise Able Archer-83 in Europe.

[4] It is worth bringing up the motto of the Russian Strategic Missile Forces (RVSN in Russian): «After us, silence».

[5] On 21 January 2021, an official statement from the incoming US administration announced its intention to agree to a five-year extension on the grounds that it was «[…] manifestly in the national security interest of the United States and makes even more sense when the relationship with Russia is adversarial». Four days later, the Russian government confirmed that contacts had been initiated. On 26 January 2021, the US and Russian presidents agreed on the extension during their first telephone conversation, which was formalised by a simple exchange of letters provided for in the treaty itself.

the core international security regime which, together with the monopoly of the use of force in the hands of the UN Security Council (the world's great directorate), is tasked with ensuring global peace and security[6]. Its loss would be a strategic catastrophe since its maintenance serves both the global interest and the national interests of both great powers. It is important to hold on to this idea because it explains the basis of Russian power today and its status as a great power.

This recognition comes, on the one hand, from the possession of an immense nuclear arsenal: The United States and Russia possess 90% of all existing nuclear weapons (US Congressional Research Service, 2022). They base their respective national security strategies on the possession of these arsenals, on doctrines of deterrence, and on a common strategy based on mutually assured destruction, which is kept alive by the ongoing massive modernisation programmes of the nuclear triad. On the other hand, its status as a permanent member of the Security Council (with the right of veto) grants it the legal standing to participate in the creation of the fundamental norms that govern international society and to which the rest of the states can only submit or succumb, as has persistently been the case since 1945[7]. It is therefore no coincidence that they are the legal nuclear states, as the NPT of 1 July 1968 calls them. The corollary is that only members of the global directorate can possess the weapons that remove great power warfare from the conflict equation, precisely because of the capacity to cause incalculable damage to any nuclear aggressor that, yet, has not existed. This is what it means to be a great power today[8].

Consequently, as Frías Sánchez points out in the previous chapter, the destruction of disarmament agreements implies a serious breakdown in existing security mechanisms; promotes an arms race that is in the interests of neither side; and allows

[6] Their fundamental mission is to prevent war between great powers, not war per se, and indeed, when they deem it necessary, they resort to the use of force in varying degrees to impose their will, ranging from the imposition of illegitimate governments to the creation of fictitious states.

[7] On 21 October 2021, Russian President Vladimir Putin spoke at the Valdai security forum on the absolute necessity of maintaining the global directorate of the five permanent members of the Security Council, which is tasked with the maintenance of international peace and security. Available at: http://www.kremlin.ru/events/president/news/66975

[8] John Mearsheimer (2003) adds nuclear counter-strike capability to be considered as such.

third powers to aspire to play a global role, which goes against attempts to maintain the *status quo*; and consequently, diminishes the supreme position of the two great nuclear powers. In fact, this was the basis of the non-proliferation regime until 2002[9]. Consequently, New START is part of the core strategic stability regime based on the principles of bilaterality and parity; it enjoys the constitutional nature of international society, and it is in the national interest of both powers to maintain it. This may change if China were to try to have an arsenal similar to that of the United States and Russia[10].

Nuclear arsenals in 2024			
	Russia	United States	China
Strategic warheads	2822	3508	438
For tactical use	1554	200	
Total in service	4376	3708	438
Produced, non-operational			62
Dismantled	1200	1336	
Total	**5576**	**5044**	**500**

Source: Author's own based on data obtained from analyses by Hans Kristensen and his team in the Nuclear Notebook of the *Bulletin of the Atomic Scientists*[11]

This is, for now, the position held by the Kremlin leadership, despite the decision to suspend its participation in New START announced by President Putin on 21 February 2023 in his annual address to the Federal Assembly[12]. The Russian regime is so dangerously efficient in the exercise of power that on the same day the Duma (Russia's lower house of parliament) received a bill to implement this decision. A week later, on 28 February 2023, the Russian authorities notified the US government of its decision.

[9] In 2002, the ABM Treaty was terminated due to the withdrawal of the US government; in 2019, the Intermediate-Range Nuclear Forces Treaty (INF Treaty), which maintained an absolute ban on such systems for both parties, and in 2020 the Open Skies Treaty.

[10] China currently has about five hundred nuclear weapons, eleven times fewer than Russia and ten times fewer than the United States (Kristensen *et al*., 2024b).

[11] See: https://thebulletin.org/nuclear-risk/nuclear-weapons/nuclear-notebook/

[12] For the full text of the speech, see: http://www.kremlin.ru/events/president/news/70565 It may be consulted in English at the following link: https://www.youtube.com/watch?v=838HG7ijveU

This is an anomalous situation, because the treaty itself does not contain a specific clause suspending the effects of the treaty, but neither is it prohibited by treaty law if the parties agree to it, either tacitly or explicitly[13]. In fact, both sides made statements on continued compliance with the treaty's quantitative limits (1550 deployed warheads, 800 deployed and non-deployed launchers, of which only 700 may be deployed at any given time) and other related obligations, so that its fundamental effects remain in force (US State Department, 2024). However, the definitive abandonment of the treaty would not only lead to the start of a new nuclear arms race, but also eliminate the mechanisms of trust and transparency in the exchange of information on nuclear arsenals that have been consolidated over the last decades, which would inevitably affect the decision-making processes of both parties in extreme scenarios of crisis and conflict, as in the case of the war in Ukraine[14].

Thus, an agreement between the major powers would have been a prime example of the workings of the balance of power, had a full-scale conventional war had not broken out in Europe and there had been no risk of a direct confrontation between Russia and NATO[15]. So, when some political leaders talk about taking punitive measures against Russia, are they really aware of the consequences of what they are saying? Do they really believe that the Kremlin would be willing to give in simply because their actions contradict the wishes of the West? All these questions will be analysed throughout this chapter under the theoretical postulates of political realism.

1 The Russian nuclear triad

Since the end of the Soviet Union, Russian leaders have been aware that Russia's military primacy and status as a major world

[13] Article XIV.3 of the New START Treaty specifically addresses withdrawal and sets out the mechanisms for implementation.

[14] Since the entry into force of New START, the governments of both powers have regularly published numerical data on the status of their nuclear arsenals under information and transparency clauses. As of 1 March 2023, 328 on-site inspections, 25,311 notifications, 42 biannual data exchanges on the status of these stockpiles, and 19 meetings of the Bilateral Consultative Commission had taken place. The war in Ukraine has affected these obligations.

[15] US power maintained peace in Europe for seventy-seven years by creating political-military mechanisms that prevented the outbreak of full-scale war. All of this was blown to bits on 24 February 2022 with the Russian invasion of Ukraine.

power is sustained by the possession of its immense nuclear arsenal, but to be credible, it must be continuously updated and tested and underpinned by a solid doctrine of use. To this end, since 2010, Russian authorities have allocated significant financial resources to the modernisation of its nuclear deterrent forces, precision munitions and space communications in two successive state armament programmes from 2011 to 2018 and 2020 to 2027, avoiding joining a new arms race, as was the case at various stages of the Cold War.

On 1 March 2018, during his annual address to the Russian Federal Assembly, President Putin reported on the development of new advanced strategic systems that would place Russia at the forefront of major powers in strategic nuclear deterrence[16]. He talked about five weapons systems that had been decades in the making, and which were able to progress due to technological advances and the availability of the resources necessary to undertake such programmes with the aim of bringing them into service. These include the Avangard hypersonic glider and the hypersonic air-launched ballistic missile (ALBM) Kh-47 M2 Kinzhal (AS-24 Killjoy in NATO), already in service, as well as the RS-28 Sarmat (SS-X-30) intercontinental ballistic missile (ICBM), the 2M39 Poseidon (Kanyon) nuclear-powered strategic nuclear-powered torpedo, and the 9M730 Burevestnik (SSC-X-9 Skyfall) nuclear-powered cruise missile (LCM) in various stages of testing. To these, it should also be added the LCM 3M22 Tsirkon (Zircon), also in service. Russian officials and experts have stated that all these programmes are aimed at overcoming US ballistic missile defence (BMD) systems and gaining a decisive advantage to maintain the regime of strategic stability[17]. For this reason, they have been developed in the utmost secrecy, their actual characteristics are unknown, and, in some cases, it is difficult to classify them as strategic or non-strategic weapons for the purpose of determining whether they are subject to the application of New START.

Eight months after the start of the war in Ukraine, data on the strategic nuclear arsenals of the United States and Russia were released on 14 October 2022. According to this information, as of 1 September 2022, Russia had 1549 strategic nuclear war-

[16] For the full text of the speech, see: http://www.kremlin.ru/events/president/news/56957

[17] On 20 December 2018, President Putin stated: «We are not looking for an advantage in the nuclear race, we are looking to maintain the balance and ensure our own security», see: http://www.kremlin.ru/events/president/news/59455).

heads deployed, 759 launchers including ICBMs, SLBMs and strategic bombers, of which 540 were deployed, thus increasing all three indicators compared to the measurement of the previous period[18]. At that time, the Russian Foreign Ministry filed a complaint alleging that the quantities declared by the United States were not correct because they did not account for systems that were covered by the treaty[19]. Such disagreements were not new, but in the context of the West's growing involvement in the war in Ukraine, they had added propaganda value and could be used as a justification for withdrawing from the treaty or eventually failing to comply with it, as did in fact happen.

It is worth remembering that these data do not include the total volume of nuclear weapons of each party, since New START only deals with strategic weapons with the limits and types outlined above. At the start of 2024, the Russian nuclear arsenal was estimated to amount to 5576 warheads or nuclear payloads distributed as follows (Kristensen *et al.*, 2024a)[20]. Firstly, 2822 strategic warheads in operational status or in storage ready for use if needed. The disparity between the data quoted for strategic warheads and those published in the light of the New START treaty is explained by the fact that, for the purposes of this treaty, strategic bombers count as one unit, regardless of the number of warheads they can deliver. Secondly, 1554 tactical or theatre warheads, which would be made available to the operational commanders of the three traditional branches of the Armed Forces for use in the event of conflict. Thirdly, the rest, some 1200 nuclear warheads are in storage pending dismantling. Their numbers are reduced from year to year, but they can be recovered if necessary. In this regard, there are approximately forty permanent nuclear weapons storage facilities, including ten national-level central depots, all under the 12th Main Directorate (12th GUMO) of the Ministry of Defence, which is the agency responsible for the safekeeping, custody, and protection of all nuclear weapons.

It should therefore be noted that the Russian Armed Forces have two nuclear triads: a strategic one with a strong deterrent role

[18] On their side, the United States had 800 launchers, 659 of them deployed, and a total of 1420 nuclear warheads.

[19] Specifically, the Russian authorities repeated claims related to ground-based training silos (four in total), a category that does not appear in the treaty, as well as 41 B-52H strategic bombers and 56 Trident II SLBMs, which did not qualify for de-accountability.

[20] The data are cross-checked with other specialised sources.

(including a powerful counter-strike force) and a tactically employed one, also called theatre, for use on the battlefield.

The strategic nuclear forces bring together all fixed and mobile ICBMs, SSBNs with their SLBMs and strategic bombers, and report directly to the General Staff in Moscow. The modernisation programme based on known technologies and industrial capabilities inherited from the Soviet era has progressed well and has succeeded in replacing 88% of the combat systems inherited from the Soviet era (Karakayev, 2024). These forces currently total an estimated explosive power of 455.09 megatons (Mt), equivalent to 25,282 atomic bombs similar to the one used at Hiroshima[21].

The Strategic Rocket Forces (RVSN) have been an independent branch of the Russian Armed Forces since their creation in 1956 and are organised into three intercontinental ballistic missile armies with 11 divisions and 39 combat regiments distributed in three main areas of the country: European Russia, the Volga region and Siberia. They maintain in service 326 ICBMs of four different types with 1244 warheads, accumulating a total explosive power of 274.52 Mt (equivalent to 15,251 Hiroshima bombs). The RS-24 Yars ICBM (SS-29) armed with various types of 100 kiloton (kt) warheads has been massively introduced in both silo and tractor-mounted-launchers (TEL), which are replacing the Topol (SS-25 Sickle) and Topol-M (SS-27 Sickle-B) missiles. The new heavy ICBM Sarmat, meanwhile, is five years behind initial deployment plans[22] despite statements by political and military leaders, including President Putin himself[23]. Flight testing did not begin until April 2022, several failures have been recorded (February and October 2023), and in September 2024, a test

[21] The absolute secrecy of the characteristics and explosive power of warheads in service makes it impossible to know the real data in all cases and impedes the assessments of capabilities, so that statistical analyses tend to go to the maximum and therefore may lead to results that are misleading because they are exaggerated. In this chapter we use power data in the lowest known range.

[22] It is intended to replace the R-36M Voevoda, which entered service in the 1980s and was dubbed SS-18 Satan by NATO because of its terrifying destructive capability. Some thirty remain in service today, each armed with up to ten 500 and 800 kt nuclear warheads.

[23] On 21 June 2023, President Putin declared that the Sarmat would enter service in the near future, and the following 1 September, Roscosmos head Yury Borisov announced that the RVSN had commissioned the first ICBMs of this model. These statements must be understood in the context of the war in Ukraine, both internally as a struggle for dwindling financial resources and externally as part of the Kremlin's ongoing strategy of nuclear threat.

missile exploded inside a silo in Plesetsk causing severe damage to the facility (Podvig, 2024b). It is a gigantic 208-tonne missile capable of flying more than 15,000 kilometres armed with a Multiple Independently Targetable Reentry Vehicle (MIRV) with up to ten nuclear warheads or several Avangard hypersonic warheads, enabling it to deliver a payload of 5 to 8 Mt explosive payload to virtually any point on the planet[24]. The goal of the RVSN force is to have some 300 ICBMs (250 Yars and 50 Sarmat) armed with different types of warheads adapted to missions.

While this target was being achieved, it was decided to activate two strategic missile regiments armed with Avangard hypersonic warheads using old ICBMs UR-100NUTTk (SS-19 Stiletto Mod. 4) in silos until they could be replaced by Sarmats. Thus, in December 2019, the first pair of missiles were commissioned at the 13th Dombarovsky Missile Division in the Urals Federal District, and in November 2022, the second regiment (each with six missiles along with its command-and-control units) started to be equipped (Pérez, 2022b). The move underscores the Kremlin's efforts to maintain deterrence at a time when there is unambiguous talk of the use of nuclear weapons in conventional conflicts.

The Russian Navy (VMF in Russian) has two SSBN divisions assigned to the Northern and Pacific Fleets, tasked with nuclear deterrence and strike missions, and amassing a formidable counter-strike capability with twelve SSBNs armed with 192 SLBMs that can carry up to 992 MIRV warheads with a total yield of some 99.2 megatons, about 5510 Hiroshima bombs. Since 2014, it has received and commissioned seven Project 955 (Borey class) SSBNs, which are replacing the previous generation Project 667BDRM (Delta IV class). Three more are under construction at the Sevmash shipyard in Severodvinsk and the construction of two more has been announced with the aim of having strict parity with the US Navy for decades to come[25]. Each SSBN Borey carries sixteen SLBM 3M30 Bulava (SS-N-32) armed with up to six MIRV warheads with an explosive power of 9.6 Mt equivalent to 530 Hiroshima bombs, are equally divided between the Arctic

[24] The Ministry of Defence announced that it would equip two missile divisions located deep in Russian territory: the 13th Dombarovsky Division, Orenburg oblast, and the 62nd Division in Uzhur, Krasnoyarsk territory, where construction work on new silos and facilities has been observed.

[25] Significantly, by the time the first SSBN of the new Columbia class enters service around 2032, the Russian Strategic Submarine Forces will have twelve operational Borey strategic submarines.

and the Pacific areas and will form the backbone of the Russian counter-strike force for the next four decades (Pérez, 2023).

Additionally, new Belgorod and Khabarovsk class nuclear submarines (one in service and at least two under construction) are being built as carriers for the giant nuclear-powered Poseidon torpedo that would be equipped with a multi-megaton warhead designed to destroy large enemy coastal infrastructure (Pérez, 2023). Their qualification as strategic weapons are complicated and it is disputed whether they are included in the New START provisions.

The Long-Range Aviation (Strategic Aviation), which is part of the Aerospace Forces (VKS), brings together 67 Tu-95MS (Bear-H) turboprop strategic bombers and Tu-160 (Blackjack) supersonic bombers distributed in two large air units stationed in two separate areas of the country: in European Russia and in Siberia-Far East. Of these, some fifty are assigned to the primary nuclear strike mission. As part of the nuclear deterrent modernisation programme, the resumed production of the Tu-160 was approved with a long-term target of fifty aircraft (model Tu-160M2), intended to replace all bombers still in service from the Soviet era. This is a highly ambitious goal, but one that is unattainable for the Russian aircraft industry. These bombers function as launchers for very long-range cruise missiles with conventional or nuclear capability and are also part of Russia's counter-strike force. They currently have an estimated 586 nuclear warheads, including air-launched cruise missiles (ALCMs) and unguided bombs with an explosive yield of 58.6 Mt, equivalent to 3255 Hiroshima bombs.

Alongside these strategic capabilities is an immense arsenal of nuclear weapons (1554 warheads) for tactical or theatre use that make up a second Russian nuclear triad. In the event of war, these munitions would serve a wide variety of purposes and are a source of constant concern for Western policymakers, military decision-makers, and specialist analysts.

The Russian Ground Forces (SV) have thirteen brigades of 9M723 Iskander-M (SS-26 Stone) short-range ballistic missiles, and 9M728 cruise (SSC-7) and 9M729 medium-range cruise (SSC-8) missiles, which can carry warheads between 10 and 100 kt. An estimated 95 are in service[26]. The Navy has 807 nuclear payloads

[26] Within the context of the war in Ukraine, new missile brigades are being created as organic units of newly formed armies in the Ground Forces.

stockpiled for cruise missiles, anti-submarine, torpedoes, depth charges and coastal missiles[27]. The Aerospace Forces have 334 nuclear payloads in both missile and unguided bombs to be delivered by bombers and multi-mission fighters, and another 318 very low-yield payloads for anti-aircraft missiles. All tactical delivery vehicles, from missiles to fighter aircraft, warships, and anti-aircraft systems, are undergoing modernisation programmes, yet the state of preservation and maintenance of these Soviet-era warheads is almost entirely unknown. This situation is made more worrying by the fact that all armies and divisions of the Russian Armed Forces are engaged in a struggle for increasingly limited financial resources as a result of the sharp increase in war spending in Ukraine.

The existence of ongoing modernisation plans for all components of the nuclear deterrent, together with long-term programmes with priority funding, underlines the Russian leadership's determination to maintain its status as a major power. At the same time, they retain the means to ensure the destruction of any enemy in the event of aggression. From the Russian perspective, therefore, nuclear weapons continue to fulfil the functions for which they were created, which are to deter aggression, prevent conflict, and maintain order and stability among great powers. Precisely, the breakdown of the disarmament regime that put an end to the Cold War with the abandonment of treaties has opened the door to a new nuclear arms race, which will add more actors this time around, as Herrera Almela points out in Chapter Three of this volume.

2 Russia's nuclear weapons doctrine

The Russian military doctrine of 19 December 2014 maintained in force the reserved annex of the same document dated 5 February 2010, which stated that nuclear weapons fulfil both a deterrent and a military function because they are the ultimate guarantee of the existence of the Russian Federation in case of aggression (Pérez, 2015). On 2 June 2020, President Putin made these assumptions of use public for the first time with the approval of the document *Foundations of State Policy of the Russian*

[27] As a result of a September 1991 verbal agreement between Presidents Reagan and Gorbachev, nuclear-powered attack and cruise missile submarines (SSNs and SSGNs) do not carry nuclear warheads on peacetime patrols. Neither side has so far challenged or withdrawn from this agreement, and therefore it continues to be honoured.

Federation in the Area of Nuclear Deterrence[28]. As noted in the previous chapter, deterrence is based on the ability of a nuclear power to cause damage of unacceptable (catastrophic) proportions in retaliation against an attack by another nuclear power, but also in the event of a generalised conventional war.

The publication of this document was therefore intended to «ensure that a potential adversary realizes the inevitability of retaliation in the event of aggression against the Russian Federation and (or) its allies»[29], so that, in the face of aggression, the Kremlin would be able to respond with a nuclear counterattack, i.e. deterrence by retribution. Also, there is a consistent lack of declaration of no first use[30], in contrast to the Soviet era, and it does not provide for a limited nuclear war scenario[31]. It should be borne in mind that the Russian nuclear doctrine is a political declaration that emanates from the Russian president himself and is binding as far as he wishes because there is no national, let alone international, authority that can sanction a possible breach. Its main purpose is to send a message to the outside world, which may or may not be true.

It should be made clear in advance that the Soviet Union first, as well as independent Russia later, considered that a nuclear war would always involve the massive use of available nuclear weapons. It is therefore a war of total destruction through the implementation of the MAD strategy. This conception of nuclear war is incompatible with theoretical approaches to the possibility of waging a limited nuclear war or the so-called escalation strategy for de-escalation (Kofman and Fink, 2022; Post, 2024), which were always rejected by the Soviet leadership and also by the Russian political and security elite, as President Putin pointed out at the Valdai security forum (also known as the Valdai Discussion Club) on 18 October 2018, when he stated that «any aggressor

[28] Decree number 355/2020 of 2 June 2020. Available at: http://www.kremlin.ru/acts/news/63447

[29] *Ibidem*.

[30] One day following the publication of the presidential decree, on 3 June 2020, Kremlin spokesman Dmitry Peskov declared that Russia would never use nuclear weapons in the first place (See: https://www.armscontrol.org/act/2020-07/news/russia-releases-nuclear-deterrence-policy). However, this statement was not backed by any political or military authority of the Russian state and is therefore worthless.

[31] During the Cold War, Herman Kahn proposed measures for this (in *Thinking about the Unthinkable*. New York. Horizon Press, 1962). However, ingenuous theories of limited nuclear warfare fail to consider that, once the nuclear exchange has begun, it is impossible to set a threshold for the maximum use of nuclear weapons because an opponent who is outmatched will escalate to the next step and so on.

should know that retaliation is inevitable and they will be annihilated», emphasising that «we as martyrs would go to paradise while they will simply perish because they won't even have time to repent their sins»[32]. It may be argued that such claims are a bluff, i.e. a mere political statement designed to frighten potential opponents, but it raises a question that is very easy to resolve: Who dares to put it to the test when the consequences might be absolutely catastrophic? The answer is quite rational: a correct assessment of interests excludes direct military confrontation with other nuclear powers.

The June 2020 document therefore confirmed the fundamental principles set out in the previous 2010 document. It states that:

> «The Russian Federation considers nuclear weapons as a means of deterrence, the employment of which is an extreme and compelled measure, and makes all the necessary efforts to reduce the nuclear threat and prevent aggravation of interstate relations that could trigger military conflicts, including nuclear ones».

Accordingly, this policy aims to maintain «the capabilities of nuclear forces at a level sufficient to ensure nuclear deterrence and guarantee the protection of sovereignty and territorial integrity of the state».

The document also set out the threats that may lead to the use of nuclear weapons: the presence of nuclear weapons and other weapons of mass destruction held by other states, the uncontrolled proliferation of nuclear weapons, the deployment of these weapons on the territory of non-nuclear states or of offensive weapons in countries that may see Russia as a potential adversary, anti-missile systems, short- and medium-range cruise missiles, hypersonic missiles, directed energy weapons, offensive space systems and the build-up of military forces near Russia's borders, in what was a clear allusion to NATO.

Just over a year later, on 2 July 2021, the Russian president approved Russia's new national security strategy, which, over the course of forty-three pages, sets out the threats and challenges to be faced by the country during the current decade[33]. This is

[32] Available at http://www.kremlin.ru/events/president/news/58848

[33] The national security strategy is the basic long-term planning document that defines national interests and foreign policy objectives and sets out policy guidelines for ensuring national security and development.

not a new document, but an updated version of the previous strategy, repeating the themes of the threat of NATO's activities, the build-up of NATO's military infrastructure in Eastern Europe, and the expansion of military exercises near Russia's borders. It also reiterates the increase in conventional military threats and how they lower the threshold for the use of nuclear weapons in the event of conflict. But it also emphasises the existence of internal and external forces that seek to attack national cohesion and take advantage of inter-ethnic and inter-religious conflicts to destabilise the countries of the so-called «near abroad», the former Soviet republics. Also, due to the existence of Western sanctions since 2014, the implementation of measures to prepare the economy and society for crises or conflicts was set as a priority. This plan also included the defence of traditional values, Russian culture, and history[34].

As will be seen below, this nuclear doctrine has been challenged in Russia within the context of the war in Ukraine. On 28 October 2024, the researchers Sergey Karaganov and Dimitry Trenin, together with the former commander of the Pacific Fleet, retired Admiral Sergey Avakyants (who commanded a large nuclear combat force), published a book in Moscow entitled *From Deterrence to Intimidation*, in which they systematised the fundamental ideas that should serve as the basis for an effective new Russian nuclear doctrine, i.e. one that functions and deters Russia's enemies, even in the face of proxies and proxy warfare when vital security interests are at stake (as in the case of Ukraine, but possibly not the only one)[35]. According to the authors, not using nuclear weapons in such circumstances reveals a weakness that is exploited in political-strategic terms by potential enemies to advance their anti-Russian positions.

But it cannot be ignored that these positions have been encouraged by the Kremlin under the idea that public debate alone carries a message of intimidation which, in the hands of successful propagandists (and they have proven to be successful), can be managed and customised to each target audience (their own, others', Western, European, American, or global) to achieve the ends of deterrence. However, it also requires actions and demonstrations of power; it requires that the declared capabi-

[34] Official Russian propaganda constantly accuses the US and other Western countries of fostering anti-Russian campaigns, both inside and outside Russia.

[35] See: https://karaganov.ru/ot-sderzhivanija-k-ustrasheniju/

lities and readiness acquired in exercises be linked to the most important factor in the exercise of power by great powers: the intention or willingness to use those weapons if necessary[36]. This and only this is how nuclear deterrence works.

Thus, on 19 November 2024, President Putin signed a new decree regarding updates to the doctrine on the use of nuclear weapons[37]. It does not however introduce substantial modifications that would allow us to say that Russia has changed its nuclear policy: it still does not adhere to a NFU policy, nuclear weapons continue to be the guarantee of state security and will be used against anyone who attempts a course of action similar to that carried out in 1941 by Hitler's Germany against the Soviet Union[38]. The new scenarios that may trigger a nuclear response are:

- When there is aggression by a non-nuclear state with the support of a nuclear state, that will be considered as a combined attack.
- Such an aggression by any country that is part of a military alliance (i.e. NATO) will be considered an alliance-wide aggression, and the alliance will suffer the consequences collectively.
- In reaction to the use of weapons of mass destruction against Russia or its allies.
- When there is a critical threat to its sovereignty and territorial integrity or that of Belarus.

These changes are closely linked to the evolution of the current conflict and the Kremlin's perceived need to boost nuclear deterrence against Western attempts to enter Ukraine, as the Russian president recalled on 16 December 2024 during the annual meeting with senior military commanders to discuss the Defence Ministry's main lines of action and the activities of the annual training plan for the coming year: «Let me stress once again, so that no one accuses us of trying to scare everyone with nuclear weapons: this is a policy of nuclear deterrence»[39].

[36] See Frías Sánchez's discussion in the previous chapter on the existence of a taboo on the use of nuclear weapons.

[37] Decree number 991/2024 of 19 November 2024, available at: http://www.kremlin.ru/acts/news/75598

[38] These are the same fundamentals underpinning the strategic sufficiency doctrine of France, the world's fourth-largest nuclear power, at least in terms of number of nuclear warheads.

[39] The text of his speech is available at http://www.kremlin.ru/events/president/news/75887

The Russian propaganda apparatus quickly began to develop the ideas put forward by President Putin. On the same day, Kremlin spokesman Dmitry Peskov said that the use of Western long-range missiles by Ukrainian armed forces against Russia could lead to a nuclear response under the new doctrine[40]. Deputy Secretary of the Security Council of Russia and former Russian President Dmitry Medvedev said:

> «The use of Alliance missiles in this way can now be qualified as an attack by the bloc's countries on Russia. In this case, the right arises to launch a retaliatory strike with weapons of mass destruction against Kiev and the main NATO facilities, wherever they are. And this is already World War III»[41].

This statement contains a double threat: on one hand directly against the government in Kyiv, but also against the West by declaring that, in case of direct confrontation, the world as we know it will cease to exist.

Thus, nuclear weapons would be used in the event of a nuclear attack on Russia or its allies, in the event of an attack with other weapons of mass destruction or in the event of an attack on vital state and military installations such as the seat of political power, command and control centres and strategic force bases, since their attempted destruction would jeopardise the retaliatory capability of Russia's nuclear forces. Finally, the extreme case of the existence of the state being endangered by a generalised military attack was also cited.

The decision to use nuclear weapons rests with the President of Russia, who can, if he deems it appropriate, inform the leaders of other states or international organisations about the readiness to use their nuclear weapons, about the decision to use them, or about their actual use. In the event of the Russian political and military leadership being toppled as a result of a prior attack, the automatic perimeter system would be able to execute a retaliatory strike against the aggressor (called «Dead Hand»), fulfilling the previously stated maxim of nuclear deterrence as the ability to cause damage of catastrophic proportions in the event of aggression. Such a decision would be taken as soon as reliable data is received from the early warning system (in its space and ground segments) regarding a massive ballistic missile launch

[40] See: https://www.gazeta.ru/politics/news/2024/11/19/24419209.shtml
[41] See: https://ria.ru/20241119/medvedev-1984567032.html

against the territory of Russia or its allies, or when the country or its allies are attacked in any of the ways listed above. Here it is important to stress that Russia does not have a NFU policy, which is a consequence of its conventional military inferiority *vis-à-vis* NATO and *vis-à-vis* China[42].

Additionally, the goal of deterrence is achieved by strategic planning and the existence of nuclear strike plans against potential opponents; by the continued peacetime availability of strategic nuclear forces, including the ballistic missile early warning system, continuous training, regular deployments of the components of the nuclear triad, and annual large-scale nuclear warfare *(Grom*) exercises; during the immediate threat of aggression; and in wartime until the start of the nuclear exchange.

The importance of these declarations approved by means of decrees is that they serve as a reminder of the three primary functions of nuclear weapons:

- The deterrent function, since the possession of a huge nuclear arsenal provides the country with immunity against an attack by another major power[43].
- The strategic function, in that possession of this arsenal grants the country the status of a major world power and makes it an inescapable part of the strategic stability regime.
- The pacifying function, as the mere existence of nuclear weapons is a guarantee that there will be no new world war because, if nuclear weapons exist and fulfil their function, there will only be limited conflicts between the great powers.

3 Russia's nuclear deterrence crisis within the context of the Ukrainian War

In 2020 or perhaps 2021, Russian policymakers felt strong enough to try to change the strategic situation in Europe according to their own rules[44]. Their aim was to re-establish relations

[42] This is exactly the opposite of what happened during the Cold War, when Soviet forces had a numerically overwhelming conventional capability and their strategy envisaged the widespread use of theatre nuclear weaponry to win a war against NATO (Frías, 2020).

[43] Over the past four centuries, Russia has suffered five invasions from the West with a toll of tens of millions of casualties, the bloodiest of which was the Second World War.

[44] Acknowledgement of this may be found in President Putin's remarks during his appearance on the citizens' hotline on 19 December 2024. See: http://www.kremlin.ru/events/president/news/75909

with the West under the fundamental principle of parity, thus creating the conditions necessary to maintain domestic stability once President Putin leaves power. The sequence of events is close and well known.

On 2 December 2021, Russian Foreign Minister Sergey Lavrov met the US Secretary of State Anthony Blinken in Stockholm to discuss the tension caused by increasingly massive Russian troop deployments near the Ukrainian border. The Russian side raised the demand for binding agreements that would limit NATO's eastward expansion, as well as restore stability on the European continent. On 7 December, Presidents Putin and Biden held a videoconference of more than two hours on the strategic stability regime and on the security situation in Ukraine. Although the meeting ended without an official declaration, it was clear that the Kremlin was taking steps towards a new Yalta Agreement in Europe (Baqués, 2024). Three days later, the Russian Foreign Ministry announced that it was preparing a comprehensive proposal on security guarantees for an upcoming meeting with US representatives.

On 15 December 2021, during a brief visit to Moscow, Deputy Secretary of State Karen Donfried received the contents of these proposals formalised in two draft treaties: one bilateral, Russia-United States (eight articles), and one multilateral with NATO member countries (nine articles), regulating basic issues such as limiting the expansion of infrastructure, troops and exercises near each other's borders; the blocking of NATO membership for Georgia and Ukraine; the prohibition of bilateral military assistance to countries of the former Soviet Union, excluding the Baltic states, which are already NATO members; and the suspension of strategic bomber flights —with or without nuclear weapons— near mutual borders, as well as prohibiting the deployment of short- and medium-range missiles and nuclear weapons outside the territory of both powers[45]. It also included a reference to the role of the Security Council in its mission to maintain international peace and security, which in Russian terms meant that NATO would no longer act as a global security organisation without a mandate.

The Russian authorities stressed that the two documents were indivisible and could not be negotiated separately, nor partia-

[45] The contents of these documents are available at https://mid.ru/en/foreign_policy/news/1790809/

lly adopted or implemented. The talks were intense but without results, due to the blocking positions of both sides[46]. The reasons for Western opposition to Russian demands contain philosophical, political, and moral arguments that are not negligible and even commendable, but they also ignore the reality of power politics, at least defined in terms of the balance of power, following Kissinger's theses (Kissinger, 1994). Russia's aim to intimidate European countries with a heavy military deployment along Ukraine's borders was unsuccessful and it is likely that the decision to intervene militarily in Ukraine had already been taken. However, it should be remembered that, in the aftermath of the global COVID-19 pandemic, a full-scale war in Europe appeared to be a highly unlikely scenario at the time (Pérez, 2022c).

Significantly, on the same dates (3 January 2022), representatives of the five permanent members of the Security Council (P5) adopted a joint statement on the prevention of nuclear war, the rejection of arms races, and commitment to the non-proliferation regime[47]. This statement emphasises the need to maintain a rational perspective amongst the political leaders of the great powers. These meetings have continued amidst the tension caused by the war in Ukraine and regular statements of a threatening nature.

However, the Kremlin did not hesitate to send a strategic deterrent message against the United States and NATO when it decided to invade Ukraine. On 19 February 2022, it conducted the Grom-21 nuclear exercise, involving all components of the strategic nuclear triad, a warning that nuclear weapons are present and ready to play their role[48]. Five days later, the Russian armed

[46] In the face of the Kremlin's challenge, consultations began on the Western side, which were quickly resolved by rejecting the idea of creating new areas of influence. However, direct negotiations with Russian representatives were convened: on 3 January 2022 a meeting was held within the framework of conversations surrounding disarmament in Vienna, on 10 January, a US-Russia meeting in Geneva, on 12 January, a NATO-Russia-meeting in Brussels, and on 13 January, meetings between Russia and the US and European OSCE countries in Vienna.

[47] The statement was published in full on the official websites of the presidents of the major powers. For Russia, see: http://en.kremlin.ru/events/president/news/67551 (and for the United States, see: https://www.whitehouse.gov/briefing-room/statements-releases/2022/01/03/p5-statement-on-preventing-nuclear-war-and-avoiding-arms-races/

[48] The security situation on the Ukrainian border and in the Donbas began to deteriorate in late October 2021, precisely when the United States was conducting its own nuclear exercise named Thunder, which ended on 28 October. Meanwhile, Russian forces continued to build up powerful conventional assets near Ukraine. It is likely that the Kremlin decided, under the circumstances, to wait and avoid sending a message that could be misinterpreted by the West.

forces invaded Ukraine, applying Clausewitz's maxim of achieving political objectives by other means, understood as violent means (Dacoba, 2022). The result is a prolonged war, with stalemates at the front, continuous attrition, support for Ukraine by the Western bloc, sanctions, and hundreds of thousands of dead (Calvo, 2024; Pardo, 2023b). On a higher level, Russia has broken with the West, but for now it has not destroyed the regime of strategic stability with the United States, which serves its interests (Pérez, 2023a).

The political leaders of major powers speak openly of nuclear weapons and make threats regarding their use, and even regarding the war in Ukraine. This rhetoric has also been pushed by leaders of certain allied countries with extremely dangerous statements which demonstrate that they are unaware that what is at stake is not only international peace and security, but the very existence of the countries they represent. At this point it must be borne in mind that either prudence (application of rationality) is applied in the statements made and decisions taken, or the world is en route to a cliff edge of history (Pérez, 2024b)

For its part, the Kremlin has resorted to the nuclear threat and has even raised the possibility of its use with three main motivations (Pardo, 2023a):

- The first is the threat of its use to block direct NATO intervention in favour of Ukraine prior to the start of the war. This is where the successful application of the Grom-21 demonstration comes in.
- The second is the possibility of use should Russian forces face military defeat. This scenario has not come to pass.
- The third is to block the delivery of Western long-range missiles to Ukraine that can reach targets deep inside Russian territory. In this case it has been partially successful.

On 24 February 2022, President Putin made a televised appearance in which he set out justifications, arguments, truths, and inventions, but also issued a series of warnings against the United States and NATO if they tried to propose any coercive measures against Russia. Putin declared that[49]:

> «As for military affairs, even after the dissolution of the USSR and losing a considerable part of its capabilities, today's Russia

[49] For the full text, see: http://www.kremlin.ru/events/president/news/67843

> remains one of the most powerful nuclear states. Moreover, it has a certain advantage in several cutting-edge weapons. In this context, there should be no doubt for anyone that any potential aggressor will face defeat and ominous consequences should it directly attack our country. [...] No matter who tries to stand in our way or even more so create threats for our country and our people, they must know that Russia will respond immediately, and the consequences will be such as you have never seen in your entire history. No matter how the events unfold, we are ready. All the necessary decisions in this regard have been taken. I hope that my words will be heard».

In other words, he issued a direct warning that any action that might jeopardise his country, understood as military action against Russia during the Ukraine campaign, could be met with punishment of catastrophic proportions. Moreover, such a statement is consistent with the then-current doctrine of nuclear weapons use discussed above.

These are terms used when talking about nuclear deterrence and the use of nuclear weapons in the event of conflict. But it also allows us to assess how the Russian leadership considers itself immune to aggression, precisely because it possesses a complete arsenal of nuclear weapons that guarantees this immunity, which supports the thesis that nuclear weapons prevent wars between great powers, although they do encourage minor conflicts. Otherwise, the world would be plunged into wars with devastating results, not only for the participants themselves, but for all other international actors.

Once again, on 21 September 2022, during a televised address for the mobilisation of 300,000 reservists for the war in Ukraine, Putin reminded the West not only of the existence of nuclear weapons but also of his willingness to use them if necessary. A few days later, on 30 September 2022, the Kremlin staged the annexation of the occupied territories of Donbas and southern Ukraine[50], which formally came under the protection of the Russian nuclear umbrella. Less than a month later, on 26 October 2022, the nuclear deterrent forces conducted the Grom-22 exercise. It was the first exercise of this kind since the start of the

[50] Putin's speech was aimed at justifying the annexation of these territories, both from a historical point of view and in terms of the legitimacy of such a move, which has no justification under international law. For the text, see: http://www.kremlin.ru/events/president/news/69465

war in Ukraine, and, on this occasion, the aim was to convey a message of normality and strength despite the military setbacks at the time (retreats of Russian forces from Kharkiv and Kherson areas). But it also carried an implicit message to the Ukrainian government, that Russia had the capacity to win the war at any moment by executing a devastating nuclear strike against its armed forces or government institutions, which would destroy any capacity to resist in a terrifying and radical way.

However, this is where the rationality of the political decision-makers of great powers comes into play, which is extraordinarily reinforced by the possession of nuclear weapons, the threat of their use and the ability to use them, which must be certain and leave no room for doubt, but which, at the same time, fulfil their function by not being used. As strategic theorists demonstrated long ago, their mere possession deters by means of fear and their perfection lies in the fact that they will never be used because the aggressor will be unwilling to assume the harm that is implicit in their use (Freedman, 1992).

On 25 March 2023, President Putin announced the unprecedented decision to stockpile Russian nuclear weapons in Belarus as of 1 July 2023. To avoid accusations of NPT violations, the Russian authorities declared that both the custody and operational use of these munitions would always remain under the control of the Russian Armed Forces. However, the deployment of nuclear weapons in Belarus does not in itself increase the risk of use but offers more options in the event that such a decision is taken (Sokov, 2023; Kütt *et al*, 2023).

This decision has at least three objectives. In the short term, it seeks to disrupt Western decision-making in the war in Ukraine. In the middle term, it prepares for a scenario of strategic competition with NATO following the end of the conflict. And in the longer term, it seeks to increase its influence over the Belarusian regime by promoting the integration of the two states to gain strategic depth with Europe. It should be recalled that this debate was raised in the summer of 2023, when there was talk of the possibility that Ukrainian forces could be stationed at the gates of Crimea and the eventual use of nuclear weapons in Ukraine. This was certainly an extreme scenario, but one that was foreseen in Russian use doctrine.

On 5 October 2023, the Russian president declared at the Valdai Discussion Club that the war in Ukraine was not a territorial con-

flict, rather the basic principles of international order were being decided; that the Russian Armed Forces would continue military operations until the established strategic objectives had been achieved; and that Russia's response to a nuclear attack would leave the aggressor with no chance of survival[51]:

– «I want to assure everyone that as of today, this response will be absolutely unacceptable for any potential aggressor, because seconds after we detect the launch of missiles, wherever they are coming from, from any point in the World Ocean or land, the counter strike in response [...] no enemy will have a chance to survive».

He also discussed progress on the Sarmat and Burevestnik missiles and raised the possibility of abandoning the 10 September 1996 Comprehensive Nuclear Test Ban Treaty (CTBT), to which the United States is not a party[52].

Twenty days later, on 25 October 2023, he led the Grom-23 exercise from the Kremlin command post, where he was linked to the sections of the national nuclear authority and the operational heads of the strategic nuclear triad forces (land, naval and air). The dates and the means used were the same as those of the 2022 edition, with no actions that deviated from the script. As a result, they conveyed a message of normality, preparedness, and capability, but also a willingness to act only in the event of a pre-emptive strike. And this point is extremely important in order to comprehend how the Kremlin leadership thinks and acts within the context of the war in Ukraine.

On 29 February 2024, during his annual address to the Federal Assembly, Putin issued another warning on the potential consequences of direct intervention in the war in Ukraine[53]. In his speech he stated that Russian sovereignty was not limited to internationally recognised Russian territory but extended to territories that have historically been Russian or where there is a sig-

[51] For the full text, see: http://www.kremlin.ru/events/president/news/72444

[52] The Soviet Union conducted its last test in 1990 and the United States in 1992. Since then, they have adhered to unilateral moratoria that remain in place as of the date of drafting of this chapter. In February 2023, Putin issued orders for the Armed Forces to be ready to resume nuclear testing at any time and, in November 2023, he signed the law authorising Russia's withdrawal from the CTBT (Diaz-Maurin, 2024; Podvig, 2024a).

[53] For the full content of the speech, see: http://www.kremlin.ru/events/president/news/73585

nificant presence of Russian citizens or those of Russian origin. In these areas, Russia would be called upon to exert its power and influence and ultimately serve to secure its internal borders as a buffer zone, which reached their maximum expansion during the Cold War, with its military presence in East Germany and the existence of the Warsaw Pact as a control mechanism. As back then, they believe that their buffer zone can and should be defended with nuclear weapons. Moreover, he brutally asserted that «the West has forgotten the consequences of war», that «they think they are cartoons» and «this makes them lose their minds and creates risks for everyone», arguments that were already put forward by former presidential adviser Karaganov in articles published in June and October 2023 (Karaganov, 2023a and 2023b). As a corollary, Putin asserted that the nuclear arsenal maintains full readiness, that Russia has the capability and will to escalate to the maximum, and that they are prepared to fight a war on the premise that no one will win because the result would be the demise of civilisation (Cimbala and Korb, 2024).

In typical fashion, his warnings are often followed by demonstrations in an attempt to maintain the validity of the nuclear deterrent. Thus, one day later, on 1 March 2024, the Russian Ministry of Defence announced a training exercise involving the launch of a Yars ICBM from a test site at Plesetsk in northern European Russia (Nilsen, 2024). On 12 April 2024, an ICBM Topol-M was launched, this time from the Kapustin Yar range, to test a new reentry vehicle for combat warheads (Podvig, 2024c).

On 6 May 2024, the Russian Foreign Ministry separately summoned the ambassadors of France and the United Kingdom in reaction to statements by their leaders on military support for Ukraine. In parallel, the Russian Defence Ministry announced readiness exercises for nuclear-capable Ground Forces and Tactical Aviation missile units in southern Russia, close to the area of operations in Ukraine. On 8 May 2024, in Moscow, Presidents Putin and Alexander Lukashenko confirmed the participation of Belarusian military personnel and equipment in the exercises, which included the launch of nuclear-capable missiles against tactical targets.

The next day, on 9 May 2024, in his Victory Day speech, Putin declared that he would not allow anyone to threaten Russia, that he would do all that was possible to avoid a global conflict, but that he rejected any country or alliance that would seek to impose itself on others. He also stated that strategic nuclear forces would

be kept permanently activated to ensure security, i.e. the operation of deterrence by the threat of mutually assured destruction. Following the end of the parade, accompanied by Lukashenko, he said, «Since non-strategic nuclear weapons are deployed on the territory of Belarus, we invite our friends and allies, and the President of Belarus has requested it, to participate in one of the stages of this exercise». It was the first explicit and official statement of the presence of Russian nuclear weapons on Belarusian territory since 1994. At that same moment, the Russian Deputy Foreign Minister Sergey Ryabkov stated that the evolution of the international security situation (i.e. the level of involvement of Western powers in the war in Ukraine) could imply a review of the nuclear weapons policy and the abandonment of the unilateral moratorium on the deployment of short- and medium-range missiles in Europe declared by the Russian president in September 2019.

During the St. Petersburg Economic Forum (with 21,300 attendees from 139 countries and 4,200 journalists) on 7 June 2024, Karaganov moderated a discussion on the topic of nuclear weapons doctrine and use in the context of the war in Ukraine where President Putin himself was present, and once again delivered an unappealable strategic message: «It is only the assessment of our own interests that determines our decisions»[54].

On 29 October, one day after the presentation of the previously-mentioned book by Karaganov, Trenin and Avakyants, Putin declared that the use of nuclear weapons was an extreme measure to ensure the country's security, that Russia would not engage in an arms race, that it would maintain a sufficient level of nuclear armaments, and that it would continue to upgrade all components of the nuclear triad. He then led the annual Grom-24 exercise from the Kremlin command post with the well-known practical demonstrations of launching ICBMs, SLBMs and ALCMs from launchers of the strategic nuclear triad[55].

The latest update to this series of Kremlin nuclear threats (as this strategy notebook is being drafted) came in mid-November 2024. On 15 November, the Russian president had a telephone conversation with German Chancellor Olaf Scholz, where he once

[54] For the full text, see: http://www.kremlin.ru/events/president/news/74234

[55] Previously, for a month and half, Russian nuclear forces had launched a dozen exercises involving missile units, bombers, and ships with nuclear-capable Kalibr long-range cruise missiles.

said that Russia was ready to negotiate, but based on its own interests, not those of Ukraine or the West. This, in the theory of political realism, is called a rational foreign policy. Therefore, this conversation only served to update the demands of each party for future negotiations. Two days later, on 17 November 2024, the Russian Armed Forces restarted the strategic bombing campaign against Ukraine (called Strategic Operation for the Destruction of Critical Infrastructure or SODCIT) interrupted in August 2024, most likely to stockpile missiles to maintain a sustained effort throughout the winter based on their acquired dynamic targeting capabilities. On that day, more than two hundred missiles of all types (ground, naval and air) and long-range Geranium-2 loitering munitions were used against Ukrainian energy facilities. Previously, for two weeks, Strategic Aviation bombers had been conducting preparatory flights over the Black Sea and Caspian Sea in areas that are completely out of range of Ukrainian anti-aircraft defences. It was once again about sending a message about the course of action to be followed.

Thus, the US announcement (17 November 2024) lifting certain restrictions on Ukraine's use of long-range missiles against targets deep inside Russian territory was more than taken for granted on the Russian side; the Kremlin had the rhetoric ready and the means ready for use. The next day, the First Deputy Chair of the Federation Council Committee on Defence and Security, Vladimir Dzhabarov, declared that the West had decided to escalate to a point that could lead to the destruction of Ukraine and that the response would be immediate[56].

On 21 November 2024, President Putin sent a new special message announcing the use of a novel medium-range ballistic missile called Oreshnik against the Yuzhmash Missile Plant in Dnipropetrovsk, which was hit by a handful of hypersonic warheads armed with conventional explosives[57]. It would not be a significant action in this war, were it not for the type of missile used and the propaganda campaign aimed at demonstrating that the US withdrawal from the INF Treaty in 2019 had been a mistake and that it was others who paid the consequences, in this case Ukraine. It also marked the breaking of the unilateral moratorium on the non-deployment of short- and medium-range missiles in Europe. Thus, the use of this missile was also a res-

[56] See: https://tass.ru/politika/22426487

[57] For the full text, see: http://www.kremlin.ru/events/president/news/75614

ponse to the installation of two MK-41 launchers of the US BMD system, first in Romania and more recently in Poland. Russian officials have repeatedly asserted that such systems jeopardise deterrence because they seek to nullify the ability to respond to a nuclear strike in the event of conflict, a circumstance that, taken to the extreme, would incentivise an aggressor to execute a decapitation strike.

But in his speech, Putin also talked about hypersonic warheads, i.e. explosive charges that fly at extremely high speeds and render any existing anti-aircraft weapons ineffective. He was sending the message that, despite all Western military aid and superiority, Ukraine remains defenceless against the supremacy of Russia's strategic weapons. Such actions and statements show that the Russian leadership believes it has regained the strategic initiative in the war in Ukraine and that it will not lose it again unless NATO countries become directly involved in a mutually destructive conflict. The Russian president's meeting with senior military commanders on 22 November 2024 to discuss advanced strategic weapons was the result of actions aimed at sending a strategic message, in this case, to the new Trump administration which was due to take office on 20 January 2025. Therefore, the missile used (whether newly produced or a weapon already in service) was not significant, the strategic message sent by the Kremlin was.

All these threats are part of a coordinated strategy involving officials at all levels to keep deterrence against the West alive to block any attempt at direct intervention in its war in Ukraine. Consequently, these same officials are busy proclaiming the likely targets of Russian nuclear weapons (which they do not point out on Ukrainian territory), should the Kremlin leadership decide to take the step called for by Karaganov and Trenin, to restore deterrence by fear of a nuclear detonation strike and, on the rebound, immediately end the war in Ukraine (Karaganov, 2024; Trenin, 2024). They also stress that this would involve the use of tactical nuclear weapons, leaving aside strategic ones, intended to deter major powers by applying the MAD strategy. The goal of this rhetoric is to achieve its strategic objectives in Ukraine at all costs[58].

[58] Russia's strategic objectives are flexible and readily adapt to the political and military circumstances of the moment-and they are basically intended to weaken Ukraine so that it does not pose a long-term threat; to stop NATO's expansion; and to impose a security space of its own.

4 Future perspectives

The major powers base their national security strategies on the possession of huge nuclear arsenals, specific deterrence doctrines and MAD strategies, which are maintained by enormous nuclear modernisation programmes, because only amongst them does the principle of deterrence by mutually assured destruction in the most literal sense of the term work. The strategic stability regime has so far ensured peace and security by avoiding direct confrontation between major powers. This set of factors suggests that nuclear weapons will continue to be the foundation of Russia's (and the United States') security at least until the 2080s[59], unless a technological revolution that leads to the discovery or invention of a new type of disruptive weaponry, hitherto unknown, that will change the nature of warfare and alter the existing balance of power (Freedman, 1992).

For this very reason, calling for the development of hypersonic missiles with dual (conventional and nuclear) capabilities that jeopardise the opponent's perception of the nature of a possible attack, the use of tactical nuclear weapons in conventional conflicts, or the doctrine of limited nuclear war, poses a threat to world peace and security. However, these theoretical formulations are based on the conviction that these weapons will only be used against minor nuclear powers or non-nuclear countries because their use against a counterpart within the global strategic system would essentially lead to the destruction of civilisation as we know it.

In this regard, it is worth recalling that, despite the Russia suspending its participation in the New START treaty as of 21 September 2023, both the United States and Russia continue to strictly respect the quantitative limits, as well as the agreement on notification of ballistic missile launches intended at avoiding unwanted incidents due to a misinterpretation of the intentions of such tests, and this situation is tacitly maintained[60].

Not doing so is highly dangerous, given that Russia and China are two revisionist powers, in the words of Morgenthau (Morgenthau, 1960): a dangerous game that may not turn out well and that,

[59] The estimated decommissioning date for the strategic systems currently under development and due to enter service over the next decade.

[60] This mechanism was agreed at the end of the Cold War and has not been suspended by either side, despite the growing loss of trust between them.

instead of gaining more power, what might be achieved is a much more unstable, more insecure international system where the conflict moderation rests on an implicit regime, without clear rules, and all of this in the midst of a large-scale conventional conflict in Ukraine in which they intervene (Arceneaux, 2024; O'Brien, 2024). In other words, a much more complex scenario than that of the Cold War, in which there are three great powers with nuclear weapons that aspire to have their own spheres of influence and where each seeks to impose its hegemony to cover as many areas and spaces as possible (Castro, 2024). In this highly dangerous scenario, it is likely that nuclear weapons will no longer be able to fulfil their fundamental function, which is to prevent war between great powers, and will cease to be the moderator of conflict between the powerful and become just another weapon that may be used to win a conflict.

Despite this, some leaders call for continued escalation against Russia, attacking targets inside Russian territory and deploying military forces on Ukrainian territory to try to hold the front. These positions highlight two fundamental issues in international relations theory: firstly, they ignore the conflict-limiting power of nuclear weapons and, secondly, the absence of national interest in their decision-making. But both are on a course that leads to a direct confrontation with a major nuclear power. Such a conflict would therefore foreseeably result in the massive use of nuclear weapons, with the consequences that, were demonstrated on just a small scale by the atomic bombings of Hiroshima and Nagasaki in August 1945. The fallacy that a limited nuclear war may be fought and won must be discarded, as stated above, because, once started, the highest point of escalation is unknown, and the wielders of such weapons would be unwilling to lose such a war.

So, the questions that arise are: Is the West prepared for a war against Russia? Is it aware of the consequences of such a war? Who oversees these decisions? Will the West be drawn into a war where essential interests are not at stake for the sake of a great power struggle for world supremacy?

Conclusions

The outbreak of war in Ukraine has subjected the world to a sense of vertigo that has been used ruthlessly by the Russian leadership whenever it has sensed that the West was getting dangerously close to its military operation in Ukraine.

Historians will spend a great deal of time studying and completing the information on this period within such a significant and also exclusive area of information management, but it is enough to recall a few specific moments when the Kremlin wielded the nuclear threat: during the initial days of the invasion (with the West in a state of surprise); in September 2022, when, while withdrawing from Kharkiv, they completed the annexation of the southern Ukrainian territories; later, as an argument to block the delivery of depleted uranium-core anti-tank shells to Ukrainian forces; during the spring of 2023, as a reminder that Crimea was a red line during preparations for the failed Ukrainian offensive against Zaporizhzhia; and, most recently, when, both before and after the summer of 2024, several European powers and the United States played the card of granting Ukraine an authorisation to use long-range missiles of Western origin against critical facilities deep inside Russian territory.

At all these moments, the nuclear rhetoric set by the Kremlin —and enunciated by its qualified officials (Medvedev, Peskov, Ryabkov, Nebenzya, Zakharova)— has responded to the needs of the moment. Moreover, such threatening rhetoric has been supported by Russian academics, where the Karaganov doctrine was coined, basically calling for the restoration of deterrence by fear, that is, through the exemplary use of nuclear weapons against a non-nuclear NATO country, following the culmination of an escalation in which deterrence would not have worked. This is the language of the great powers.

Russia's update to its nuclear doctrine on 19 November 2024, which emerged in the heat of the war in Ukraine, makes no significant changes to the previous document of June 2020; it broadens the scenarios for use, but does not lower the threshold for use. Its update is associated with the need to generate deterrence in the light of the announcement by Western powers to lift restrictions on Ukraine's use of long-range missiles against Russian territory.

However, the danger of nuclear war has passed because the Kremlin believes it has regained the strategic initiative in the war and does not see the other side as being able to strengthen its actions —rather the contrary. While the nuclear threat blocks the West's decision-making power, they view their conventional military advantage on the ground as their greatest asset in preparing for a negotiation favourable to their interests in Ukraine.

But, if rationality does not prevail, war can only lead to more damage and destruction and the latent threat that a nuclear-armed great power will not accept defeat when its vital interests are at stake will continue. In the case of Russia, this is the case because their own territory is at stake (historically they consider this to be the case).

For the foreseeable future, a high degree of confrontation between Russia and the Western bloc may be observed, which extends beyond the outcome of the war in Ukraine. The Russian approach is to identify those areas where it has relative advantages over its adversaries and seek to exploit them to the maximum, and where it is at a disadvantage, it will apply containment through asymmetric measures focused on the adversary's vulnerabilities. The nuclear threat will play a prominent role among these actions because Russian leaders know that it is a powerful inhibitor of direct confrontation.

Thus, on the Eurasian continent, its goal will be to contain military threats from NATO by reinforcing its conventional capabilities, hybrid warfare and nuclear deterrence, including actions against communications and energy infrastructures. In the post-Soviet space, it will continue to maintain a relative advantage that it will strategically exploit with multiple tools of influence. In the Arctic, it will seek to exert its exclusive and exclusionary dominance by investing large resources in its control, which will undoubtedly generate new crisis hotspots. Moreover, in the Pacific, it will seek to exercise its role as a major power by strengthening its military capabilities, including nuclear power, in preparation for the next decisive confrontation between major powers.

Chapter Three

The nuclear panorama in the Indo-Pacific: a region in constant turmoil

Manuel Herrera Almela, PhD

Abstract

The Indo-Pacific is a key geopolitical arena marked by nuclear complexity and the constant challenge of maintaining stability in an increasingly tense security environment. Since World War II, there have been nuclear tests in the region and evolving military doctrines that have consolidated a delicate strategic environment. Currently, with states such as China, India, Pakistan and North Korea possessing nuclear capabilities, territorial rivalries and political disputes are intensifying. This chapter examines the drivers of nuclear proliferation in the Indo-Pacific, the implications of alliances such as AUKUS and the evolution of nuclear deterrence and modernisation amongst key actors, especially China and North Korea. It also explores regional efforts for non-proliferation and arms control, and the challenges in creating a nuclear-weapon-free zone in Northeast Asia. Faced with complex alliances and growing military capabilities, it highlights recommendations for avoiding conflicts, promoting cooperation and confidence-building measures.

Keywords

Indo-Pacific, Nuclear, China, United States, Missiles.

Introduction

The Indo-Pacific has historically been a complex and multifaceted geopolitical scenario, marked by key milestones that have shaped international relations. For example, on 6 and 9 August 1945, the United States dropped two atomic bombs on the Japanese cities of Hiroshima and Nagasaki. These events marked the dawn of the nuclear age and left an indelible impact on global consciousness. It is also a region marked by fifty years of nuclear testing where, since the nuclear bombings in 1945 until the tests conducted by Pakistan in 1998, there has never been a period of more than twenty-two months without nuclear testing. Finally, the denuclearisation movement was a significant political movement in the Indo-Pacific that was able to establish two nuclear-weapon-free zones (NWFZs) through the Treaty of Rarotonga in 1985 and the Treaty of Bangkok of 1995.

Today, nuclear politics in the Indo-Pacific are a game of shifting dynamics ranging from security issues to strategic considerations. This region is home to the world's largest number of states with nuclear weapons, as well as those with nuclear latency, each with its own nuclear policies and strategies. Given this situation, efforts to promote arms control and non-proliferation have become crucial in the Indo-Pacific, as geopolitical rivalries and territorial disputes may have nuclear implications. For example, nuclear alliances such as the extended deterrence commitments of the United States with Japan and South Korea have major implications for regional security. Efforts to reduce the risk of nuclear conflict, improve crisis communication, and establish confidence-building measures are key to ensuring stability in the region.

This chapter therefore analyses each of the regional hotspots of conflict where nuclear capabilities are present and suggests initiatives and recommendations for dealing with possible destabilising scenarios that arise from the presence of said capabilities.

1 21st century nuclear dynamics in the Indo-Pacific

By the midpoint of this century, the Indo-Pacific will be shaped by four main dynamics: managing China's rise, the challenge of reassessing strategic interests in the US-led Asian alliance network, regional disparities in addressing endemic security issues, and the prevalence of traditional security dilemmas in conflict points

such as the Taiwan Strait or the Korean Peninsula (Lee and Pempel, 2012: 3-21). These trends are reflected in the struggle for regional hegemony between China and Washington's allies (Japan, South Korea, Taiwan, Australia and India), the recent developments on the Korean peninsula, intra-regional competition in territorial disputes in the East and South China Seas, and perhaps most importantly, the lines of long-term regional strategic competition and cooperation between China and the United States.

At the same time, security dynamics in the Indo-Pacific are related to a regional economic interdependence, which presents a paradox: despite historical tensions and rivalries, perpetual strategic mistrust and weak multilateral regional institutional architecture, the Indo-Pacific security complex is also defined by non-military rules of state behaviour (Pempel, 2012: 212-232). These centrifugal and centripetal forces both amplify and mitigate the sources of conflict in the region. Even so, the risk of miscalculation and potential confrontation persists: economic interdependencies cannot resolve the region's persistent security dilemmas amidst national interests, strategies, aspirations and growing capabilities in terms of power projection. More importantly, deepening economic interdependencies are juxtaposed with the strategic ramifications of competing visions between China and the United States, which also poses a challenge for Washington since Japan, South Korea, India and Australia now trade more with China than with the United States. The main challenge for these key US regional allies is to pursue two fundamentally opposing policy objectives: to boost and maintaining security ties with the United States while deepening economic ties with China (Lee and Pempel, 2012: 4); a China that they also criticise for its increasingly assertive behaviour and lack of transparency regarding its modernisation and expansion of nuclear and conventional capabilities. In the face of uncertainty regarding the future strategic and security panorama, US allies in the region are increasing their military spending and implementing hedging strategies to address their growing security concerns. As a matter of fact, they are acquiring indigenous power projection capabilities such as fifth-generation air platforms, long-range precision weapons, ballistic and cruise missiles and early warning, intelligence, surveillance, and reconnaissance (EW-ISR) systems, as well as naval assets, maritime patrols and submarines. They are also displaying their political will to use these assets in different strategic contexts such as Northeast Asia, for example.

These developments are increasing the risk of open conflict between regional powers, especially in scenarios such those of the Korean peninsula or Taiwan. Any escalation of tension leading to open war in the region would be, however, the result of a miscalculation or false perception of reality rather than the result of a deliberate decision. In a prescient article published in November 2014, Desmond Ball[1] argued that there are military-technical incentives in Northeast Asia for both sides to escalate «even an unintentional minor conflict» (Ayson and Ball, 2014). According to Ball, the vulnerable nature of contemporary Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) capabilities increases the risk that one party will use force if it perceives —rightly or wrongly— that an adversary seeks to take significant and imminent military action against said party, especially if that action targets these capabilities (Ayson and Ball, 2014). Likewise, the scholar Fiona Cunningham has argued that Beijing and Washington's diametrically opposed visions of escalation control significantly increase the risk of crises escalating into full-scale conflicts, including the possibility of crossing the nuclear threshold (Cunningham and Fravel, 2019: 61-109).

China's strategic ambition is to usurp the United States' position in the Indo-Pacific and thus become the sole actor, while the latter seeks to maintain its position. While both sides continue to express their willingness to wage war to defend their broader objectives, they do so mainly in order to convince the other side to back down without fighting. However, given the stakes involved, it is unlikely that either party will do so. As tensions continue to rise, Beijing and Washington will ultimately face a choice between backing down in humiliating fashion or actually waging war, most likely over Taiwan, given that both sides have indicated their readiness to use force to defend the island. Beijing and Washington are likely to pick conflict over a humiliating concession that could fatally undermine their overall strategic position in the Indo-Pacific.

The risk of inadvertent or unintended escalation has already been recognised by countries in the region (Government of Australia, 2017), and the Regional Forum of the Association of Southeast

[1] Desmond John Ball was an Australian academic and expert on defence and security. He is credited with successfully advising the United States against nuclear escalation in the 1970s.

Asian Nations (ASEAN) has held workshops to discuss measures for nuclear risk reduction in the region (Watts, 2023). Australia's Foreign Minister Penny Wong publicly called upon Beijing to reciprocate the Biden administration's calls to establish «guardrails»[2] designed to prevent the increasingly tense US-China rivalry from escalating into conflict. She is also reported to have discussed this issue privately with her Chinese counterpart (Tillett, 2022). Wong (2023) also spoke of the balance to be struck between «strategic reassurance through diplomacy» and military deterrence if conflict is to be avoided and stability preserved, especially regarding Taiwan. Indeed, deterrence is widely seen in the region as the only way to avoid open war between regional powers. However, assessments such as these assume a rational calculation by the parties involved and overlook the extent to which deterrence tends to increase rather than decrease the risks of inadvertent escalation. It is true that there has been an increase in dangerous encounters at sea and in the air since the United States and its allies have adopted increasingly robust deterrence strategies *vis-à-vis* China (Strating, 2023).

However, even if it is accepted that there is a real risk of inadvertent escalation in the region, there is little enthusiasm among regional powers to adopt any measures to mitigate it. For example, with regard to the creation of incident prevention mechanisms between China and the United States, the chances of these adversaries reaching an agreement to de-escalate their rivalry is quite low as long as the underlying problems between them remain unresolved, as is the case here.

To sum up, China's increasing power projection capability is gradually redefining the regional military balance and consequently, US strategy and that of its partners and allies. All of this is generating preferences for strategic competition between regional powers, where asymmetric denial and strategic ambiguity in the nuclear sphere will increase the likelihood of conflict in the Indo-Pacific in the near future. The following sections explore each regional hotspot one by one, as well the key actors in the region where nuclear capabilities are present and propose recommendations to prevent these hotspots from escalating or, if they do, to ensure that the escalation may be controlled.

[2] The term «guardrails» here refers to mechanisms that halt, prevent or impede open conflict between countries.

2 China: a global nuclear power with regional implications

During this century, China will be present either directly or indirectly in all security issues related to the Indo-Pacific. The military, political and economic rise of the Asian giant has provided Beijing with new geopolitical opportunities to increase the range of strategic choices and decisions. At the same time, China's rise has led to some uncertainty about how an Indo-Pacific dominated by this power would look like. According to Feng Zhu (2009: 17-45), Professor of Business Administration at Harvard Business School, «China's greatest challenge is to manage its own rise —to take advantage of its stronger capabilities to expand its regional influence without provoking the regional instability that could undermine its long-term economic prosperity and integration». Indeed, China suffers from numerous internal challenges, all of which have an external dimension, thus creating insecurity in its regional neighbours, many of which still have territorial and maritime disputes with Beijing. China also seeks to be recognised as a great power by reasserting its geopolitical role and influence in the region by leveraging its global economic power and boosting its military capabilities. The cumulative effects of these developments have been substantial, as the catalogue of air, land and naval platforms and assets of the People's Liberation Army (PLA)[3] is gradually catching up in terms of both qualitative sophistication and operational effectiveness (Erickson, 2012: 60-125).

China's accumulation of political, economic and military power is thus reshaping regional geopolitics in a way that is detrimental to the United States and its regional allies. Indeed, over the past eight decades, US policy in the region has remained fairly constant: to maintain a solid active presence embedded in bilateral alliances to preserve access and mobility in the Western Pacific and thus defend its allies and ensure peace, stability and prosperity in the region. While the United States continues to maintain broad strategic advantages thanks to its regional presence and relative technological and military superiority, China is arguably challenging Washington's ability to ensure stability in the region (Blumenthal, 2012: 168). This may be seen in the fact that China seeks to project greater power regionally in its three seas (the

[3] The People's Liberation Army (PLA) is the army of the Chinese Communist Party (CCP) and the People's Republic of China (PRC). It consists of four services: Army, Navy, Air Force and Rocket or Missile Force. It is headed by the Central Military Commission (CMC), whose chairman is the commander-in-chief.

Yellow Sea, East and South China Seas) or in areas disputed with Japan and Taiwan. This projection has been interpreted in US strategic circles as a denial of freedom of action for US forces by restricting deployments into the theatre of operations (anti-access) and denying the freedom of movement of forces already there (area denial) (Schreer, 2013). In the long term, China seeks to gain strategic control over its periphery, which would involve rolling back the US presence to its bases in Guam. The United States, on the other hand, with its strategic rebalancing policy towards the Indo-Pacific, seeks to remain a Pacific power with its presence and its economic, diplomatic, cultural and military influence (Ratner, 2013: 21-38).

With regard to China's current and future nuclear capabilities, the 2024 Nuclear Notebook of the Bulletin of the Atomic Scientists estimates that China possesses around five hundred nuclear warheads and that more are being produced to equip future delivery systems (Kristensen, 2024b). Other estimates, such as those of the Nuclear Threat Initiative (NTI), indicate that China could have 320 nuclear warheads, as well as 280 ICBMs, 72 SLBMs and 20 gravity bombs (Nuclear Threat Initiative, n. d.). These figures would make China's nuclear arsenal the third largest in the world, after Russia and the United States.

Of the nine nations with nuclear weapons, China is deemed to have one of the fastest growing nuclear arsenals today. According to the US Department of Defence in its 2022 annual report, in line with China's modernisation goals, it is expected to have more than a thousand operational nuclear weapons by 2030, many of which are likely to be «deployed at higher readiness levels». And if China is to keep up the pace of its nuclear expansion at the rate anticipated in 2022, it will most likely have an arsenal of about one thousand five hundred warheads by 2035, which is the date planned by the PLA to «basically complete its modernisation». China has also built new nuclear testing facilities.

The increased quantity and quality of China's nuclear arsenal raises serious concerns due to the country's opacity in developing these new capabilities. China's increased nuclear arsenal is mainly for two reasons: firstly, to maintain a credible deterrent to other states with nuclear weapons that it is competing with, namely India and the United States. And secondly, to enhance its global status as a powerful country with a strong nuclear deterrent. What should be ruled out is that China is seeking nuclear parity with the United States and Russia. There is no data to support this

hypothesis. For example, given that the United States has eight hundred strategic nuclear weapon launchers and an arsenal of three thousand and seven hundred warheads, even if China ends up with more intercontinental ballistic missiles than the United States and increases its nuclear arsenal to one thousand and five hundred warheads by 2035, this «does not give China parity» (Kristensen, 2023). What this expansion of China's nuclear capabilities does demonstrate is the shift from a doctrine based on minimum deterrence to one of limited deterrence. Alastair Iain Johnston (1995: 5-6) notes that, according to Chinese strategists, limited deterrence «requires sufficient tactical, theatre and strategic counterforce and countervalue nuclear forces to deter the escalation of conventional or nuclear war. If deterrence fails, this capability should be sufficient to control escalation and force the enemy to retreat».

China has also upgraded its force structure to the People's Liberation Army Rocket Force (PLARF), which has invested significantly in modernising its nuclear forces by upgrading its silo-based intercontinental ballistic missiles and adding more launch and survivable delivery vehicles. According to the 2019 Chinese Defence White Paper, the PLARF is working to increase the credibility and effectiveness of nuclear deterrence and counter-attack capabilities, boosting long and intermediate-range strike force, and improving the strategic counterforce capability to build a strong and modernised missile force (State Council of the People's Republic of China, 2019). This was proven in 2018 when the PLARF commissioned the DF-26 missile, marking a significant step forward in its military arsenal. The DF-26 has a range of up to four thousand kilometres and the capacity to carry a twelve hundred to eighteen hundred kilogram nuclear or conventional warhead, allowing China to directly attack the US territory of Guam or to target ships at sea, which is considered as «ace in the hole» and a «new strategic tool» (Panyue, 2018) for the PLARF. The 2023 report of the US Department of Defence suggests that:

> «The PRC may be exploring development of conventionally-armed intercontinental range missile systems. If developed and fielded, such capabilities would allow the PRC to threaten conventional strikes against targets in the continental United States, Hawaii, and Alaska. Conventionally-armed ICBMs would present significant risks to strategic stability». (US Department of Defence, 2023).

Currently, China's ICBM arsenal is at approximately three hundred and fifty (Chase, 2018), including fixed and mobile launchers capable of launching single and multiple re-entry vehicles. Some sources indicate that the new ICBM DF-27 is already operational (Gwadera, 2023). These developments suggest that the PLARF is not only providing key military capabilities but has also become a «potential source of coercive leverage» for Beijing, which also acts as a 'visible symbol' of China's major power status (Gwadera, 2023.)

From China's perspective, changes in the estimates of what constitutes a credible minimum deterrent are the cause of structural and size-related variations in the nuclear force. The evolving security landscape and the growing external challenges facing China are also driving these changes. In short, China's long-standing policy of maintaining a small nuclear deterrent is no longer satisfactory for a rising nation.

3 Northeast Asia: stability and underlying threats

North Korea represents one of the most persistent nuclear proliferation challenges in the Indo-Pacific. Its nuclear programme started in the late 20th century, and since then, it has evolved into a series of nuclear and ballistic missile tests that have escalated tensions on the Korean peninsula and beyond. despite numerous sanctions and diplomatic efforts, including six-party talks, North Korea has continued to develop its nuclear capabilities, citing the need for deterrence against perceived external threats. The nature of the North Korean regime further increases the unpredictability and difficulty of assessing the exact capabilities of its nuclear arsenal. Thus, in the case of North Korea, international society faces the challenge of striking a balance between implementing sanctions, extending diplomatic initiatives, and ensuring a stable regional security environment; the ultimate goal of these measures being to achieve the denuclearisation of the Korean peninsula. Until this goal is achieved however, international society must cope with the qualitative and quantitative growth of North Korea's nuclear arsenal.

North Korea poses a nuclear risk through various avenues, both intentional and unintentional. For example, there are numerous command and control problems in North Korea, which has opted for an offensive orientation with a low threshold for use. The risks of escalation are also manifold: in a multipolar context, a

major concern will be how measures taken by the United States, South Korea and Japan to deter North Korea will threaten Russian and Chinese interests. A secondary set of concerns arises from how the Korean peninsula will contribute to increased regional nuclear risks by exerting proliferation pressures on US allies. Ultimately, as may be seen, containing North Korea is an extremely difficult task within the current diplomatic environment.

3.1 North Korea's nuclear and missile programme and its nuclear doctrine

At the 8th Congress of the Workers' Party of Korea, Kim Jong-un, the party's general secretary, announced the five-year plan for the «development of defence science and weapons systems», and emphasised the development of «tactical nuclear weapons» and «advanced capabilities for pre-emptive and retaliatory nuclear strikes» (Korean Central News Agency Watch, 2021). Stressing the importance of powerful defence capabilities, the five-year plan pursues the development of strategic and tactical weapons, including miniaturised nuclear warheads, tactical nuclear weapons, large nuclear warheads, hypersonic warheads, solid-fuel ICBMs, nuclear-powered submarines, SLBMs and a military reconnaissance satellite. Two months following the publication of the new defence plan, North Korea launched two cruise missiles on 21 March 2022 and two ballistic missiles into the Sea of Japan on 25 March 2022. In October 2022, it inaugurated a set of new large-scale weapons at the first national expo on defence development. By way of demonstrating its capabilities, between 2021 and 2023, the North Korean armed forces conducted a series of short-, medium-, and long-range missile tests. If the situation wasn't already tense enough, renewed activity in Tunnels 3 and 4 at Punggye-ri which was closed in 2018, indicate a possible resumption of nuclear testing.

It is well-known that nuclear weapons play a vital role for the North Korean regime, including defence and deterrence, economic leverage and reunification but what is most noteworthy is the recent expansion and modernisation. What is driving North Korea to rush ahead with the development of its nuclear and missile programmes? Firstly, in the face of the growing conventional military imbalance between the two Koreas, Pyongyang has no choice but to resort to its nuclear weapons. Facing a growing asymmetry in conventional force capabilities, North Korea has decided

to invest in its nuclear capabilities rather than in an ageing conventional force, both for cost and strategic reasons, in order to rebalance power on the Korean peninsula. Secondly, changing geopolitical dynamics which have escalated the tensions between the United States, China and Russia, provide North Korea with a major opportunity to accelerate its nuclear build-up. As long as China and Russia maintain their support for North Korea and are unwilling to address the North Korean nuclear issue, North Korea will continue to advance its nuclear goal.

Regarding its nuclear doctrine, in September 2022, North Korea adopted a new law called «On North Korea's Policy on Nuclear Forces», which replaced the previous nuclear law passed in 2013. The new law introduces significant changes to its nuclear policy, first, in the area of command and control, and second, in the right[4] to pre-emptively use nuclear weapons. According to Article 3, Kim Jong-un has «all decisive powers» over command and control. It also allows for the automatic and immediate launch of nuclear weapons if the command and control system is ever compromised[5]. This suggests that North Korea grants a very limited delegation of authority to use nuclear weapons in the event of an emergency.

Another specific characteristic of its updated nuclear doctrine is the pre-emptive use of nuclear weapons. Article 6 allows for pre-emptive nuclear strikes when a military attack against «the leadership of the State, the head of the State's nuclear forces or important strategic objectives of the State» is deemed imminent. North Korea seeks to use nuclear force against both nuclear and conventional threats from the United States and South Korea. By intentionally lowering the nuclear threshold, its goal becomes not only to strengthen deterrence and defence but also to limit what it considers growing threats, such as South Korea's counterforce capability and the joint and the joint military posture between South Korea and the United States.

Despite certain limitations, it is clear that North Korea's nuclear strategy has evolved in a more aggressive direction to rely now on «triangular deterrence» and «asymmetric escalation» This makes North Korea's nuclear doctrine unique: North Korea seeks deterrence against the United States, as well as indirect dete-

[4] The term «right» is used by the law itself.

[5] On option that may be considered by North Korea for this type of scenario is a «Dead Hand» system similar to Russia (see the chapter by Luis V. Pérez Gil in this volume).

rrence towards South Korea. Likewise, North Korea, which lacks technological parity with its southern rival, seeks to counter the leading nuclear power (the United States) by threatening a neighbouring state that is its ally (Harkavy, 1998: 63-81), thus adding even more pressure on South Korea.

3.2 China, an actor to engage or deter?

South Korea has a less hostile relationship with China than with North Korea. For this reason, Seoul has so far not felt the need to clarify the red lines regarding use of its long-range strike capabilities in its bilateral relations with Beijing. However, certain recent developments may require more clearly defined assurances concerning China. For example, in 2021, South Korea lifted the range limitations on its missiles[6]. For the first time, South Korean missiles can now reach targets over a thousand kilometres away, putting not only the entire North Korean territory within range, but also Beijing and the Taiwan Strait (Eveleth, 2023).

Beijing has likely noted this change but has yet to make any official comment on its implications. South Korean President Yoon declared that South Korean missiles are only intended to attack North Korea. But this comment reflects a fundamental dilemma for South Korea: given its geographic proximity to both North Korea and China, for every step it takes to deter North Korea, it must ensure that China is not the real target. China's harsh reaction to the 2016 deployment of a US Terminal High Altitude Area Defence (THAAD) system in South Korea demonstrated the need for better security guarantees if South Korea is to avoid unnecessarily provocative retaliation by China.

In this sense, South Korea is attempting to maintain a diplomatic posture based on values and «mutual respect» (Yuan, 2022) as an attempt to make a progressive reset in its relations with China. Although there have been some tense exchanges between Chinese and South Korean diplomats recently, the relations-

[6] South Korea's ballistic missile range guidelines were an agreement between South Korea and the United States, in force from 1979 to 2021, aimed at reducing missile proliferation in the region. It limited the range of South Korean weapons so that nearby nations other than North Korea would not feel threatened, thus limiting their desire to build similar weapons. On 21 May 2021, South Korean President Moon Jae-in and US President Joseph Biden agreed to completely abolish missile guidelines, allowing South Korea to develop and possess any type of missile, including ICBMs and SLBMs.

hip seems to be stabilising (Snyder, 2023). For example, the South Korean president's office has been clear about its intention to organise a visit by Xi Jinping to Seoul in the near future. Similarly, South Korea and Japan are currently planning to resume trilateral talks between foreign ministers with China through the Trilateral Cooperation Secretariat (TCS). Despite attempts by the previous South Korean administration to expand its work, the TCS has generally avoided hard security issues. However, this effort represents at least a return to high-level talks that include China. The TCS is a forum where some level of trust may start to be built among top diplomats. Separately, Japan and China have recently established a hotline between their respective defence ministries. However, a much-needed hotline between the Japan Self-Defence Forces and the PLA is still missing.

These initiatives and moves by all sides could also present an opportunity for action on deterrence communication. Ideally, this effort should include an attempt to clarify intentions and red lines with Beijing. The problem remains that South Korea and Japan have little experience in engaging China in a deterrence dialogue and face enormous difficulties in talking to Beijing on hard security issues, where their efforts often fail. In this regard, it is worth noting that Japan and South Korea's policies focus on deterrence, but they do not adequately conceptualise the implementation of security guarantees *vis-à-vis* China and North Korea as a necessary element of this deterrence. A coordinated approach to integrating security assurances into deterrence relations is key to making these efforts effective. Otherwise, China and North Korea may take advantage of gaps between the policies of different countries, or between these and US policy.

Security guarantees face some of the same dilemmas as deterrence. Therefore, reaching an agreement between Japan and South Korea on guarantees will be complicated. The key will be in the details: agreeing on the principles underpinning the guarantees, their scope and institutional framework. The difficulty of reconciling different priorities, interests and political cultures among security partners must be addressed for all these issues. Security guarantees may take many different forms. Some may be communicated discreetly, in the form of political promises, while others may be embodied in written documents. Some may be agreed bilaterally (e.g. between North and South Korea) and others plurilaterally. They may also be integrated at the multilateral level, for example through UN resolutions or initiatives within the

NPT framework. In turn, assurances from South Korea and Japan need to be matched by assurances from China and North Korea to be of practical significance and politically acceptable.

One complication in defining security guarantees relates to maintaining them during a dual crisis involving both the Korean peninsula and the Taiwan Strait. Many decision-makers and experts, especially in South Korea, fear that China and North Korea could exploit a crisis in one theatre to their advantage in another, exploiting the fact that the United States or its allies may be too compromised or distracted. Maintaining guarantees under these changing conditions can be especially challenging.

3.3 The US nuclear umbrella: a sufficient guarantee?

The alliance between the United States, South Korea and Japan is a decisive factor for stability on the Korean peninsula. This has been possible mainly due to US extended deterrence. Annual military exercises and force projection have become an essential part of extended deterrence, which demonstrates joint capabilities and readiness to respond forcefully to North Korean aggression. However, US extended deterrence presents its own problems and limitations: its failure to deter North Korea's hostile military provocations has damaged the credibility underpinning extended deterrence.

Another problem that has been glimpsed in the alliance is the growing lack of trust and confidence *vis-à-vis* the deterrence guarantor and South Korea and Japan. It is not easy for the nuclear supplier to secure the customer in an asymmetric alliance framework. Asymmetric alliance relationships may involve divergent threat perceptions. Such divergent threat perceptions may give rise to fears of entrapment or abandonment (Snyder, 1984: 461-465). Given that South Korea is constrained by North Korea, it is inevitably concerned about the latter's rapid nuclear build-up. In addition to geographical proximity, threat perceptions may differ greatly due to the confrontation between the United States and China-Russia. Amid the strategic competition between the United States and China, and the Russian invasion of Ukraine, the Biden administration's main security concerns were China and Russia, not North Korea. Washington and Seoul must strive to close the security perception gap and rebuild mutual trust within the alliance and extended deterrence against North Korea.

3.4 A nuclear South Korea?

South Korea's position on pre-emptive strikes against North Korea undermines the credibility of its policy. Under current South Korean doctrine, it will use locally produced capabilities to conduct pre-emptive strikes if it detects signs of a North Korean missile launch and will follow any successful attack on South Korea with «massive punishment and retaliation». However, there is uncertainty about Seoul's operational capability to correctly identify an imminent attack and therefore respond appropriately (Bowers and Hiim, 2021: 7-39). Moreover, careless statements by some South Korean politicians about decapitation attacks on Kim Jong-un and the North Korean leadership have introduced significant ambiguity regarding the conditions that may trigger a South Korean attack on North Korea.

All this leads to the debate that has emerged in South Korea, remarkably, on acquiring an independent nuclear deterrent. If North Korea raises its nuclear threats and continues its policy of playing on the brink of nuclear war, South Korea may strategically opt to acquire its own nuclear force to maintain a balance of terror on the Korean peninsula. President Yoon has openly floated the idea, even if he later retracted it, and several prominent politicians have expressed support for the possibility of South Korea developing a nuclear bomb of its own. Another indication of Seoul's nuclear reserves is its development of submarine-launched ballistic missile capabilities, as the only non-nuclear armed state to have done so. Likewise, following the AUKUS agreement, there has been renewed support for the development of an indigenous nuclear-powered submarine among South Korean experts and officials (Chang, 2023). Proponents of a South Korean nuclear deterrent also argue that its independent nuclear capabilities can enhance Seoul's value and prestige as a US alliance partner. However, others see South Korea's «nuclear standby» approach as a negotiating tactic to obtain more security assurances from Washington.

Still, the nuclear debate in South Korea clearly indicates that some South Koreans do not see their (or the United States') non-nuclear capabilities as strategic assets. Many in Seoul believe that an effective deterrence posture must be based on the possession of nuclear weapons and, to avoid this, it is essential to take steps to ensure that Seoul does not decide to build its own nuclear arsenal. In the short term, this will require enhancing the exten-

ded deterrence posture of the United States and South Korea in line with the strengthening of the so-called three Cs (capability, credibility and communication) as well as security assurance —a measure that will, in turn, strengthen the principle of extended deterrence. Other measures to be taken include enhancing balanced conventional and nuclear deterrence and defence, reinforcing joint military preparedness in alignment with North Korea's advanced nuclear posture, strengthening security assurance measures corresponding to the existential threat posed by North Korea, and promoting the application of extended deterrence at the military level.

3.5 Towards a nuclear-weapon-free zone in Northeast Asia?

One possible solution to all tensions and problems discussed in this section may be the formalisation by treaty of a Northeast Asian NWFZ. Indeed, in the past, this region was considered a candidate for the creation of such a zone since its nuclear proliferation has traditionally posed a risk to international security. The challenge, however, in creating a NWFZ is that the very concept of Northeast Asia is controversial because the states parties are either associated with different sub-regions or belong to the broader continent of Asia. At the same time, compared to other regions where NWFZs have been established, the development of a sense of regionalism in Northeast Asia is very weak. Regional organisations overlap and constitute an area of competition between China and Japan. However, despite conflicts, tensions and low institutionalisation in the region, its interdependence has continued to grow over the years and there are hundreds of cooperation projects ongoing (Wan, 2018).

On the other hand, a NWFZ would consist of multiple actors with diverse visions of nuclear weapons. South Korea and Japan are nuclear threshold states; North Korea is a state with nuclear weapons that withdrew from the NPT and China is a state with nuclear weapons that is part of the P5. United States, Russia and China, (together with the other two states that possess nuclear weapons and which are recognised by the NPT) must provide negative security guarantees to the countries of a potential NWFZ in Northeast Asia. However, China's place in the region and its role as North Korea's patron makes it one of the actors that would negotiate such a NWFZ. In other words, China's role would extend beyond providing negative security guarantees.

In this sense, the main stumbling block to the creation of a NWFZ in the region would not be North Korea, rather China. There are several reasons for this: China's regional security requirements do not seem to be advanced by a NWFZ as the regional security scenario is favourable to its interests. China's regional power is growing and will not be challenged by other regional powers. This means that South Korea and Japan will continue to base their security on the US security umbrella. On the other hand, the negative security guarantees that China would have to commit to, would require an understanding between Russia, China and the United States. This does not seem achievable in the short term. Another barrier to the development of a NWFZ from the Chinese perspective is the potential nuclearization of Japan or South Korea. Finally, while a NWFZ in Northeast Asia will not change China's nuclear status, it may impose some constraints on its missile deployment. Despite there being few incentives for China to support the creation of a NWFZ, China was the main supporter of the six-party talks in the past and remains its primary advocate (Wan, 2018). This means that rather than an NFWZ, from China's perspective, the denuclearisation of the Korean peninsula appears to be the preferable security arrangement for the region.

Moreover, the main actors lack a common vision of what collective security in Northeast Asia should be, which would limit the possibilities of creating a NWFZ in the region. First, Japan and South Korea have committed to maintaining their denuclearised status despite North Korea's threats. However, they continue to rely on the US nuclear umbrella for their defence and there are currently no relevant actors at the national level to suggest an end to this support. Second, the United States is reluctant to consider a NWFZ because its influence would be reduced if the nuclear umbrella provided to South Korea and Japan were to be removed (Koo, 1998: 123-139). Third, Japan and South Korea's status as nuclear threshold states would be hampered by a NWFZ, as it would restrict much of their nuclear development related to fuel cycle and reprocessing technologies (Koo, 1998: 123-139). Fourth, as highlighted above, China is not eager to establish a NWFZ, as its nuclear strategy towards its immediate neighbourhood would be affected (Koo, 1998: 123-139). Fifth, North Korea's nuclear trajectory does not appear to be reversing, and without a disarmed North Korea, a NWFZ cannot be achieved. Sixth, Northeast Asian countries have so far not been advocates of multilateral security (Cha, 2014: 737-757), as they have not

invested in building regional security architectures in fields other than arms control. Instead, they have chosen to address security issues through the lens of security self-reliance and, in the case of Japan and South Korea, allying with the United States. Finally, the lack of official dialogue on a NWFZ in Northeast Asia impedes any possibility of progress on this issue (Wan, 2018).

4 The strategic nuclear trilemma: China, India and Pakistan — a delicate balance

The overall picture of nuclear issues in South Asia is characterised by great complexity: three nuclear powers share a direct border and have unresolved territorial disputes. There is also an asymmetry between conventional and nuclear capabilities and precedents of open warfare between the parties. Moreover, their diverging perspectives on how to establish deterrence; nuclear dyads extending into strategic chains; the interconnectedness of nuclear issues with the conventional, space and cyber domains; historical animosities; and the divisions engendered by ideologies, religions and civilisational issues make for a very complex situation where all elements for a possible uncontrolled nuclear escalation are in place.

Factors accentuating the conflict in this area are the issues of Kashmir, Aksai Chin and Arunachal Pradesh; Pakistan's instrumentalization of terrorism; the meddling of major powers in regional politics (especially the United States and Russia); and perceptions of the intentions of adversaries. Consequently, nuclear dynamics in South Asia are quite challenging as the deterrence relationship between the involved parties is not bi-directional, as was the case of the United States and the Soviet Union during the Cold War. At the same time, the region is being drawn into bloc politics that are conditioned by the strategic rivalry between the United States and China, with Islamabad emerging as Beijing's ally and New Delhi as Washington's. This complicates the distribution of deterrence amongst the various regional nuclear powers in a responsible and credible manner.

Moreover, as noted above, the role of perceptions is key to understanding current developments in South Asia. In this sense, there is an asymmetry of perceptions regarding the nuclear issue amongst regional powers. Pakistan perceives India's nuclear capabilities as a tool of blackmail and an existential threat to its survival. Pakistan's tactical nuclear weapons influence India's

perceptions of Pakistan's readiness to deploy nuclear weapons in conflict. India also perceives a threat on two fronts from the strategic military alliance between China and Pakistan. In turn, China perceives the United States' role in the Indo-Pacific as part of a strategy to contain China, of which India is an indispensable part. Added to all this is the fact that there is an absence of talks among the South Asian nuclear powers, which also leads to a general lack of shared danger perception.

Finally, internal factors and leadership policy can both incentivise and limit risky behaviours. The short-term risks of escalation are high in the event of domestic instability. Three elements of the domestic environment are common to India, China and Pakistan: the first is nationalism and a sense of national pride, the second is a focus on hard power and military build-up, and the third is a low level of understanding within the public and political leaders of the consequences of a breakdown in deterrence.

4.1 Nuclear deterrence in South Asia

The triangular relationship between China, India and Pakistan has led to the formation of the nuclear dyads India Pakistan and India-China. The third nuclear dyad, Pakistan-China, exists as a strategic partnership with extensive cooperation in nuclear and missile capabilities (Paul, 2023: 21-29). India's nuclear threats emerge from both sides of its border. For Pakistan, India is the only nuclear threat. Meanwhile, Chinese strategic calculations prioritise the United States. Therefore, the nature of nuclear dynamics is manifested in a complex nuclear chain involving four states (Einhorn and Sidhu, 2017).

The result is a cascading security dilemma that disrupts regional strategic stability and increases the risk that crises may cross the nuclear threshold. In addition to the general dynamics of the arms race, the introduction of new munitions, more capable delivery vehicles and potentially more risk-prone doctrinal changes generally tend to exacerbate strategic instability in South Asia. Sophisticated missile defence systems, hypersonic missiles and multiple independently targetable re-entry vehicles, as well as tactical, sea-based (surface and submarine) and dual-capable nuclear systems, present new challenges for crisis management and raise questions about how they may influence the nuclear strategies and doctrines of states in the region.

India's dual deterrence challenges *vis-à-vis* China and Pakistan highlight another example of a multipolar nuclear risk. For example, India faces the task of designing a force structure that can deter both what it perceives as an offensively oriented Pakistan —which relies on a low-threshold first-use nuclear strategy— and China positioning itself to secure retaliation backed by a no-first-use policy[7]. These tasks seem irreconcilable for India, where decision-makers may feel they must size their force to consider deterrence requirements *vis-à-vis* China, even if this exacerbates Pakistan's threat perceptions. In this sense, India is establishing its deterrence on the basis of a publicly articulated nuclear doctrine that provides a considerable amount of transparency about the role, nature of capability build-up, usage scenarios and deployment postures of its nuclear capability. India believes that doctrinal clarity may be an asset in terms of reducing false perceptions and avoiding instability in crises or arms races.

In contrast to China and India, for Pakistan, the atomic bomb is an instrument of conventional deterrence towards India. Consequently, this signals a low nuclear threshold and derives deterrence by spreading the nuclear weapon for «total defence» with the aim of deterring both nuclear and conventional attacks, as well as counterforce and counter-value targets. To make these full-spectrum threats appear credible, Pakistan has embraced the concept of full-spectrum deterrence and invests in the capabilities needed to carry it out (Khan, 2016: 109-153). Pakistan prefers to project the first use of nuclear weapons, including the use of tactical nuclear weapons, to deter India. It pursues a strategy of *brinkmanship* to deter conventional Indian military action in response to acts of terrorism. Pakistan likes to highlight the risk of nuclear escalation to increase deterrence (Sethi, 2013; Gregory, 2011; Hundley, 2012). The prospect of the conflict escalating to the nuclear level is meant to evoke fear not only to deter India, but also to scare international society into becoming involved in the resolution of any regional conflict. Thus, as some have suggested, Pakistan does not desire nuclear stability, rather managed instability (Hundley, 2012).

China, for its part, has traditionally used opacity to enhance its nuclear deterrence. It has preferred to conceal its nuclear numbers and capabilities and thus establish deterrence. More recently, however, China has not hesitated to demonstrate its capabilities,

[7] Few Indian strategists take China's «no first use» policy at face value.

as it now bases its deterrence on ambiguity. Given the threat it perceives from the United States' ballistic missile defence and the possible use of long-range strategic missiles with conventional warheads to degrade its nuclear arsenal, China has deemed it prudent to deploy dual-use delivery systems and mix its conventional and nuclear forces at the same base to increase the risk of «nuclear entanglement» (Acton, 2018: 56-99). In doing so, it seeks to deter the United States by increasing the risk that the latter may inadvertently attack sites where both asset types are held, which could be perceived as a nuclear attack, leading to nuclear escalation. The uncertainty generated is meant to enhance deterrence.

4.2 Nuclear capabilities in South Asia

Interestingly, while the concept of minimum credible deterrence has been associated with all three countries, each has interpreted it differently. For example, Beijing held true to this description for many decades, as the number of its nuclear warheads was believed to remain under two hundred and fifty between 1990 and 2010. However, in the last decade, nuclear modernisation programmes have accelerated in pace and variety, including the construction of new silos indicating a possible increase in the number of warheads (Kristensen and Korda, 2021a; US Department of Defence, 2020); the commissioning of new Jin-class nuclear submarines; the deployment of independently steerable multiple re-entry vehicles and perhaps manoeuvrable warheads on their missiles; dual-use cruise missiles; hypersonic missile research and development; and the increasing use of space-based capabilities to enhance intelligence, surveillance and reconnaissance (ISR). It is unclear as to what extent these developments will move China away from its long-term strategy of minimum deterrence. Having been satisfied with «minimal means of retaliation» for a long time, it is now displaying signs of change.

It is estimated that India has built up an arsenal of between one hundred and fifty and one hundred and sixty nuclear warheads in the last twenty-four years. An effort has been made to test and incorporate variable range missiles and move towards dispersing delivery platforms across the nuclear triad. According to India's nuclear doctrine, the country must develop sufficient nuclear forces —which can survive a first strike and are operationally ready— a robust command and control system, effective

intelligence and early warning capabilities to ensure maximum credibility and survivability. Survival is emphasised through a combination of multiple redundant systems, mobility, dispersal and deception. India has been moving forward according to this plan to build a credible arsenal and set of capabilities needed to fulfil its concept of minimum credible deterrence.

Pakistan, for its part, with an estimated arsenal of one hundred and sixty-five nuclear warheads, has begun to describe its strategy as one of full-spectrum deterrence (Kristensen and Korda, 2021b: 265-278). This seems to place importance on building a ready arsenal of nuclear warheads ranging from low-yield to high-yield, as well as a range of delivery systems from very short-range to longer-range, in order to strike the entire Indian territory. In recent years, missile tests have been conducted with new technologies, such as multiple re-entry vehicles (commonly known as MIRV) and independent missiles from underwater platforms (Ababeel) and longer-range cruise missiles (Babur 1B). It has also announced the sea-based deployment of missiles with nuclear warheads on surface ships and diesel-electric submarines, ostensibly for a sea-based deterrent.

4.3 Nuclear command and control in South Asia

With regard to its command-and-control systems, on 2 February 2000, Pakistan announced the creation of its nuclear command organisation, consisting of the National Command Authority, the Strategic Plans Division and three strategic service commands, one for each branch: Army, Navy and Air Force. The military has always been the main decision-maker in nuclear matters, and its predominance is also reflected in nuclear command and control structures. Pakistan claims to have a two-man system for authorising the use of nuclear weapons. It maintains that it has an assertive system without delegation of control, although this contradicts the value of possessing tactical nuclear weapons, which are effective only with delegation of control for nuclear use. On the other hand, Pakistan is not yet credited with a sophisticated early warning system.

In the case of China, its nuclear forces have a highly centralised, redundant and networked command and control system for its nuclear forces. The structure has recently been reorganised as part of a major military overhaul announced by President Xi in 2015. Under this process, the PLARF has become the fourth arm

of the PLA, alongside the Army, Navy and Air Force. It remains under the direct command of the Central Military Commission, the highest and most centralised level of military leadership in the Chinese Communist Party. The PLARF commander is also believed to be a member of the Central Military Commission. PLARF orders are believed to be encrypted and protected and require human authentication. There is an emphasis on there being a «man in the loop» for nuclear launch orders and, in that sense, command and control does not exist as a fully automated system. Additionally, the PLARF has control over both conventional and nuclear missiles. China is also known to be building an early warning system with Russian assistance (Korolev, 2020) and has indicated an apparent focus on keeping nuclear forces in a more operational state, as also indicated in the 2019 National Defence White Paper.

India's nuclear doctrine, as set out in a January 2003 press release, mandates the creation of the Nuclear Command Authority, comprising a policy council and an executive council. The former is chaired by the prime minister and is the only body that can authorise nuclear use. The Executive Council is chaired by the National Security Adviser and provides input to the Political Council, as well as executing the directives it receives from the Political Council. The Commander-in-Chief of the Strategic Forces Command manages and administers the national nuclear forces and is responsible for training and other operational issues related to the use of nuclear weapons. The responsibility for the safe storage and reliability of nuclear warheads rests with the Department of Atomic Energy, while delivery vehicles are maintained and controlled by the Armed Forces. A national command post, including an alternate command post, is planned to ensure the survivability and certainty of retaliatory signals.

4.4 Confidence-building measures, the way forward

As may be seen, more confidence building measures must be developed among the three parties, even if none of them agree with the other on what form and substance these measures should take. In terms of policy recommendations, these include steps that may contribute to reducing nuclear risk, promoting stability in times of crisis and thus helping to build confidence and reduce tensions.

Initiating trilateral strategic dialogues to better understand each side's threat perceptions is an important step. From a political

point of view, an exchange of views or even the exchange of unofficial documents at an appropriate level may be the easiest first step, as it would not imply any compromise or agreement regarding capability constraints. However, this could be useful in reducing false perceptions. In relation to this, the use of political and military hotlines, or improved use where such lines already exist, may be established for crisis management. Such arrangements may be useful in addressing the problem of inadvertent escalation, especially when faced with a strategy of *brinkmanship* or ambiguity that may spiral out of control.

Another possible measure could be to formalise low alert levels, as stockpiles in China, India and Pakistan are in such a state. Although it appears difficult, this step may be explored at the Track II level among experts. Should some understanding be reached on how to create acceptable verification mechanisms for this, it may be a highly significant step towards stability in times of crisis, especially once new technologies —such as hypersonics— reduce response times. In this matter, China's approach would be key, as it must also take into account US developments. Indeed, there are fears that it may be forced to alter its own force posture towards greater preparedness (Kulacki, 2019).

Another way to create a habit of engagement and dialogue may be to start with something less intrusive in terms of national security, such as sharing best practices on nuclear safety and security related to civil nuclear facilities. As nuclear energy programmes are expanding in all three countries, it may be useful to promote collaboration between their nuclear centres of excellence. Promoting joint ventures in the manufacture of radiation detection equipment could help foster a common culture of safety and security for the region, which could then be expanded to other areas.

In another possible initiative, the political leadership, as well as the population of the three countries, may be sufficiently educated or made aware of the nature of nuclear weapons and the risks of a breakdown of deterrence. As it currently stands, the discussion on nuclear weapons in all three countries is framed by their profound role in national security. However, it is also important to understand the limitations of these weapons. For example, despite possessing nuclear weapons, India has had to endure acts of terrorism by Pakistan and border incursions by China. Nuclear weapons are not the answer to every security threat. Therefore, other types of capability build-up and political commitment become necessary complements to nuclear capability. During the

Cold War, regular drills, nuclear alarms and exercises kept the population aware of the possibility of nuclear war. This also gave rise to a civil society movement pushing for measures to reduce nuclear risks. Such a phenomenon has never been experienced in South Asia. In fact, there is very little understanding of the dangers of nuclear use among the general population, as well as among political leaders. To better manage crises between nuclear states in the region, policymakers should therefore be trained in complex nuclear crisis diplomacy by conducting simulation exercises within the intelligence community, developing a generalised policy manual for the India-Pakistan and India-China crises, and India-Pakistan-China overlapping crises, as well as routinely sharing knowledge from these planning documents. Moreover, countries in the region should work to improve their indicators and warnings for regional crises and prepare to share information —publicly and with other regional actors— to combat disinformation, where doing so could prevent or de-escalate conflict. A better understanding of the above could lead to a willingness to invest in negotiations to resolve the trilemma, either through more specific risk reduction measures or broader conflict resolution efforts that target the drivers of conflict.

Finally, it may be suggested that the answer to the region's nuclear complexities might also lie in fostering cooperation in non-nuclear areas. These three countries share common concerns and suffer the consequences of climate change, health emergencies due to pandemics, locust invasions in the summer months, and tensions over access to river basins. There is room here for the three to explore certain collective solutions. Until the time that a shared understanding of nuclear risks is established, habits of cooperation on other, less dominant security issues may be formed.

With regard to purely bilateral recommendations, there is an urgent need to resume political and military dialogue between India and Pakistan to avoid possible escalation or a new war between the two countries. Moreover, India and China should include the nuclear issue as part of their bilateral strategic dialogue in order to generate a mutual understanding of shared risks and dangers. All of this could be handled through Track 1.5 or Track II diplomacy[8]. One step that may be achieved between

[8] Track II diplomacy is the practice by which non-state actors use conflict resolution tactics such as workshops and talks to de-escalate tension or fear between conflicting groups. These non-governmental, informal and unofficial contacts organise activities to improve communication and understanding between citizens.

India and China would be to formalise a bilateral non-first use treaty. Currently, these two nations are the only advocates of such a doctrine. Its merit as a stabilising doctrine has been evident during the last military confrontation in 2020, as they did not brandish their nuclear weapons. Mutual acceptance of a no-first-use policy would also have the potential to reassure the adversary and decrease the chances of false nuclear perceptions and inadvertent escalation. Indeed, the policy makes even more sense when faced with an adversary with a small nuclear arsenal that is likely to be extremely sensitive to its survival. India and China have at different times proposed a multilateral no-first-use treaty. Until this gains more support, it might be useful to at least convert their unilateral statements into a bilateral agreement.

5 AUKUS: a covert proliferation risk

The United States has decided to boost its presence in the Indo-Pacific. This has been demonstrated by the renewal of the Quadrilateral Security Dialogue (QSD), but above all by the formalisation of AUKUS together with the United Kingdom and Australia. The agreement aims to strengthen the capacity of all three partners to ensure shared security and defence interests.

Phase I of the agreement includes providing assistance to Australia in building nuclear-powered submarines. To this end, the United States and the United Kingdom will soon establish capabilities and infrastructure, including training for crews, engineers and maintenance personnel. However, preparing a country to handle such sophisticated and sensitive technology should not be considered an ordinary task. Concerns have been raised, even within Australia, about how a country without a civil nuclear power programme could suddenly start operating nuclear-powered submarines. Indeed, a country must first be aware of the controlled and responsible handling of radioactive materials such as highly enriched uranium (HEU) to ensure that there is no diversion of nuclear material and technology that could be used for military purposes not foreseen in the IAEA safeguards agreement.

For its part, China has criticised the AUKUS, calling it a «return of the Cold War mentality» (Ministry of Foreign Affairs of the People's Republic of China, 2022). Beijing sees the AUKUS as a direct threat and an attempt by the United States to contain its freedom of action in the Indo-Pacific. China's response is loud and clear: it has claimed that the United States, United Kingdom

and Australia are creating a new military bloc by establishing AUKUS, which has exacerbated geopolitical tensions (Permanent Mission of the People's Republic of China to the United Nations and Other International Organisations in Vienna, 2021):

> «China maintains that, pending a proper formula worked out by Member States of the Agency through consensus, the United States, the United Kingdom and Australia should not go ahead with their nuclear submarine cooperation under AUKUS, whereas the secretariat of the IAEA, for its part, should not proceed on its own to negotiate the relevant safeguards arrangement with the three countries».

This was stated by Chinese Ambassador Wang Qun. China has also called on the AUKUS parties to recommit to nuclear non-proliferation obligations (Permanent Mission of the People's Republic of China to the United Nations and other international bodies in Vienna, 2021).

The creation of AUKUS allows the United States to regain a significant presence in Asia. Washington is strengthening its commitment to its regional allies, as well as its presence to contain Chinese expansion. In this sense, AUKUS complements the objective of the QSD, as it contributes to the free and open trade in the Indo-Pacific, shifting the military balance away from China. Thus, many states in the region, most notably Japan which feels threatened by China's military presence and naval expansion, have welcomed AUKUS as well as the QSD.

However, these initiatives have serious implications for the region. The United States is manoeuvring aggressively in the Indo-Pacific towards an irreversible political and military confrontation that increases the risk of war by encouraging its allies to advance their offensive military capabilities. This also disrupts regional stability and harmony: by portraying China as a threat to the region similar to North Korea (Lenon, 2018), Washington is projecting Beijing as «offensive» in its economic and military policies and deepening rivalry. However, by focusing only on militarisation, the United States is overlooking the economic hegemony that China has acquired, which is an undeniable fact for the world and unavoidable for the region. This is, for example, one of the main points raised by the ASEAN countries: Indonesia and Malaysia have expressed concern regarding the geopolitical upheaval that Australia's acquisition of a nuclear-powered submarine fleet would entail, while Australia's closest ally Singapore

has shown concern, though it has not exerted as much pressure (Patti, 2021). Vietnam and the Philippines appear to welcome the move and see it as ensuring strategic balance in the region (Patti, 2021). It is likely that the agreement will sow greater long-term disunity in the heart of ASEAN and encourage the member states to side with either the United States or China. The other less likely incident may be the uncertainty surrounding Australia's use of this maximisation of military power in its relations with regional states.

Moreover, the creation of AUKUS has revealed that Washington prefers one ally over the other. Citing the nuclear non-proliferation regime as the main reason, the Trump administration declined South Korea's request to transfer technology and HEU for its potential nuclear-powered submarine fleet (Park, 2023: 1-22), while the Biden administration made an exception for Australia, which undermines the same non-proliferation commitment. Secondly, while the same administration emphasised strengthening the US alliance system, the development of AUKUS shows that the UK and Australia must be more important allies for the United States than France. Preferring some allies over others is not a concern, unless one alliance becomes the cause of deterioration in the others. If history is anything to go by, the United States has continued to shift its preferences from one ally to another according to its national interests.

As a result, however, Australia is likely to lose its neutrality in terms of its foreign policy[9], while opening itself up to tension and conflict with China. Indeed, there is a large trust gap in the Australia-China relationship. Some Australian experts go so far as to suggest that Beijing's attempts to stabilise relations with Australia are a ruse aimed at exploiting Australian goodwill at a later date. Australian officials argue that the strategic impact of AUKUS is negligible compared to the implications of China's nuclear arsenal build-up. From the Chinese perspective, however, AUKUS has generated a great deal of diplomatic resignation. Additionally, AUKUS has complicated Australia's efforts to lead on nuclear security and risk reduction issues in forums such as the IAEA and the NPT.

[9] Neutrality must not be understood as a political and legal status with a defined content in international law; this is international relations, not law. In this sense, it should be understood as Australia's attempt to maintain a position of possible and potential political benefits, in accordance with its own perceived interests in developing its bilateral relations with the United States and China respectively.

Finally, Washington is already interested in further expanding AUKUS. In an interview with the Lowy Institute, Kurt Campbell, the National Security Council's Indo-Pacific coordinator, referred to AUKUS as «an open architecture... that other countries could join over time». According to Campbell, AUKUS will serve as a platform through which the United States seeks to work with «like-minded states in key areas of military innovation». Jake Sullivan, the US National Security Advisor, also presented an ambitious vision for AUKUS, which could include promoting shared security and strengthening technological, economic and climate cooperation in the Indo-Pacific region (Tan, 2022: 1-4). These comments suggest that AUKUS could become a non-exclusive initiative that «complements, rather than contradicts, existing regional architecture and standards» (Tan, 2022: 1-4).

5.1 Implications of AUKUS for Australia

Australia is making rapid progress in acquiring long-range weapons. Former Defence Minister Richard Marles has used the term «impactful projection» to describe Australia's future long-range strike doctrine, which he defined as «an ability to hold an adversary at risk, much further from our shores, across kind of the full spectrum of proportionate response» (Australian Government, 2022). The nuclear-powered submarines to be procured through AUKUS are one of Australia's top investment priorities for this purpose. As Canberra's *2023 Defence Strategic Review* points out: «Nuclear-powered submarines are key assets both in effecting a strategy of denial and in the provision of anti-submarine warfare and long-range strike options» (Australian Department of Defence, 2023).

Other important AUKUS investment priorities include Australia's acquisition of more than 200 Tomahawk missiles from the United States and an accelerated programme to manufacture guided missiles in South Australia (in part to help expand the US military-industrial base in the Indo-Pacific region) by 2025. Long before the AUKUS pact was announced, Australia and the United States had been cooperating to develop and test air-launched hypersonic weapons on Australian territory (Royal Australian Air Force, 2023). Experts at the Australian Strategic Policy Institute have speculated on whether Australia should also acquire other US-made long-range capabilities, including the B-21 strategic bomber. Such weapons could potentially play roles beyond those

required by the deterrence-by-denial posture implicit in official Australian statements (Hellyer and Nicholls, 2022).

The political community is aware that the agreement is «a big Australian bet on the future of the United States, and at a more uncertain time in American politics than at almost any point in the history of the alliance» (Gyngell, 2021). Uncertain geostrategic impacts on Australia may also mean that the AUKUS implementation may not be as smooth as many policymakers hope. Despite this, the agreement on nuclear-powered submarines may, in fact, generate dynamics similar to a regional arms race. It is also unclear how the details of cooperation in so many areas will unfold between the three countries. It is nevertheless possible that, over time and with the attractiveness of various proposals for partnership with other parties, more and more states will realise the usefulness of this security pact.

One way to assess the long-term implications of AUKUS for the Indo-Pacific region is to look at how Australia has employed it as an instrument to address the rise of China: Despite numerous positive assessments of its usefulness as a strategic tool, AUKUS has not been without its critics, both in Australia and elsewhere in the world. Firstly, AUKUS represents the strategic intention of the United States to work with its allies to strengthen its military balance *vis-à-vis* China. Through AUKUS, Australia has become a strong participant in the strategic game of the United States. (Kapur, 2021: 1-17). Given the economic interdependence between Australia and China, Australia's open economy could become even more vulnerable to great power geopolitics. According to one analyst, «security arrangements like the recent Australia-UK-US (AUKUS) Pact will become an economic straitjacket» (Westland, 2021).

Some analysts argue that AUKUS may not be directly relevant to the defence of Australia's domestic territory. According to these sceptics, Australia's security and defence might be better served by a fleet of smaller conventional submarines, given that Australia enjoys several geographical advantages. Two questions remain unanswered or only partially answered: Why does Australia need these long-range submarines to operate in the South and East China Seas, and what strategic objectives can Australia achieve by harnessing these submarines? It is also doubtful whether Australia, as a relatively minor power, has the material strength to aspire to a naval force across three oceans. If Australia's intention is to use this new naval capability to help shape a rules-based order in the region, there are many other

means to achieve that goal. Other observers have argued that Australia's acquisition of the nuclear-powered submarine fleet could take a long time, perhaps almost two decades. By then, it would be too late for Canberra to play a significant naval role in a Taiwan contingency.

On the other hand, it is very likely that Australia will need to outsource the operation of submarines to the US Navy, at the expense of its sovereignty (Wyeth, 2022). It is also argued that by the time Australia obtains the nuclear-powered submarines, China's anti-submarine capabilities may have advanced to the point where Australian submarines could be vulnerable in waters close to China's coast. Operationally, during peacetime, Australian submarines are likely to need air cover from the US carrier task force. In a war between the United States and China, it is likely that the Australian Defence Force would be integrated into the US military force. Thus, Australia would inevitably become a party to a war with China. If it becomes involved in a military confrontation between two nuclear-armed great powers, its national security would be at great risk. These strategic implications and technical difficulties suggest that the deterrence granted to AUKUS against China may be limited.

5.2 Implications of AUKUS for the nuclear non-proliferation regime

With regard to the implications of AUKUS for the nuclear non-proliferation regime, this represents a dangerous precedent. Since the joint statement on AUKUS, an intense debate has raged over whether nuclear-powered submarines are damaging the spirit of the NPT or whether this is just another criticism. For example, AUKUS is seen as a nuclear proliferation risk because of the issue of nuclear propulsion technology transfer which, although not a direct propagation of nuclear weapons, represents a sensitive issue related to the spread of nuclear materials and technologies.

It is true that making Australia the first non-nuclear-weapon state to receive HEU for the building of nuclear-powered submarines sets a negative precedent[10]. This has weakened the non-transfer

[10] It should be noted that while Australia will be able to build nuclear-powered submarines with the assistance of the United States and the United Kingdom, its reactors will be sealed. Therefore, the reactors will not have to be opened for the lifetime of the submarine. This is one of the arguments put forward by the parties to show that there would be no violation of the NPT in this case.

obligation under Article I of the NPT at the global level. Detractors of AUKUS argue that naval reactor technology and related materials used to power nuclear submarines are not covered by IAEA safeguards[11]. In other words, the HEU used to power nuclear submarines is exempt from the IAEA inspections required by the treaty (Kibe and Akagawa, 2021). This reveals another loophole in the Safeguards Agreement (Acton, 2021).

Sharing HEU for submarine propulsion continues to be a violation of the NPT by its biggest supporter, the United States. This leaves the world concerned, even if Australia assures the world that it will not seek to develop nuclear weapons. But who can guarantee that Australia will not change its mind in the future and begin accumulating weapons-grade uranium for other purposes? How could other countries be prevented from acquiring or producing HEU using the same excuse of powering their nuclear submarines? How would the strategic dynamics change if Japan and South Korea decided to follow suit? One option to address growing proliferation concerns is for the United States and United Kingdom to ensure that Australia's nuclear submarines use low-enriched uranium (LEU) rather than HEU, since it cannot be used directly as weapons-grade material (Acton, 2021)[12].

It therefore poses a challenge for Australia: to seriously address the concerns expressed by some countries regarding nuclear proliferation risks. In this context, it is up to Australia to establish and comply with additional, more stringent measures for the production, use and disposal of HEU, as required by the IAEA and the NPT. What follows is that Australia, as a non-nuclear-weapon state, will have to make a special inspection arrangement with the IAEA (Wyeth, 2022), and negotiations have commenced in this regard.

China registered a strong protest with the Agency, stating that it would be wrong and dangerous to «support the nuclear proliferation acts of these three countries» (Liu, 2022). While it is unli-

[11] Article 14 of the safeguards agreement between the IAEA and non-nuclear weapon states allows nuclear material to be excluded from the agency's inspection system or process and used in a non-proscribed military activity, such as nuclear propulsion of submarines. Only while the nuclear material is in use in such an activity do the safeguards under the agreement not apply. In the specific case of Australia, it is recommended to consult INFCIRC/217.

[12] The Brazilian PROSUB programme for a nuclear-powered submarine based on French technology raises certain similar as well as divergent issues (Garay and Pérez, 2014).

kely that China will seek to form new alliances in the foreseeable future, Beijing might be tempted to enter AUKUS-type relations with certain countries in the region, for example North Korea, given that AUKUS has removed restrictions on China doing so.

Conclusions

As this chapter has shown, the Indo-Pacific nuclear lanscape is characterised by multiple actors and a web of complex strategic relationships, where the accumulation of nuclear capabilities and regional tensions represent a significant threat to regional and international security. In this sense, one can glimpse the consolidation of a bloc politics where the United States, India, Australia, Japan and South Korea agree that China is the most important challenge as it attempts to rewrite the regional order in its own image. This, in turn, has direct implications for the deterrence strategies of these actors, who are finding it necessary to build collective deterrence and defence to confront the Chinese threat. However, they do not all view these threats in the same manner, which makes building collective deterrence and defence an arduous task, since the five countries fail to agree on how this should be done. Thus, within a context of growing geopolitical rivalries and asymmetric nuclear deterrence, the risks of unintended escalation or miscalculation are high. The situation on the Korean peninsula, the Taiwan Strait and relations between China, India and Pakistan are points of risk that must be managed with containment policies and effective communication.

To mitigate these risks, it is critical that Indo-Pacific countries adopt approaches that promote long-term stability and peace through increased communication and cooperation, including the creation of political and military hotlines that may reduce the risks of inadvertent escalation. Establishing crisis communication protocols in sensitive areas such as Northeast Asia or South Asia would allow for a controlled response to potential conflicts and improve transparency. A precursor to this could be for countries such as China, India and Pakistan to orient their nuclear arsenals towards minimum and transparent deterrence, avoiding the development of first-use or offensive capabilities. A focus on credible minimum deterrence would better manage threat perceptions and reduce the risk of nuclear escalation.

The creation of a NWFZ in Northeast Asia would also help to reduce the nuclear threat by restricting the deployment of

nuclear weapons in this territory. However, for these initiatives to succeed, active engagement by nuclear powers such as China and the United States is necessary to ensure the security of participating nations and to build a consensus to promote the progressive denuclearisation of the Korean peninsula. Indeed, given North Korea's unpredictability, engagement policies that combine sanctions with diplomatic incentives are required and the resumption of multilateral dialogues within an inclusive framework can help reduce tensions on the peninsula, thus moving towards its eventual denuclearisation.

Moreover, alliances such as the Quadrilateral Security Dialogue and AUKUS must consider the impacts of their deterrence strategies on regional stability. Instead of purely defensive approaches, these alliances could prioritise measures to foster a strategic balance based on mutual respect and dialogue, which would minimise threat perceptions among their members and other powers in the region.

Finally, the Indo-Pacific, with its deep economic interdependencies and historical rivalries, represents both a challenge and an opportunity for the development of a cooperative security system. Adopting these approaches would help to promote a sustainable strategic balance, and it is only through confidence-building, communication and engagement that Indo-Pacific states can build a lasting stability that will deter the nuclear threat and foster peace in the region.

Chapter Four

Iran-Israel antagonism within a nuclear context

Emilia José Peña Ruiz, PhD

Abstract

Occasionally there arises within the international system a situation where states tend to accumulate power, leading to spiralling patterns, which form the basis of arms races. For years, Iran and Israel have been at the centre of such a reality in the Middle East, accompanied by a nuclear backdrop. Recent events have caused the relationship between the two states to evolve into a situation called the game of chicken in game theory, where the rational solution ends up being the most irrational of all.

Keywords

Iran, Israel, Proliferation, Game theory, Security dilemma, Game of chicken.

Introduction

In the language of social science, «security» is a controversial concept, as there is no general consensus on its meaning. Depending on the people, their culture, or perception of reality, the term takes on a different value, which explains why security concerns have changed significantly over the years. Helga Haftendorn (1991: 3-17) has stated that there is no single concept of security. National, international and global security all refer to different aspects and have their origins in different historical or philosophical contexts.

This is corroborated by the numerous definitions of security that have emerged, especially since the end of the Cold War. National, common, collective, shared, human or cooperative security provide a description of what their ideologues believe should be understood as security and, perhaps more importantly, how it is to be achieved (Laborie, 2011).

There are different approaches on how to deal with state security because traditionally it has been the object of protection. From the lens of national security in the traditional sense, the most commonly used method has been the military, and today the state continues to be this benchmark entity where the armed forces and security forces are the predominant security instruments because they continue to hold the monopoly on the use of force.

Security and insecurity are defined in relation to internal and external vulnerabilities that threaten or have the potential to weaken the territorial and institutional structures of the state and governing regimes (Ayoob, 2010). Therefore, some authors consider the enemies of a state to be unpredictability and instability (Derian, 2008). Along these lines, it is naturally assumed that what leads to discord and war is inequality between the parties, since conflict is a constant presence in any context where different actors coexist (Domínguez and García, 2003: 1). However, Thomas Hobbes (2022: 51-52) showed that equality leads to distrust and war where the principle of self-preservation causes inertia towards discord.

The security context in which states exist plays a highly relevant role within the international system itself, as they sometimes generate too much uncertainty, which is the first step of mistrust and, all together, forge a situation in which they are forced to seek more and more power in order to escape the impact of the power of others.

The most insecure states are forced to prepare for the worst because no actor can feel completely secure in a world where

all sides are in constant competition. Competition activates the vicious circle of security and power accumulation, whereby distrust, insecurity and uncertainty are key elements in generating fear and fear is free (Schweller, 1992: 90-121).

International relations in peacetime exemplify situations of ongoing conflict. The need for cooperation conditions the opposition of interests (Borgatta and Montgomery, 2000: 333) and the security dilemma arises, sometimes all too often. This situation in which states are forced to acquire more and more power in order to escape the impact of the power of others generates insecurity in other states and forces them to prepare for the worst. As all actors compete with each other, the sense of emptiness increases and the craving for power becomes uncontrolled (Herz, 1950: 157). Basically, it is the simple instinct of self-preservation that is at work here, and this is due to the fact that a very strong state may be seen as equally provocative as a weak one, as it upsets the existing security balance. This is the so-called «spiral model» developed by Robert Jervis (1976: 62-66).

This propensity of certain countries to «acquire more and more power in order to escape the impact of the power of others» was also interpreted by John Herz in the concept of the security dilemma, referring to the propensity of certain countries to fall into a vicious arms race that leads inexorably to the security paradox (Wheeler and Booth, 2007: 27).

Arms races are a clear manifestation of the spiral model, as the more armaments they secure, the more secure these states feel (Jervis, 1976: 65). However, attempts to build up security by stockpiling weapons are counterproductive because increased armaments intended to project a sense of strength lead to fear, which breeds suspicion and mistrust. This leads states to believe that they must do everything possible to protect the interests of their people and take all possible precautions, actions that other states will interpret as evidence of hostile intentions (Olinick, 1978).

Lewis F. Richardson[1] developed the arms race model on an action-reaction process where fear[2] becomes the main driver

[1] Lewis F. Richardson (11 October 1881-30 September 1953, United Kingdom). Mathematician, physicist, meteorologist, psychologist and pacifist, a pioneer of modern mathematical techniques of weather prediction and the application of similar techniques to studying the causes of war and how to prevent them (Gold, 1954: 216-235).

[2] «[...] It should be noted that this mathematical model is consistent with the verbal analysis part of the 'mutual fear' model» (Olinick, 1978).

reinforcing the warmongering impulse[3], although in many cases there is also a nationalist motivation (Buzan, 1991: 432-433). On the other hand, it should also be noted that the security dilemma arises not only because of lawlessness, but because people perceive what they expect (cognitive rigidity)[4]. In a multipolar system, this dilemma plays an essential role because it replicates the pattern of a zero-sum game in game theory. It especially follows the logic of the «prisoner's dilemma»[5].

Game theory demonstrates how apparently diverse situations have the same logical structure and constitute one of the foundations of rational choice theory, which is in fact an approach or approximation to social reality. Within it, collective choice theory, spatial models of political competition or political economy models are developed. All of them are inspired by the fact that the pursuit of self-interest is the most important factor in explaining human action.

The bridge between game theory and international relations is how to find the equilibrium, as it is the crucial element in every game, along with players, information, strategies and payoffs (Krause, 1999: 3; Rasmusen, 2006: 16). Balance is understood as the profile of strategies that integrates the best tactics for each player (Rasmusen, 2006: 17), while a game is a decision-making situation characterised by strategic interdependence, governed by a set of rules and with a defined outcome. Each participant implements a specific way of playing their strategy which, regardless of what other players do and the duration of the game, must dictate the actions to be taken in detail (Rapoport, 1961: 210-218; Flook *et al*, 1970: 292-293). Thus, a game is a multi-solution problem, with an outcome for each player.

The Prisoner's Dilemma is a simple but unnerving game because it introduced the component of irrationality (Krause, 1999: 4). A universally applicable concept that arises where two parties with mutual and divergent interests coexist (Kanouse and Wiest, 1967: 206). This model became an experimental paradigm just

[3] The author uses the term militarist in the original text (Etzioni, 1962: 464).

[4] The concept of cognitive rigidity is understood as a particular way of processing information and expresses a preference for structured, ordered, simple and unambiguous stimuli. On the relationship between political conservatism and cognitive rigidity, see: (Rottenbacher, 2012: 257-271) and also (Rottenbacher and Schmitz, 2012: 31-56).

[5] «In a multipolar system (such as the one that existed before 1945), the primary alliance dilemma among the major states follows the logic of an N-person prisoner's dilemma [sic]». (Translation provided by the chaper's author) (Snyder, 1971: 66-103).

as the proliferation of nuclear weapons and the arms race began to be a cause for concern (Domínguez and García, 2003: 12) .

Within game theory there are also zero-sum games, mathematical representations of a conflict situation where if one side wins, the other loses (Schelling, 1958:1-2); i.e., representations of an open war (Delpech, 2012: 61-91). These are games in which steps that may be taken by one player to avoid mutual harm affects the other player's strategy, therefore it is not always an advantage to have the initiative (Tadelis, 2013: 35-51).

In the prisoner's dilemma, the rational solution is to try to cheat the other and take all the benefit. However, if both actors choose this solution, neither will achieve anything, which shows that rational behaviour does not lead to success, while irrational behaviour does. The most efficient solution from a societal perspective is for both players to cooperate, but as reality shows, states do not cooperate (Poundstone, 2015: 179), which is why the prisoner's dilemma evolves into a different game, the game of chicken[6].

Bertrand Russell criticised those who play this version of geopolitics, for the politics of pushing the envelope has fatal results[7], as will be seen. The major difference between the game of chicken and the prisoner's dilemma is that the worst and most feared solution is that both actors defect from cooperation. That is to say, they continue ahead without turning away. In geopolitical terms, it represents a conflict situation where one player only wins when the other loses, and in nuclear terms, which is what this chapter is concerned with, it symbolises mutually assured destruction[8].

John Herz (1959: 259) interpreted the nuclear age as a revolutionary process of weapons innovation and highlighted the apparent absence of an effective defence against this kind of weaponry which suddenly made traditional military superiority obsolete and created a common interest, survival. Defensive» measures and «security» policies could no longer be separated from «offensive» or «expansionist» measures.

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[6] This model represents a situation where two cars are driving at high speed towards each other. The first driver to pull away is the «chicken» and loses. Herman Kahn, in his book *On Thermonuclear War* (New York. The Free Press, 1960), credits Berttrand Russell with making the comparison of the Game of Chicken (Poundstone, 2015: 283).

[7] He was referring to Secretary of State John Foster Dulles' policy, inspired by the «Game of Chicken». Dulles defined the Cold War as: «Everything that is not a hot or declared war» (Office of the Historian, n. d.).

[8] See the chapter by Frías Sánchez in this notebook.

In an arms race scenario, if actor A deceives actor B and does not cease its activities, it creates a worse scenario for actor B from a strategic point of view than if B withdraws from a negotiation. In the game of chicken, a rational player will always choose to surrender when faced with an opponent who is not expected to cooperate, as they cannot «protect» themselves from non-cooperation (Snyder, 1971: 84). In fact, history has already provided us with an example of this situation in the Cuban missile crisis (Bock, 2014: 116).

During this crisis, both the Soviet leader Nikita Khrushchev and US President John F. Kennedy sought to balance the situation by deploying nuclear missiles[9]. Soviet missiles deployed in Cuba could reach and destroy Washington, and US Jupiter missiles, located in Turkey, were considered a threat by Moscow. However, they were only a means of deterrence for both actors. In the end, the two countries decided to step aside (Bock, 2014: 117-119).

Currently, two actors may be identified who also play their own version of the game of chicken against a nuclear backdrop, in a conflict that is always open and with the risk of destabilisation that accompanies regional leadership disputes: Israel and Iran.

1 The security environment poses a nuclear and balancing issue in the Middle East

As this chapter is being written, yet another conflict is breaking out in the Middle East. In a sense, this expression has no expiry date, as this part of the world may be considered to have always survived in this constant. To quote Shimon Peres, Israel's prime minister from 1984 to 1986 today's conflict is a matter of generations not cultures in the Middle East.

Tensions between Israel and Iran, which began in the 1980s, have created a dangerous dynamic in the region where a scenario of open conflict between the two sides and the possibility of the use of nuclear weapons cannot be ruled out today (Nader, 2013: 21-24).

Israel is a state that from birth has believed its existence to be at risk, and its history includes three Arab-Israeli wars and three wars in Lebanon, in addition to the ongoing conflict in Palestine.

[9] After the successful launch of Sputnik, the US was concerned about the Soviet Union's potential and whether the US was in a superior or inferior position.

On the other hand, it lives in a permanent dispute for regional leadership with Iran (Garrido, 2017b).

It is therefore understandable that, precisely to ensure its existence, Israel has sought to acquire nuclear capabilities whilst preventing potential adversaries from obtaining them (Cohen, 1998: 13). Nevertheless, it maintains a position of opacity in which it neither admits nor denies that it has this type of weapon (Castro, 2020: 167-212).

The little that is known about Israel's alleged nuclear weapons programme is due the account and photographs provided by Mordechai Vanunu to London's *Sunday Times* in 1986. According to this information, Vanunu was an operator at the Neveg Nuclear Research Centre in Dimona and, within that facility, there was a technician from the Machon 2 Institute and a six-level building (five underground) where plutonium was recovered from spent fuel and nuclear weapons components were manufactured[10].

In fact, it is not party to the Non-Proliferation Treaty and has not ratified the Nuclear Test Ban Treaty (CTBT) (Campos, 2020). However, it has formally joined the Convention on the Physical Protection of Nuclear Material. In this context, it has also joined initiatives against nuclear terrorism, including the Global Initiative to Combat Nuclear Terrorism, the Proliferation Security Initiative, and UN Security Council Resolutions 1540 and 1673.

Iran, in turn, signed its first civilian nuclear cooperation agreement with the United States in 1957 (Bahgat, 2006: 307-308), the result of the Atoms for Peace initiative[11] and, since then, it is a part of all international instruments related to weapons of mass destruction (WMD) such as the Geneva Protocol (1925), the

[10] According to the images, Vanunu photographed what was supposedly a full-scale model of a hydrogen bomb (Cochran, 1996).

[11] On 8 December 1953, US President Dwight D. Eisenhower delivered a speech to the United Nations General Assembly titled *Atoms for Peace,* in which, instead of focusing exclusively on the dangers of atomic warfare, he praised the civilian applications of the atom in agriculture, medicine and power generation, and proposed the creation of an International Atomic Energy Agency to promote the peaceful uses of nuclear energy «for the benefit of all mankind». The initiative was aimed at developing countries, to whom nuclear energy was presented as a means to achieve greater progress and welfare worldwide, which would serve as a basis for the US to launch its civil nuclear cooperation agreements with several countries, including Iran (International Atomic Energy Agency, 2013: 3). On the origins of international cooperation in nuclear matters, see Garrido Rebolledo (1993: 305-313).

NPT[12] in 1970 and its Comprehensive Safeguards Agreements[13], the Biological Weapons Convention (BWC, 1972), the Chemical Weapons Convention (CWC, 1992) and the CTBT (1996).

Iran's nuclear ambitions have been evident since the times of Mohammad Reza Pahlavi. This yearning has been fuelled by historical victimhood, given the country has repeatedly suffered foreign aggressions. However, at the same time, it also sees itself as a proud and modern descendant of a great civilisation with wide and expansive interests, a civilisation that stretches from Central Asia to the Persian Gulf to the Mediterranean. In the eyes of many Iranian leaders since World War II, Iran not only deserves its place in the sun, but must further consolidate its rightful position by possessing nuclear weapons or, at the very least (for now), keeping in active reserve an advanced capability to develop them at will (Levite, 2021).

At the same time, the Iranian leadership always hides behind the *fatwa* issued by Supreme Leader Ali Khamenei to deny its interest in nuclear weapons, as this religious decree imposes restrictive measures on Iran in line with the NPT. However, there are many detractors of this argument who rely on the lack of evidence of such a *fatwa*[14].

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[12] For the official status of the NPT, see the United Nations Office for Disarmament Affairs. (1968). *Treaty on the Non-Proliferation of Nuclear Weapons* [online]. United Nations. [Accessed on: 2025]. Available at: http://disarmament.un.org/treaties/t/npt

[13] All non-nuclear-weapon States parties to the NPT, as well as States parties to regional nuclear-weapon-free zone treaties (NWFZ treaties), are required to formalise comprehensive safeguards agreements (CSAs) with the IAEA. These agreements are formalised in accordance with document INFCIRC/153 (Corrected). The State undertakes to accept IAEA safeguards on all nuclear material in all peaceful nuclear activities on its territory, under its jurisdiction or carried out under its control anywhere. Under these agreements, the IAEA has the right and obligation to ensure that safeguards are applied on all nuclear material of this type for the exclusive purpose of verifying that this material is not diverted to nuclear weapons or other nuclear explosive devices (International Atomic Energy Agency, 1971 and 1974). For the list of facilities under safeguards, see: *IAEA Document GOV/2004/83*. *Annex 1.* IAEA*List Of Locations Relevant To The Implementation Of Safeguards In Iran*, 15 November 2004. Available at: https://www.iaea.org/sites/default/files/gov2004-83_annex1.pdf

[14] The following documents are available for consultation: MEMRI Special Dispatch, n.º 5406*, Release Of Compilation Of Newest Fatwas By Iranian Supreme Leader Khamenei-Without Alleged Fatwa About Nuclear Bomb*, 13 August 2013; MEMRI Inquiry & Analysis Series Report n.º 1022*, The Official Iranian Version Regarding Khamenei's Alleged Anti-Nuclear Weapons Fatwa Is A Lie*, 4 October 2013, and MEMRI Special Dispatch n.º 5681*, Prominent Iranian Analyst, Author, And Columnist Amir Taheri: Nobody Has Actually Seen Khamenei's Anti-Nuclear Fatwa, Which Obama Often Quotes*, 17 March 2014.

Studies have shown that references to the *fatwa* are not clear at the top of Iranian politics. In 2012, then-President Hassan Rouhani mentioned it in an interview and referred to a 2004 Friday sermon by Ali Khamenei (Carmon and Savyon 2013). All mentions referring to the *fatwa* are speeches or sermons and it is not published on any official website[15].

Proponents of this argument state that the *fatwa* reflects a primary Islamic order *(hokm-e-avvaliye*), and therefore it is not correct to evaluate its issuance from fear *(taghiyye*) or expediency *(maslehat*) (Eisenstadt and Khalaj, 2011). On the contrary, the *fatwa* 's commitment is unilateral and unconditional and, in some respects, broader than that of the NPT, as it commits Iran to refrain from producing, acquiring, stockpiling and using all types of weapons of mass destruction (WMD), including nuclear weapons (Sirjani, 2022: 57-80).

The key to understanding the origins of the *fatwa* is the Iran-Iraq war (1980-1988), when the Supreme Ayatollah Ruhollah Khomeini issued a *fatwa* banning chemical weapons as incompatible with Islam, which would explain why Iran did not deploy such weaponry in the conflict, and demonstrates the deep-seated and sincere aversion to the development of chemical and nuclear weapons (Porter, 2014). This episode of history went unnoticed for decades until Mohsen Rafighdoost[16], minister of the Islamic Revolutionary Guard Corps (IRGC) during the Iran-Iraq war, recounted it in an interview in 2014. In late 1987, when Iraqi aircraft bombed Iranian cities with what was supposed to be mustard gas, the Iranian leadership began working with the Ministry of Defence on projects to prepare for retaliation. However, Rafighdoost met with resistance from Ayatollah Khomeini. «It doesn't matter if it is on the battlefield or in the cities; we are against this, […]» Khomeini told Rafighdoost. «It is *haram* [forbidden] to manufacture such weapons. If we produce chemical weapons, what's the difference between me and

[15] Official website of Supreme Leader of Iran Ali Khamenei: https://www.leader.ir/fa

[16] He was Ruhollah Khomeini's bodyguard and head of his security detail. He was also a founding member of the IRGC and was personally involved in all major military decisions taken by the corps during the Iran-Iraq war, including the launch of Iran's ballistic missile programme and the creation of Hezbollah. He currently holds the rank of brigadier general and is politically active in the Islamic Coalition Party. He is also the chairman of the Foundation for the Oppressed and Disabled, an Iranian charitable foundation linked to the Revolutionary Guard and Iran's second largest commercial enterprise, behind the National Iranian Oil Company and the largest holding company in the Middle East.

Saddam?» (Porter, 2014). Production ceased, the buildings in which they were stored were sealed in 1988 and the production equipment was dismantled in 1992[17].

Khomeini's verdict meant the end of the chemical weapons initiative within the IRGC and resulted in a ban on nuclear weapons development, as Rafighdoost understood the leader's refusal on the use or production of chemical, biological or nuclear weapons to be a *fatwa*. It was never written down or formalised, but that did not matter because it had been issued by the «guardian jurist» and was therefore legally binding on the entire government. «When the Imam said it was *haram* [forbidden], he didn't have to say it was *fatwa*,» Rafighdoost explained. Former Iranian nuclear negotiator Seyed Hossein Mousavian confirmed on several occasions in 2013 that Khomeini's *fatwa* exists and was indeed conveyed in a meeting with Minister Rafighdoost (Mousavian, 2013; Mousavian *et al*, 2013).

The current supreme leader, Ali Khamenei, has continued Khomeini's line by publicising the *fatwa* since 2004, although this argument has not generally enjoyed respectable credibility and has been regarded as a propaganda ploy. There is one exception: President Barack Obama, who referred to it in his speech to the UN General Assembly in September 2013 to demonstrate its existence (The White House, 2013).

While it is true that there are doubts and a lack of physical evidence for its existence, it should also be noted that, from a doctrinal point of view, the hierarchy of a *fatwa* issued by any qualified Muslim scholar with the *fatwas* of the supreme leader on matters of state policy has been misinterpreted. The former are only relevant to those who follow the scholar's views; the latter, however, are binding on the state as a whole in Iran's Shia Islam-based political system and have constitutional status (Porter, 2014).

If one validates the history of Khomeini's *fatwa* against chemical weapons, one may derive several ideas that are highly relevant

[17] In November 1998, the Iranian Ambassador and Director General of the Iranian Ministry of Foreign Affairs, Mohammad R. Alborzi, made a statement to the conference of States Parties to the Chemical Weapons Convention in The Hague, the Netherlands, where he admitted for the first time that Iran had acquired the precursor chemicals for mustard gas and, in September 1987, had started to manufacture the chemicals needed to produce a weapon: sulphur mustard and nitrogen mustard, but, after the ceasefire, the decision was reversed and the programme did not evolve (Nuclear Threat Initiative, 2020).

to the nuclear issue in the Middle East. On one hand, it is hard to imagine a stronger argument that demonstrates that, when the supreme leader issues a religious judgement, this decision overrides all other political-military considerations, as it placed Iranian forces at a distinct disadvantage *vis-à-vis* Iraq. And, on the other hand, it must be assumed that it has placed it *sine die* in a situation of strategic inferiority and strength, not only *vis-à-vis* Israel, but also *vis-à-vis* any other actor of similar characteristics to Tel Aviv.

This has resulted in a situation of strategic instability where the existing security balance has been disrupted and a spiral model has been created, where both Iran and Israel have been accumulating various capabilities to defend the survival of their respective states under a reciprocal threat perception.

2 Today's conflict is a matter of generations, not cultures

If we go back to the start of the chapter, we can see how Israel and Iran are currently playing their own version of the game of chicken. Over the years, it has become clear that regional coexistence between the two states has been complicated to the point where it may be described as a zero-sum game.

Most significantly, however, Israel and Iran have not always been natural competitors, nor have they been destined for perpetual conflict. Each country has traditionally maintained separate zones of interest in the region (the Levant for Israel and the Persian Gulf for Iran). For many years, before and after the Iranian Revolution, there was cooperation between the two since they shared strategic interests.

Indeed, Iran's last monarch, Mohammad Reza Pahlavi, saw a *de facto* alliance with Israel as a counterweight to its Arab neighbours. Iran's tacit cooperation with Israel continued even after the fall of the Shah in 1979, as both governments saw Saddam Hussein's Iraq as the greatest obstacle to their national security interests. Iran was in desperate need of modern weaponry and Israel clung to the old periphery doctrine which held that non-Arab states such as Iran could counter Israel's most committed enemies (Kaye *et al*, 2011).

Some post-revolutionary Iranian leaders such as Presidents Hashemi Rafsanjani (1989-1997) and Mohammad Khatami (1997-2005) attempted to pursue more pragmatic policies

towards Israel. In the 1990s, Tel Aviv did not perceive Tehran as a regional threat, nor did Tehran consider Tel Aviv in this light; this view however changed as Iran developed its military defence and security capabilities. On the other hand, Iran's aversion to Israel may be considered more ideological than irrational since Iran considers Tel Aviv a Western colonial entity and a pillar of US imperialism, but also recognises its military and political power (Nader, 2013).

It is not surprising then that this same recognition of Israeli capabilities has led Iran to seek to increase and enhance its own capabilities, hence the heavy investment in defence projects over the past twenty years. The best example of this is its ballistic missile and drone programme, materials exported to the Ukrainian theatre to support Russian operations in Ukraine (Defence Intelligence Agency, 2022), a once unimaginable event.

It has long been assumed that Israeli military and conventional capabilities outstrip Iranian capabilities and the argument of the existence of Iran's military nuclear programme has been nurtured to support this perceived inferiority, even though it is also assumed that Israeli retaliation could cause such damage to Iran that the regime would not have sufficient capacity to recover and remain in place (Kaye *et al*, 2011: 28). This idea has gained momentum following the Israeli attack on Iran on 26 October 2024, where the Israeli air force attacked very specific targets both in the Iranian capital, Tehran, and in the provinces of Ilam and Kuzhestan, where it destroyed facilities related to drone and missile production.

For Israel, a war that offers the opportunity to prevent Iran from achieving nuclear power status is an obligation rather than an opportunity. Although, broadly speaking, any actor would avoid such an unpredictable and dangerous war, it may be assumed that it is an indispensable military commitment for Israel (Beres, 2024: 5).

At this point, the region finds itself in a situation where, on one hand, the State of Israel neither affirms nor denies its status as a nuclear power, but which is assumed to be real. On the other hand, the Iranian state, shrouded in suspicion about the true intentions and capabilities of its nuclear programme since 2002, has taken refuge in empty promises and a *fatwa* by the Supreme Ayatollah Khomeini to deny that it ever had any intention of developing a military nuclear programme. As the analyst John R. Haines put it, the Iranian nuclear programme is akin to

Schrödinger's cat, which appears to be both alive and dead even though it is obviously one or the other. The paradox lies on the fact that each outcome is equally uncertain, and it remains unknown which one is false. The status of Iran's nuclear programme may be summed up in this way.

The question arises whether there is an exceptional situation in the ban on the development of nuclear weapons under Islamic law or whether the *fatwa* puts them in a dead end, since, depending on this answer, Iran's options *vis-à-vis* Israel would be quite different. Obviously, starting a game of chicken against a nuclear opponent is not the same as a game against a conventional one.

Iran is a state whose legal system must be based on Islamic principles, and this criterion is inexorably applied to all laws, regulations and guardians of the country, as stated in Article Four of its constitution. This rule states that the Iranian government, with the supreme leader as its head, has the duty to strengthen national defence to the maximum extent possible with the aim of safeguarding the country's independence, territorial integrity and Islamic order, although it does not specify ways or set limits on how this is to be done (Iran, 1979).

In the Qur'an, on the other hand, there is no rule explicitly prohibiting or authorising the use of nuclear weapons, although the Shari'a contains several principles prohibiting the use of nuclear weapons by actors subject to Islamic law.

The existing discrepancy between the Islamic law of armed conflict and the contemporaneity of nuclear weapons implies that the author will proceed by analogy *(qiyās*), which is a secondary source of Islamic law (Al-Dawoody, 2011: 72). This method seeks to identify «a concept of the Shari'a that is examined in the texts as the original case *(asl*)» and extended «to a new case if it has the same effective cause *(illah*) as the original» (Ahmed and Abozaid, 2022: 130). The value of analogy lies in the power to apply revealed law even to new legal situations. Indeed, Islamic law may be applied across time and space and, moreover, analogous reasoning is prevalent in legal reasoning and, to some extent, in international law (Weinreb, 2016: 4).

A study by Jaber Seyvanizad (2017) analysed the comments of various Islamic scholars and highlighted that both Shia and Sunni scholars issued *fatwas* on the prohibition of the use of weapons of mass destruction. In 2006 and 2008 respectively, Ayatollah Ali Khamenei declared that the possession of nuclear weapons was

contrary to the edicts of Islam and that the production and use of such weapons could not be authorised due to «fundamental religious reasons», such as the prohibition of killing non-combatants (Habibzadeh, 2014: 151).

Sohail H. Hashmi (2004: 321-322) has identified several approaches to this issue by Islamic law. First, based on the principle of reciprocity and Quranic pronouncements, some Islamic scholars defend the use of WMD in some circumstances, especially if the enemy uses them first. Its use may thus be adjusted to the regime governing hostilities under Islamic law.

Contemporary Muslim jurists such as Mohammad ben Nasar al-Ja'wan, Ahamad Nar and Mohammed Khair Heikal have argued on the basis of verse 8:60 of the Qur'an that «God Almighty has demanded that Muslims prepare against the enemies of Islam as far as possible» and, based on the theory of deterrence, argue that Muslims should gather weapons of mass destruction to deter enemies from attacking Muslims (Rifai, 2022: 8).

Islam allows Muslims to repel any attack in a proportionate manner. «If you retaliate, then let it be equivalent to what you have suffered. But if you patiently endure, it is certainly best for those who are patient.»[18]. Therefore, it would logically be permitted to acquire all those weapons that the enemies of Islam have accumulated. On the other hand, as the security of the community is one of the objectives of Islamic law, Muslim rulers are obliged to protect their community and, to fulfil this obligation, they must develop and update their weaponry and protection systems as these weapons are a means of protecting the community. Thus, the development of WMD would be permitted by the Shari'a.

Additionally, considering that the production of weapons of mass destruction has become a necessity for the survival of some countries, they have no choice but to possess such weapons to deal with enemy threats (Djanaralieva, 2023: 11). Scholars such as Mohamed Mokbel Mahmud Elbakry even considered that refraining from using a weapon used by the adversary could be considered as committing suicide, which is forbidden by this verse (Al-Dawoody, 2011: 126)[19].

But it should also be borne in mind that retaliation is not an absolute justification for the use of all means of warfare against

[18] Qur'an 16:126.

[19] With reference to verse 2:195.

the enemy. However, other scholars are in favour of the idea that Muslims should acquire such weapons and they may be used as a first resort against non-Muslims, as they interpret that all means have to be used against the enemy to gain military advantage, but this approach would render ineffective the principles restricting the use of force (Djanaralieva, 2023: 12).

Finally, another approach supports prohibition, including the acquisition and, more importantly, use, as being contrary to Islamic ethics by their very effects (Rifai, 2022: 9). Ibrāhīm Yahyā al-Shihābī concludes that «[…] killing and committing acts of vandalism just to appease anger or hatred, or for revenge, is not allowed at all and this leads us to ban nuclear weapons» (Haykal, 1996: 1353; Djanaralieva, 2023: 13).

Regarding the use or stockpiling of these weapons as a deterrence strategy, there are authors who opine that deterrence implies the killing of innocents and the devastation of the environment, stockpiling them involves the expenditure of significant resources that are not used for other vital needs of the people and, additionally, may cause a catastrophe due to the fact that the enemy can misinterpret the intentions of the other (Hashmi, 2018: 32-34).

With all of the above in mind, one must see how certain statements by leading Iranian officials such as Intelligence Minister Mahmoud Alavi, when he told Iranian state television in 2021, fit in this context:

> «The Supreme Leader has explicitly stated in his fatwa that nuclear weapons are against Shari'a law and that the Islamic Republic views them as religiously forbidden and does not pursue them. But a cornered cat may behave differently than when the cat is free. And if [Western states] push Iran in that direction, then it is no longer Iran's fault» (Reuters, 2021).

This statement was made a couple of months after Iran passed the law entitled *Strategic Plan of Action to Lift Sanctions and Protect the Interests of the Iranian Nation*, approved by the Islamic Consultative Assembly (Majlis) in December 2020 (Barakat, 2020). A rule that has considerably restricted Iran's diplomatic capacity, but which passed with 251 votes out of a possible 260. Although it was publicly opposed by some lawmakers, it was not because they disagreed with its contents, but because in most cases they felt it was not aggressive enough (Rome, 2023).

3 A new concept of nuclear deterrence

Despite the instability of the international system, there has not been a war between great powers since 1945. Bruno Tertrais explains that this is due to the historical effectiveness of nuclear deterrence, as this concept is still robust and underpinned by a strong tradition of non-use of nuclear weapons. However, he also says that the fact that it has worked so far is no guarantee that it will continue to work in this new era, where deterrence between various actors may be interpreted as a game of poker or Russian roulette (Bassets, 2024).

In November 2024, a few days prior to the US presidential elections, certain Iranian —and subsequently Western— media outlets began to echo statements by Kamal Kharazi[20], an advisor to Ali Khamenei and a key player in the regime's decision-making structure, on Iran's stance regarding its nuclear policy and national security.

In that interview, Kharazi began by emphasising that, while Iran currently refrains from developing nuclear weapons because of a higher rule, this position might not hold if Iran faced an existential threat: «Iran has respected the Leader's fatwa banning nuclear weapons, but if Iran's survival is seriously threatened, we reserve the right to reconsider it» (Tehran Times, 2024a). In this vein, he explained Iran's foreign policy approach based on deterrence. Iran is prepared for war but avoids escalation. «The path forward depends on Israel; if it continues its aggressive actions, Iran will respond accordingly».

This is not the first time that the intention to amend the *fatwa* has been leaked and strongly disseminated from Ali Khamenei's entourage. Already in 2012, this idea had been floated in some Iranian press articles (Kahlili, 2012; Bacaltos, 2012) coinciding with one of the regime's toughest stages in its confrontation with the IAEA, the European Union, and the UN Security Council. At the start of 2012, tensions between the United States and Iran were on the rise, and both the European Union and the United States were increasingly concerned about Iran's nuclear program. The United States was preparing to impose additional sanctions

[20] For more information on Kamal Kharazi, see the entry «Kamal Karazi» in Columbia University's *World Leaders Forum*, September 2003. Available at https://worldleaders.columbia.edu/directory/kamal-kharrazi

to prevent the sale of Iranian oil, which were eventually passed on 1 July of that year[21].

Nor is this the first time Kharazi has spoken about the need to change the nuclear doctrine. In May 2024, he resorted to the regime's flagship argument. Iran has no intention of building a nuclear bomb, but if its existence were threatened, it would have no choice but to change its doctrine. Similarly, the commander of the Revolutionary Guard's Nuclear Safety and Security Corps[22], General Ahmad Haghtalab, stated that a revision of the Islamic Republic's nuclear doctrine and policies and a departure from previously established considerations was possible and conceivable (Dalton and Levite, 2024).

Declarations of this nature serve the purpose of strategic communication by addressing their external and internal audience. On one hand, they validate the achievement of having been able to reach a technical threshold of nuclear development that is compatible with the attainment of nuclear capability in order to justify the State's considerable economic investment in this programme. On the other hand, they open the way to deterrence by warning that there is a real possibility of crossing the threshold set by the Supreme Ayatollah Khomeini's *fatwa*.

It is very likely that Iran's great ambition is to one day become a nuclear weapons state, a longing that was evident during the reign of Mohammad Reza Shah Pahlavi and which the Islamic Republic revitalised after the bloody and traumatic war with Iraq in the 1980s. Until it achieves nuclear status, however, Iran has moved in step with the times, advancing its capabilities wherever possible and making technical and tactical concessions where necessary, while enhancing its capabilities to acquire — indigenously and from abroad— the means it might require crossing the nuclear threshold should that time come.

It is also quite likely that the Iranian leadership is convinced that, if they cross the nuclear threshold, the world will eventually learn to accept it. They are likely convinced that, even if their efforts to acquire nuclear weapons are initially met with protests, sanctions and even covert actions from abroad, this *fait accompli* will

[21] See: Council Implementing Regulation (EU) No. 56/2012 of 23 January 2012 implementing Regulation (EU) No 961/2010 on restrictive measures against Iran. Regulations, *Official Journal of the EU*, 24 January 2012. Available at: http://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:32012R0056&rid=1

[22] Unit responsible for the security of Iranian nuclear facilities.

settle any resulting controversy, as has been the case with Israel, India, Pakistan and, most recently, North Korea (Levite, 2021) and establish tolerance.

The passing of the nuclear law may have been Iran's response to the assassination of Mohsen Fakhrizadeh in November 2020. This IRGC officer was considered one of Iran's leading nuclear scientists and is regarded as the father of the nuclear programme. While it is true that, according to Majlis records, this law had been under consideration since June of that year and the bill was debated in early November, well before Fakhrizadeh's death, the most likely interpretation is that it was a strategic move to counter the Trump administration's «maximum pressure» strategy and, at the same time, to attempt to impose on the eventual winner of the US presidential election, a swift reinstatement of the Joint Comprehensive Plan of Action (JCPOA). However, it is very likely that, due to the tense climate between the United States and Iran, Fakhrizadeh's death accelerated the decision-making process (Torfeh, 2020).

While the progress made by Iran over the past four years is considered technically reversible and Tehran may argue that compliance with the JCPOA has long been irregular, the 2020 nuclear law restricted its ability to manoeuvre and negotiate, and obstructed attempts to revive the JCPOA.

This legislation requires all sectors directly and indirectly involved in Iran's nuclear programme to intensify their nuclear activities in order to achieve a number of objectives and to cease implementing the additional protocol to the IAEA Safeguards Agreement in Iran.

Between 2018 and 2021, the Trump administration imposed more than 1500 direct and indirect sanctions on Iran or foreign companies or individuals with business or interests in the country. This ranged from the office of the supreme leader, the Revolutionary Guard or the Central Bank to government officials, the judiciary, members of the scientific community, and the military. The main objective, at the time, was for the new Biden administration to lift certain banking and energy sanctions imposed by the Trump administration on Iran, thereby demonstrating its commitment to the Nuclear Deal[23].

These sanctions were the key component of President Donald Trump's Iran strategy. Although many of the sanctions were ini-

[23] For the contents of the agreement, see UN Security Council Resolution 2231 of 2015.

tially imposed by the Obama administration, they were lifted following the full implementation of the TTIP in 2016. The «maximum pressure» campaign initiated by Trump after signing the US withdrawal from voluntary commitments made in the JCPOA[24] reimposed many of the sanctions targeting Iran's nuclear programme, ballistic missile programme, and support for Iran's proxy militias in the Middle East amongst others (Hanna, 2021).

On the other hand, the aftermath of the years of Donald Trump's first presidency affected other scenarios of US-Iranian rapprochement and did not leave a stable region. Rather the contrary. Firstly, the assassination in Iraq of General Qasem Soleimani, head of the Quds Force, caused another deep rift between the United States and Iraq that is difficult to repair, within a context of more than forty years of animosity and suspicion. Secondly, this event disrupted a useful political dynamic both in Iran, where anti-regime protests had been increasing in size and frequency, and in Iraq, where anti-Russian protests had been on the rise (Haas, 2020).

However, it also increased unease against the US ally among the Iraqi population, a sentiment that has remained largely unchanged over the years, as was detected by population's positive reaction to the news that the mission against the Islamic State, Inherent Resolve, would be completed by September 2025 (Iraqi News Agency, 2024; Middle East Monitor, 2024). And thirdly, as it demonstrated, Iran promised to suspend the interim implementation of its Additional Protocol and to take steps contrary to the JCPOA that would reduce the time required to obtain a viable nuclear device.

Since May 2019, when Iran implemented this decision, it has increased its uranium stockpile to 30% of the JCPOA limit, increased its enrichment activities to 60%, which clearly exceeds the 3.67% limit set by the agreement, resumed activity at nuclear facilities that were previously banned under the terms of the agreement, and prevented the IAEA from conducting satisfactory monitoring of its nuclear activity since February 2021 (Mills, 2024). It has been almost three years and nine months since the IAEA was able to gain full access to Iranian nuclear facilities and conduct credible reviews of current activities (International Atomic Energy Agency, 2024).

[24] The Nuclear Agreement is included in Security Council Resolution 2231 of 2015, therefore the United States remains bound by that resolution.

Under the terms of the JCPOA, the time it would take Iran to produce sufficient fissile material for nuclear weapons (breakout time) had been estimated at one year. But there is an important difference between breakout time and the time required to develop a viable nuclear weapon. A country's breakout time is the time required to produce enough weapons-grade uranium or plutonium for a nuclear weapon. The IAEA estimates this quantity to be about 25 kg of highly enriched uranium (90% enrichment or more). However, even if Iran had the quantity and level of uranium enrichment needed for a nuclear device, it would still need time to develop a viable device. This includes miniaturising a nuclear weapon in order to attach it to a missile that works accurately and reliably. Both developments are challenging and time-consuming. Moreover, an untested nuclear weapon is not a sufficient element, by itself, for credible deterrence (Center for Arms Control and Non-proliferation, 2016).

In June 2022, several analysts considered that Iran's breakout time had reached zero and that, by combining Iran's enriched uranium reserves and its centrifuge capacity, it could obtain enough weapons-grade uranium (WGU) to make a nuclear device. Using the measure of 25 kg of WGU per weapon, it would obtain almost ten nuclear weapons in one month, fourteen in three months, and sixteen in five months (Albright and Bukhard, 2022). However, these breakout time estimates failed to consider the technological capability and time required to build a fully operational nuclear warhead, which some analysts have estimated at between one and two years (Albright, 2024).

An untested nuclear weapon is not sufficient for credible deterrence. In its *2024 Annual Threat Assessment*, the US Office of the Director of National Intelligence (2024) concluded that while Iran does not appear to be pursuing the development of a nuclear device at present, nuclear activities undertaken since 2020 «better position it to produce a nuclear device, should it choose to do so».

Looking globally at developments in Iran, it may be assessed as a nuclear threshold state in a context of resistance and, in the words of Professor Sebastian Harnisch, while the NPT as a system works and did manage to limit the nuclear threat in the Middle East for years, the regional situation is now so open that, even if the NPT continues to function, the regional tension provoked by the confrontational scenario between Israel and Iran may break the stability of the non-proliferation regime.

The regional repercussions of the developments in Iran's nuclear programme, which are mainly visible in Saudi Arabia and Turkey, cannot be overlooked. On the Saudi side, Crown Prince Mohammed bin Salman has repeatedly stated his country's aspirations to develop a full-fledged civilian nuclear programme. Although this desire was born in the 1960s, it now raises more doubts than ever, mainly due to the opacity of its true intentions and the Saudi determination to refuse to have a different status than India or Japan, which were generally allowed to pursue enrichment or reprocessing capabilities under their respective «123 agreements».

Saudi Arabia has publicly declared its goal of achieving full autonomy over the entire nuclear fuel cycle (Caggiano, 2023: 33), as well as the possibility of using this technology to develop a military programme if required by circumstances, in a clear reference to Iranian developments. The expansion of uranium enrichment capacity at the Fordo facility and the increase of enriched uranium stockpiles to 60% have raised concerns in Riyadh about a possible resumption of Iranian weapons research. This situation has been exacerbated by the IAEA's limited progress in monitoring Iran's nuclear developments. Although these actions may be understood as a strategy of international pressure, and especially on the United States, rather than as a threat, Iran's lack of transparency is of concern in the Saudi kingdom.

Prince bin Salman's strategic considerations appear to depend heavily on Tehran's actions and intentions, though they are not the only reason. Saudi Arabia is also seeking to reduce its dependence on external suppliers of both fuel and uranium ore. Riyadh has enough for domestic purposes, but they are currently being extracted in cooperation with China, a project described as seriously uneconomic by both the IAEA and the Organisation for Economic Co-operation and Development's Nuclear Energy Agency (Eid, 2025).

For its part, Israel's position on the issue is clear, as articulated by its Atomic Energy Commission. Israel has expressed concern about caving in to the Saudi request to build a nuclear power plant as part of a normalisation agreement, as this decision could set a dangerous precedent and trigger a nuclear arms race in the Middle East (Schneider, 2023). Such a situation may further intensify regional competition and security dynamics and set a problematic precedent by encouraging other countries in the region, such as Turkey, to pursue similar nuclear capabilities, lea-

ding to cascading proliferation in an already volatile Middle East (Herrera, 2023).

Regarding Turkey, already in 2019, President Recep Tayyip Erdogan called it unacceptable for *de jure* nuclear states to prohibit it from obtaining its own nuclear arsenal (Bugos, 2019). This statement raised questions about Turkey's motivation in this regard, as Turkey was one of the first signatory states to the NPT and is therefore obliged to prevent the spread of nuclear weapons and to promote the goals of an effective disarmament agenda.

Turkey currently invests in different civil nuclear power plants as the country's economic investment and hosts twenty to thirty US B61 unguided nuclear bombs under the NATO umbrella at the Incirlik air base (Kristensen *et al.*, 2024c: 198). The presence of this type of weaponry on Turkish soil is related to its accession to NATO in 1952 and US deployment of Jupiter missiles in 1959. Following the withdrawal of these missiles from its territory, Ankara was integrated into NATO's nuclear sharing system. This concept was coined by the Nuclear Deterrence Organisation and allows Belgium, Germany, the Netherlands and Italy to host nuclear weapons and to use them, if necessary, subject to direct authorisation or order from the United States[25].

It is true that the possibility of Iran developing nuclear weapons makes some sense for Turkey's approach to developing its own nuclear arsenal in order to balance and address the potential challenges of cascading proliferation in the Middle East. However, there are several factors that could prevent or at least hinder this aspiration. Firstly, its membership of NATO, the NPT, and its adherence to the non-proliferation regime, as well as its long-standing desire to be a member of the European Union. Secondly, according to the white paper published in 1998, Turkey's military strategy in the 21st century is based on four pillars: deterrence, military support to crisis management, forward defence and collective security. The idea behind the whole doctrine is that of long-term commitment in its alliances, a concept far removed from the consequences of a nuclear arsenal (Yazigioglu, 2019).

And thirdly, if Turkey were to embark on this transition to military nuclear development, it would require partners who could advance its technology quickly, effectively and efficiently at all stages of the nuclear fuel cycle. These candidates could range

[25] See the chapter by Frías Sánchez in this strategy notebook.

from Brazil or Japan to Russia and, of course, China. Considering that they are all members of the NPT and the Nuclear Suppliers Group, if any of them were to collaborate with Turkey to develop nuclear military technology, it would lead to a situation similar to that of Russia with Iran, which supplies it with sensitive technology within the context of the rights of non-nuclear-weapon states under Article IV of the NPT (Kibaroğlu, 2015: 147).

4 The «nightmare of the swan», its impact and probability

Within the sphere of intelligence, there are several techniques (especially three) to help the analyst anticipate future scenarios whose impact makes their monitoring mandatory, even though they may be considered dismissible due to their likelihood. Intelligence analysts use high-impact, low-probability analysis to provide decision-makers with resources that allow them to act in time and under conditions of uncertainty that are as low as possible (Pherson, 2009: 6).

Normally, such a study begins when information is available suggesting that an event may occur that was not previously anticipated or was deemed to have a very low probability of occurrence. In this case, what drives the creation of scenarios is, on one hand, the boldness of seeking to anticipate the course of events and, on the other hand, the need and desire to try to reduce possible futures, to limit uncertainty.

At the time of writing, Israel has dealt a major blow to Hezbollah in Lebanon and several blows on Iranian soil that have severely weakened Tehran and, by extension, the Axis of Resistance. The cessation of hostilities signed on 27 November 2024 between Israel and the Lebanese militia revealed the weakness of the axis, which was unable to retaliate to the attacks it had received.

Following the Israeli strike against Iran on 26 October 2024 in response to Iran's attack on 1 October 2024, a response was expected from Tehran, the third part of Operation True Promise. After launching the operations True Promise-1 and True Promise-2 and, above all, certain statements by members of the Iranian leadership such as Foreign Minister Abbas Araghchi, Tehran focused its rhetoric on communicating that it intended, in principle, to retaliate (Jewish News Syndicate, 2024). This retaliation has not arrived and is not expected[26].

[26] At the time of writing, Iran has not launched such an operation.

A sample of this discourse may be seen in the words of the supreme leader's chief of staff, Mohammad Mohammadi Golpayegani: «[...] the recent action of the Zionist regime to attack parts of our country was a desperate move and the Islamic Republic of Iran will give it a harsh and regrettable response» (Al Arabiya News, 2024). Not much attention is paid to this official in the Western media, but he is an influential decision-maker and often acts as the leader's representative. This means that his statements and appearances shed light on his thoughts and priorities. Indeed, in November 2019, the US Treasury Department identified him as «one of the most important officials in the Office of the Supreme Leader» (United Against Nuclear Iran, 2023; Sahimi, 2021).

On paper, Iran is somewhat obliged to respond, as it cannot fail to satisfy the nationalist demands of the more conservative part of the regime without solid justification. On the other hand, a miscalculation hands Israel —and the other countries involved— new reasons to argue for an armed response on its territory. But this is precisely why it needs a forceful response, whether from action or deterrence, as well as diplomatic power.

The issue has now been exacerbated by the fall of Bashar Al-Assad in Syria after an offensive that achieved in ten days what was not achieved in more than thirteen years of conflict. While Israel was not directly involved in the events in Syria, it has benefited greatly from the Axis of Resistance's loss of the Syrian arena, already weakened by the blows in Lebanon.

Hayat Tahrir al-Sham (Organisation for the Liberation of the Levant in Syria), formerly known as the Al Nusra Front, had been planning the offensive for months, deploying forces along the borders of Idlib province, but the element of surprise was key to the offensive's success. The operation was launched when the Axis of Resistance was at a critically low point. Hezbollah and the other Shiite militias were badly worn down by prolonged fighting against Israel, especially after Israel launched Operation Northern Arrows in southern Lebanon to fight Hezbollah in September 2024. The presence of the Axis forces in Aleppo and other regions of Syria was significantly reduced when forces were relocated to Lebanon, and by the loss of key figures on the operational ground due to targeted assassinations carried out by Israel (Valensi *et al.,* 2024*)*.

With the Syrian piece removed from the chessboard, only the Iraqi space stands between Israel and Iran. Once again, Israel

and Iran may be forced to rationally assess the costs of a regional conflict, even more so if the nuclear component is included, even each have very different reasons for doing so.

Israel might even execute a pre-emptive strike on Iranian soil to prevent a nuclear escalation. However, in order for such an act not to provoke a large-scale destabilisation that would spill over to the regional level, it would have to be a synchronised operation, in step with the actions and interests of other actors in the region (Nader, 2013: 21-24). Obviously, Israel would have to rely on regional allies such as Saudi Arabia and Turkey to execute such an operation on Iranian territory, as well as keeping a close eye on the domestic political thermometer, since it would have to be uncontested.

In this new version of the game of chicken in a more than likely nuclear background, it appears that both actors are forced to act and continue to accelerate. Iran feels obliged to respond to the 26 October attack and, within that decision, the context and attempting to avoid retaliation forces it to obtain strong results, which, at the same time, reduces its margin of possibilities towards those that lead to actions that are directly or indirectly related to its nuclear programme and contrary to the JCPOA.

On 6 December 2024, the IAEA published an update on its verification activities in Iran. The two-page report sounded the alarm about a dangerous increase in Iran's enrichment activities at the Fordo enrichment plant. On 5 December, Iran began feeding 20% enriched uranium into two interconnected IR-6 centrifuge cascades to produce highly enriched uranium (HEU) (Albright and Burkhard, 2024).

This means that Iran is developing the capability to manufacture weapons grade uranium (WGU) under the guise of manufacturing 60% highly enriched uranium at the Fordo underground enrichment plant, without even using its existing stockpile of HEU, which would allow it to produce 25-35 kg of HEU on average per month and 10-15 kg of WGU per month. The latter gives an annual rate of 120-130 kg of WGU per year, enough for about five nuclear weapons.

These actions are most likely the result of Tehran's growing concern over Donald Trump's return to the US presidency and the weak position it finds itself in. In this context, numerous voices in Iran have called for a reassessment of its nuclear strategy. Iran's Foreign Minister Abbas Araghchi stated that although Iran can

produce a nuclear bomb, it has no intention of doing so, although «power and diplomacy are unified and inseparable. Without power, diplomacy is ineffective, it has no impact» (Tehran Times, 2024b) and, as stated above, Iran needs both deterrence and diplomatic power to be strong in a negotiation.

It should be noted that there is a very strong relationship between Iranian nationalism and the sentiment that encompasses Iran's nuclear programme, as it is a country where nationalism is exceptionally strong in both its secular and religious forms (Stone, 2009: 34) and moreover, directly and actively intervenes in its political management (Abrahamian, 2018: 36). In a sense, it may be assumed that nationalism advances the nuclear programme and, simultaneously, the successes of the nuclear programme enhance national pride.

If Minister Araghchi's talk of power and diplomacy is coupled with progress on the nuclear programme, with the rhetoric surrounding the —unnecessary— nuclear *fatwa*, plus a likely tactical military disadvantage *vis-à-vis* Israel, two possible scenarios may be advanced.

The first is a future where Iran cancels the *fatwa* and immediately conducts its first successful nuclear test. This would demonstrate that it has achieved full operational nuclear capabilities and would give it the military and diplomatic power it currently lacks. This scenario would have a high impact on the non-proliferation regime. It would represent a watershed moment that would be difficult to recover from and would also end up affecting the NPT and its review, scheduled for 2026.

In the second scenario, Iran also cancels the *fatwa* to continue its nuclear developments but hews close to the limits of a nuclear threshold state (Mousavian, 2024) so that it may continue to make trade-offs between the minimums of the non-proliferation regime and the maximums of credible deterrence.

Although at times the nuclear deal appears to be held together by a barely perceptible thread, the international legal framework embodied by the UN Security Council Resolution 2231 (2015) of 20 July 2015, which encompasses it, remains in force and marks the expiry of the main nuclear vetoes in July 2025. On 18 October 2025 or, in other words, on the day of the completion of the Joint Comprehensive Plan of Action, the provisions and measures imposed by the Plan will be terminated and the UN Security Council will no longer be dealing with the Iranian nuclear issue,

leaving Iran with a third —and somewhat familiar— avenue: to try to cool down and prolong the conflict in the diplomatic sphere.

This option could allow it to get as close as possible to October 2025 by claiming its intention to continue negotiations linked to the nuclear deal or to a new negotiating scenario with new features. Indeed, Iranian President Masoud Pezeshkian's recent moves appear to be aimed at resuming nuclear talks with the United States and calming international concern over Iran's advancing nuclear activities. However, Tehran's proliferation activities in recent months increase the risk that both Israel and Washington will perceive its actions aggressively and unleash a catalogue of actions ranging from stifling political and economic pressures to military action (Arms Control Association, 2024).

The theoretical framework states that when there is no possibility of cooperation, it is necessary to project disputes over time so that the conflicting parties are forced to interact. However, it should be borne in mind that the history of encounters between the sides does not necessarily play out in favour of the issue. On the contrary, previous encounters or misunderstandings can either strengthen relationships or deteriorate the situation altogether.

Therefore, if Pezeshkian seeks to pursue diplomacy, he should exercise restraint in the short term, especially given the state of relations between Washington and Tehran in the wake of Trump's first presidency. And, similarly, from the White House, the incoming administration should recognise the importance of sending early and consistent signals to Iran about a real process of negotiation, not unilaterally imposing conditions. However, considering the foreign policy decisions made in Trump's previous presidency with regard to the regional environment discussed here, and the fact that his foreign actions will be led by Marco Rubio, a hawk who believes that the United States (The Arab Weekly, 2024; Johnson, 2024) should use military force to promote its policies and who approaches international relations with a posture of force and pressure rather than dialogue, there is little to be optimistic about.

Conclusions

Analysing all the scenarios outlined above, some obvious conclusions may be drawn. The first, and most obvious, is that for the first time in a long while, perhaps since the Islamic Revolution of 1979, Iran may be on the verge of a decisive episode in its

regional, but also national, future, and will not be able to remain immobile for long. At times, it seems that Tehran has decided to adopt a stealth-based approach similar to the Hidden Imam, perhaps in the hope of one day emerging and establishing itself as a regional leader, but it seems unlikely that this will happen with the current pieces on the chessboard.

The first hurdle it will face is President Trump's second term in the White House. It is not yet clear whether Trump will return to the foreign policy lines of his previous term, but if so, Tehran would have to resolve a complex and difficult dilemma, as the regime's survival is —in itself— its *raison d'être*, but how to ensure it is also important. Although Trump has repeatedly stated that he does not seek a regime change in Tehran and that he wants a deal on Iran's nuclear programme, both he and his foreign policy team are focusing on Israel, giving Tel Aviv strategic and diplomatic leverage over Tehran.

Moreover, in the meantime, Iran has continued to develop its nuclear capabilities, and, within this context, Israel is unlikely to stand idly by while two very dangerous futures from its perspective may come to fruition. Firstly, for Iran to consolidate its military nuclear capabilities and become a *de facto* nuclear power, similar to North Korea's case. And secondly, to extend the conflict until 18 October 2025, the end date of the JCPOA, and, with more options, the first option mentioned above is realised.

It is highly unlikely that Tel Aviv would allow Tehran to consolidate itself as a *de facto* nuclear actor, as this would completely change the weight of its negotiating position, its regional influence, and its standing as a rival for regional hegemony. Even more so given that Israel has now managed to deactivate all its regional proxies, so that Tehran now has no ability to exert asymmetric pressure on the chessboard. For the first time in a long while, it must respond directly and its national and regional credibility is at stake.

With all these variables on the table, at first glance it seems that the rational solution for Israel is the most irrational of all, opting for an operation on Iranian soil, even before Tehran considers how to respond. One should not lose sight of the fact that, in the game of chicken, if one chooses the option of continuing forward to prove more courageous than the other, one only survives if the other makes the decision to step aside, since a zero-sum game between two players is an «open war» and, in a nuclear context,

would result in MAD. Thus, the rational solution would be for both sides to step back from the conflict and reach a negotiated settlement.

Unfortunately, in the case of this chapter, the context formed by years of misunderstandings, the Iranian nuclear threat and current circumstances leave little room for a solution where the game ends in a draw. This means that everything will depend on the rationality of the players.

Chapter Five

Future prospects for the nuclear non-proliferation regime

Carlos Aragón de la Serna and Raquel Sanz Pascasio

Abstract

In recent years, the international security situation has become highly fragile and unstable. This has contributed to institutional crises and lack of progress in the various treaties and instruments that make up the nuclear non-proliferation and disarmament architecture, such as the Nuclear Non-Proliferation Treaty and the Conference on Disarmament, as well as the non-ratification of the Comprehensive Nuclear-Test-Ban Treaty and the Fissile Material Cut-Off Treaty, and the suspension of the Strategic Arms Reduction Treaty or New START between the United States and Russia. The year 2026 looks to be critical, as New START will expire in February and the XI NPT Review Conference will be held, following the failure of the two previous reviews.

Keywords

Nuclear non-proliferation, Nuclear disarmament, Nuclear Non-Proliferation Treaty, Treaty on the Prohibition of Nuclear Weapons, Stockholm Initiative.

Introduction

The development of the first nuclear bombs by the United States in 1945 and their use on Hiroshima and Nagasaki initiated an arms race and build-up of nuclear arsenals, mainly by the two powers at that time, the United States and the Soviet Union, which competed for increasingly lethal weapons in ever-greater numbers. With the start of the NPT negotiations and the establishment of the IAEA in 1957, the first steps towards controlling the proliferation of nuclear weapons were taken, while facilitating cooperation for the peaceful uses of nuclear energy and the promotion of nuclear disarmament[1]. Since the NPT entered into force in 1970 and especially since the end of the Cold War in 1991, steps have been taken towards nuclear disarmament and non-proliferation, with the NPT as the cornerstone of the nuclear disarmament and non-proliferation architecture, as well as a number of other bilateral and multilateral agreements. This has resulted, on the one hand, in keeping the number of States with nuclear weapons low, less than predicted in the 1960s, and, on the other hand, in reducing the number of nuclear weapons.

The worsening of the security situation and the conflicts in recent years, especially since the start of Russia's war against Ukraine in 2022, have led to a crisis in the nuclear non-proliferation and disarmament architecture, reversing the trend towards disarmament and making it difficult —and in some cases impossible— to reach agreements.

With the NPT review conference and the end of the bilateral nuclear arms control agreement between the United States and Russia scheduled for 2026, this chapter analyses the different systems that comprise the nuclear non-proliferation and disarmament architecture, the current status of the systems, the new initiatives and threats faced by them, and their possible evolution in the coming years.

[1] The IAEA was established in 1957 in response to the deep fears and expectations surrounding the discoveries and varied uses of nuclear technology. It was created as the world organisation of «atoms for peace» within the United Nations system. From the outset, its mandate was to work with member States and multiple partners around the world to promote the peaceful, safe and secure use of nuclear technologies. See: https://www.iaea.org/es/el-oiea/historia

1 Crisis in multilateral nuclear forums

In recent years, the international security situation has become highly fragile and unstable. The return of the war in Europe due to Russia's war against Ukraine, the escalation of the conflict in the Middle East following the attacks of 7 October 2023, increased threats from North Korea and tensions around Taiwan, and the nuclear rhetoric used as a threat in several of these conflicts have contributed to the deterioration of inter-state relations and the balance in multilateral forums.

This has led to institutional crises and lack of progress in the various treaties and instruments that comprise the nuclear non-proliferation and disarmament architecture, mainly in the area of disarmament, which has affected the NPT and the Conference on Disarmament. Besides, it must be added the non-ratification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), the deadlock in the negotiation of the Fissile Material Cut-Off Treaty (FMCT), the tension added by the ratification of the Treaty on the Prohibition of Nuclear Weapons (TPNW) and the suspension of the US-Russia Strategic Arms Reduction Treaty (START).

1.1 Treaty on the Non-Proliferation on Nuclear Weapons

The NPT[2] is defined as the «cornerstone» of the nuclear non-proliferation and disarmament regime and has made a major contribution to international peace and security. It is a multilateral treaty that was opened for signature in 1968 and entered into force in 1970. After the UN Charter, it is the most universal international legal instrument, currently with 191 States Parties (except India, Israel, North Korea[3], Pakistan and South Sudan). Since 1995, the NPT is in force indefinitely and subject to a five-year review cycle of the state of its implementation, culminating in review conferences. States Parties to the NPT meet in preparatory committees during the three years prior to each review conference, at the UN headquarters in Vienna, Geneva and New York, to identify points of divergence and consensus.

[2] See: https://www.un.org/es/conf/npt/2010/npttext.shtml

[3] North Korea was a State Party to the NPT until January 2003, when it announced its withdrawal. See: https://www.iaea.org/newscenter/focus/dprk/fact-sheet-on-dprk-nuclear-safeguards

The NPT is built around three «pillars»: the first relating to nuclear disarmament for States with nuclear weapons[4] (China, France, Russia, the United Kingdom and the United States); the second, to the non-proliferation of nuclear weapons for non-nuclear-weapon States; and the third, to the promotion of and right to the peaceful use of nuclear energy for all States.

The last time an agreement was reached at an NPT Review Conference was in 2010, when specific disarmament commitments were agreed upon[5]. At the 2015 review conference, no consensus was reached on the draft *Review Conference Outcome Document***,** due to disagreements over holding a conference to create a Middle East WMD-free zone[6] by 1 March 2016 (Wan, 2015).

The 2022 review conference (corresponding to 2020, but postponed due to the COVID-19 pandemic) ended without agreement due to Russia's opposition to the final document due to including references criticising the attack on the Zaporizhzhia nuclear power plant, within the context of Russia's war against Ukraine (Schneider and Horovitz, 2022).

The first two preparatory committees of the current review cycle, which will end in 2026, have already taken place. The 2023 Preparatory Committee, held in Vienna, concluded without consensus on the final report intended to factually collect the discussions that took place throughout the committee, and the topics that will dominate discussions in the current review cycle became clear: growing frustration at the lack of progress on disarmament, especially by non-aligned States[7]; increased questioning (led by

[4] Under the terms of the treaty, nuclear-weapon States parties are defined as all States that have manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967. See: https://www.iaea.org/es/temas/el-oiea-y-el-tratado-sobre-la-no-proliferacion

[5] See: https://documents.un.org/doc/undoc/gen/n10/390/24/pdf/n1039024.pdf

[6] The 1995 NPT Review Conference adopted a number of decisions including the indefinite extension of the NPT (until then it had to be extended at each review conference) and the call for the establishment of a zone free of nuclear, chemical and biological weapons of mass destruction and their delivery systems. This WMD-free zone in the Middle East would commit States not to possess, acquire, test, manufacture or use any nuclear, chemical and biological weapons and their delivery vehicles (Arms Control Association, 2019).

[7] The Non-Aligned Movement originated in 1955 and brought together nations that did not wish to engage in the ideological confrontation of the Cold War but instead focused on struggles for national independence and economic development. See: https://nam.go.ug/history

China) of «nuclear sharing» arrangements (establishing nuclear weapons in non-nuclear-weapon States), extended nuclear deterrence (policy of using nuclear weapons to defend non-nuclear allies) and export control regimes[8], and criticism to China for its lack of transparency, the build-up and modernisation of its arsenals, and its refusal to join the moratorium on fissile material production. Both the factual summary and the chair's recommendations could be presented at the Second Preparatory Committee held in Geneva in July 2024, which was a slight improvement over the previous year's committee, although there were still disagreements regarding the aforementioned topics.

Despite the crisis suffered by the NPT in recent years, the Treaty has been remarkably successful in terms of non-proliferation and the promotion of peaceful uses of nuclear energy. At a press conference in 1963, US President John F. Kennedy warned that he saw «the possibility in the 1970s of the President of the United States having to face a world in which fifteen, twenty, or twenty-five nations may have these weapons». However, as of 2024, only four States had developed nuclear weapons since the NPT entered into force (India, Israel, North Korea, and Pakistan). North Korea's exit from the NPT in 2003 dealt a severe blow to the Treaty. Additionally, in recent years, there has been growing uncertainty over Iran's nuclear programme, which —if not adequately resolved— could trigger another nuclear proliferation crisis. Regarding the peaceful uses of nuclear energy, and through the IAEA and its Technical Cooperation Fund, various projects are being established in the areas of training, safety and security, together with applications in the fields of health, nutrition, agriculture and the environment (International Atomic Energy Agency, n.d.).

In terms of nuclear disarmament, the NPT, which provides in Article VI that nuclear-weapon States shall proceed towards disarmament in good faith, has achieved more modest results. Although there were around 39,000 nuclear weapons in the world when the treaty was opened for signature, and this number has been reduced to 12,000 by 2024 (Kristensen *et al.,* 2024d), this progress has been achieved bilaterally through various strategic disarmament treaties signed between the United States and Russia. In the last of these treaties, the 2010 New START, both

[8] More information in the chapter «The future of nuclear deterrence: an analysis of the strategies of major nuclear powers» by Frías Sánchez in this notebook.

States committed to decreasing strategic deployed weapons by 30% and to modernise and update the mutual verification system to make it more effective and transparent, requiring faster exchanges of information and notifications. This treaty expires in February 2026 and, in addition, in February 2023 Russia suspended the application of the verification measures provided in the Treaty, although they did not completely withdraw from it, arguing the hostile attitude of the United States for providing weaponry and financial assistance to Ukraine.

For its part, China has historically resisted becoming a member of nuclear arms control agreements on the grounds that its arsenals are small compared to those of the United States and Russia. Within the NPT, this stance has been criticised as being incompatible with Article VI and increasingly inconsistent with the increase and modernisation of nuclear arsenals in recent years (Seligman, 2022). While China agreed to start a bilateral nuclear dialogue process with the United States in November 2023, it suspended it in July 2024, in reaction to US arms sales to Taiwan.

Therefore, in terms of disarmament, the increase in operational nuclear warheads, the existence of modernisation programmes for both nuclear warheads and their delivery vehicle systems (Stockholm International Peace Research Institute, 2024), and the finalisation of the few existing nuclear arms control treaties only further erode and call into question the relevance of the NPT.

1.2 Conference on Disarmament

Another major instrument today is the Conference on Disarmament which, with 65 member States[9], is the only permanent body for negotiating disarmament issues in which all nuclear weapon States are present[10]. Within the Conference of Disarmament (CD), key treaties for non-proliferation and disarmament have been negotiated, like the NPT, the Chemical Weapons Convention,

[9] See: https://web.archive.org/web/20040626212727/http://disarmament2.un.org/cd/cd-backgrnd.html

[10] The Conference on Disarmament was founded in 1979 as a forum for the negotiation of multilateral arms control and disarmament agreements and is an «autonomous body» recognised by the United Nations. The Director General of the United Nations Office at Geneva serves as Secretary-General of the Conference on Disarmament, and the Conference is also based at this Office. Through the president, the conference reports annually to the UN General Assembly. See: https://documents.un.org/doc/undoc/gen/g23/186/41/pdf/g2318641.pdf

the Biological Weapons Convention and the CTBT, among others. However, it has been in deadlock for the past twenty years and has failed to adopt a working plan. Reasons include the strict application of the consensus rule, tensions between different «disarmament sensitivities», and the impact of unresolved regional conflicts (such as Russia's war on Ukraine) on its functioning.

Currently, the CD mainly works, among others, on the cessation of the nuclear arms race and nuclear disarmament, the prevention of nuclear war, the prevention of an arms race in outer space, the pursuit of effective international arrangements to safeguard non-nuclear-weapon States against the use or threatened use of nuclear weapons, and on new types of weapons of mass destruction and new systems of such weapons (such as radiological weapons) (United Nations Office for Disarmament Affairs, n.d.a.).

1.3 Comprehensive Nuclear-Test-Ban Treaty (CTBT)

Another element contributing to the crisis in the nuclear non-proliferation and disarmament architecture is the failure of the CTBT to enter into force (Graham, 1996). This treaty was adopted in 1996 with the aim of banning both atmospheric and underground nuclear testing (hence the term «comprehensive»), which is seen as a fundamental step towards non-proliferation, both by preventing new States from gaining access to nuclear weapons and by making it more difficult for those that already possess them to apply technological advances to their nuclear arsenal by banning testing. Despite not entering into force, it is an extremely important instrument for the detection, monitoring, control and verification of nuclear weapons detonations through its International Monitoring System (IMS), consisting of 337 facilities (321 monitoring stations, including seismic, radiological and hydroacoustic facilities, and 16 laboratories), of which almost 90% are already operational, covering up to 89 States and with multiple scientific applications (Comprehensive Nuclear-Test-Ban Treaty Organisation, n.d.).

Annex II of the CTBT contains a list of 44 States whose ratification is compulsory for the treaty to enter into force, as all of them have military, civilian or research nuclear reactor programmes and, currently, it is pending the ratification by China, Egypt, India, Iran, Israel, North Korea, Pakistan and the United States. In 2023, Russia joined these countries by withdrawing its ratification of the treaty, although maintaining its signature, thus

bringing its status in line with the United States (which has also signed but not ratified the CTBT). This move is a clear reversal of the trend in recent years of increasing the number of countries ratifying the CTBT, and a further symptom of the crisis in the nuclear non-proliferation architecture.

1.4 The Fissile Material Cut-off Treaty (FMCT)

The FMCT, a treaty banning the production of fissile material for military purposes, is a commitment made by the Conference on Disarmament in 1995 and reiterated by the 2010 NPT Review Conference, but its negotiation has not started. To minimise the effects of this paralysis, there have been growing calls for the declaration of a moratorium on fissile material production as an interim measure until the treaty is signed. There is broad support for this proposal, but it has not yet been formally adopted because of the resistance from some states, including China, whose opposition is the strongest. For its part, Russia is formally in favour of the treaty and the moratorium, although it has not been particularly active in its defence[11].

1.5 Treaty on the Prohibition of Nuclear Weapons

In reaction by a group of states to the lack of progress on nuclear disarmament within the NPT framework, the TPNW entered into force in 2021 (Office for Disarmament Affairs, n.d.b), which prohibits developing, producing, receiving, transferring, threatening or using nuclear weapons and includes provisions on the prohibition of nuclear testing, seeking or receiving assistance from any State for any activity contrary to the treaty, as well as the prohibition of stationing, installing or deploying any nuclear weapon on the territory of a State Party. It is currently signed by 94 States[12] and ratified by 73, including none of the nuclear States.

Although the NPT and the TPNW share the goal of achieving the complete elimination of nuclear weapons, the TPNW has some weaknesses, such as the lack of a clearly defined disarmament verification protocol, the non-adherence (so far) of any of the nuclear weapon States, and its incompatibility with a step-by-

[11] For further information, see the chapter «Russia's nuclear power: new approaches to capabilities and doctrine of use» by Pérez Gil in this notebook.

[12] See: https://treaties.unoda.org/t/tpnw/participants?status=signatories

step approach to disarmament. In addition, the entry into force of the TPNW has the potential to further weaken the current system, as it forces the diversification of efforts, previously focused on strengthening and advancing compliance with the obligations assumed under the NPT as a universally accepted non-proliferation and disarmament instrument.

On the other hand, the TPNW has been able to incorporate the humanitarian approach of the consequences of the use of nuclear weapons, which until now had been largely absent from NPT discussions. This has contributed to gaining ground with many partners in the global south (some directly affected by nuclear tests in past decades, such as Kazakhstan or Tuvalu), as well as with public opinion and civil society.

1.6 Other factors

Other factors that have contributed to the weakening of the nuclear non-proliferation regime include the consequences of Russia's war against Ukraine, challenges to export control regimes, and new dangers arising from the development of new technologies.

1.6.1 Russia's aggression against Ukraine

Russia's unilateral, illegal and unjustified aggression against Ukraine has permeated all international forums and contributed to further stress the nuclear non-proliferation and disarmament regime.

First, the aggression is a breach of the Budapest Memorandum (Office for Disarmament Affairs, 1994), signed in December 1994 by the United States, the United Kingdom, Russia and Ukraine, in which the three nuclear powers undertook to respect Ukraine's sovereignty and territorial integrity in exchange for the nuclear arsenal on its territory being returned to Russia, and Ukraine's accession to the NPT as a non-possessor state. Russia's breach of the agreement, initially in 2014 with the invasion of the Crimean Peninsula, has led to loss of confidence in the compliance of negative security assurances and reassessment of the potential utility of nuclear weapons possession for deterrent purposes (Budjeryn, 2014).

Additionally, the aggression has led to a continuous exchange of accusations in all multilateral forums between Russia and its allies (essentially Belarus) on the one hand, and the states opposing

the aggression (mainly the United States and European States) on the other. The first consequence has been the paralysis of processes and the difficulty of reaching consensus in such forums; among which the lack of agreement at the 2022 NPT review conference is perhaps the most serious. The second consequence has been the growing frustration of global partners attending these meetings, witnessing how the discussions focus on the conflict in Ukraine while the substantive issues of these forums, and their own interests, are relegated to a second place (Notte, 2024). This has contributed to increasing the disaffection that already existed in these States with regard to the NPT due to the perceived imbalance in the implementation of the pillars of disarmament and peaceful uses, the insufficient recognition of the humanitarian claims of the States that suffered the consequences of the nuclear tests, and the prioritisation of the interests of the nuclear States recognised in the Treaty (Herrera *et al*, 2023: 1-15).

1.6.2 Challenges to export control regimes

With regard to export control regimes, there is a growing trend among global partners, led by China, to question export controls, both within the NPT and in the framework of the UN General Assembly, where they submit a draft resolution every two years entitled «Promoting International Cooperation on Peaceful Uses in the Context of International Security». This narrative argues that export controls are discriminatory, non-transparent and used politically to impede the development of States in the global south by controlling access to certain technologies. As an alternative, China suggests the establishment of an export control system within the UN framework but, given the current lack of agreement in multilateral forums, it is unlikely that a new control regime could be successfully negotiated. These criticisms of the current export control regimes overlook the fact that these regimes have so far been an effective tool in the fight against non-proliferation, creating a level playing field at the international level, with a set of transparent lists of controlled items. All of this has facilitated export controls, which would otherwise be carried out according to criteria chosen independently by each State, making exports very difficult.

In the nuclear field, the Nuclear Suppliers Group (NSG)[13], currently comprising 48 members, defines and implements com-

[13] See: https://www.nuclearsuppliersgroup.org/index.php/es/

mon and agreed guidelines to control exports of nuclear and dual-use materials, equipment and technology (for use in both nuclear and non-nuclear technology applications) and ensures that civil nuclear trade is not diverted to nuclear weapons development or production programmes, or to use by non-state actors.

1.6.3 New technologies

In addition, there is an ever-increasing and faster technological development that entails new threats. On the one hand, AI facilitates the autonomy of nuclear detection systems, mainly in its communications, command and control segment, to the point of allowing the non-inclusion of the human factor, with the possible ethical risks and associated system failures (Cartagena, 2022). It would therefore be essential to address the integration of AI into nuclear command and control systems by establishing robust regulatory frameworks, maintaining human control in critical decisions and fostering global cooperation to ensure lasting strategic stability (Herrera, 2025). On the other hand, the development of hypersonic systems, which reduce response times, increases the risk of misinterpretation and consequently, escalation. The growing interrelation between the areas of nuclear defence and space also brings with it new threats. Additionally, these new areas are not yet regulated, which contributes to increased mistrust, risk of escalation, misinterpretation and stress on the elements of the nuclear non-proliferation architecture and opens the possibility of creating new crises.

1.7 Variable geometry

On a more positive note, and to complement and revitalise the more formal and institutional forums and treaties, new initiatives have emerged that question the traditional balance of power and opt for a variable geometry, while maintaining the institutions of today. Some of those created in the nuclear field — Spain being part of some of them— are the Non-Proliferation and Disarmament Initiative (NPDI), International Partnership for Nuclear Disarmament Verification (IPNDV), Creating an Environment for Nuclear Disarmament (CEND) or the Stockholm Initiative for Nuclear Disarmament (SI). All these initiatives make possible to continue the dialogue at a time when talks between States within the framework of institutional regimes are becoming increasingly complicated.

1.7.1 Non-Proliferation and Disarmament Initiative

The NPDI[14] was founded in 2010 by a group of States[15] that, at the ministerial level and within the framework of the NPT, sought practical steps to boost consensus outcomes at the 2010 NPT Review Conference, in order to advance the nuclear disarmament agenda and seek greater transparency in the way nuclear-weapon States implement their disarmament commitments. Following the first ministerial meeting in September 2010, it continues to meet twice a year.

The NPDI has no formal constitution or permanent secretariat, and its administration is not hierarchical. Decisions are taken by consensus, but not unanimously. Current NPDI priorities include promoting greater transparency around nuclear disarmament efforts, addressing the lack of substantive work in the Conference on Disarmament, enhancing support for and formalising key legal instruments safeguarding and regulating nuclear activities, and strengthening the NPT regime.

1.7.2 International Partnership for Nuclear Disarmament Verification

The IPNDV[16], created in 2014, is an initiative that brings together over 25 nuclear and non-nuclear States to work on identifying and developing practical solutions to the challenges associated with nuclear disarmament verification. To this end, States collaborate with national institutions, government agencies, military services and universities to identify possible procedures and technologies that may be used in future nuclear disarmament agreements and to test their application in scenario-based exercises and technical demonstrations.

The IPNDV is working to address two key verification challenges. On the one hand, given that there are no internationally agreed procedures for verifying the dismantling of nuclear weapons, it seeks to develop an inspection and monitoring procedure for this purpose. On the other hand, to ensure that States have the technical capacity to support the multilateral verification process of nuclear disarmament, it seeks to build international technical capacity and expertise by bringing together experts from

[14] See: https://www.nti.org/education-center/treaties-and-regimes/non-proliferation-and-disarmament-initiative-npdi/

[15] Australia, Canada, Chile, Germany, Japan, Mexico, the Netherlands, Poland, Turkey.

[16] See: https://www.ipndv.org/

nuclear-weapon and non-nuclear-weapon States to exchange mutually beneficial knowledge. Partners meet in person several times a year to exchange information and conduct technology exercises and demonstrations.

1.7.3 Creating an environment for nuclear disarmament

The CEND (US Department of State, n.d.b) was launched by the US during the 2019 Third Preparatory Committee for the NPT Review Conference in order to establish a forum for dialogue to make progress in identifying and addressing security factors that hinder progress on disarmament, re-establishing more favourable conditions for global security and peace, reducing the potential for armed conflict, building trust and transparency among nuclear States, and establishing a pragmatic approach to disarmament. The goal was to have a debate on disarmament in a more relaxed and less formal atmosphere, allowing participants to freely express their technical opinion, which may not necessarily be in line with the official position of the States they represent.

1.7.4 Stockholm Initiative for Nuclear Disarmament

The Stockholm Initiative (SI) was born with the aim of strengthening the NPT regime, energising nuclear disarmament and contributing to the success of the 2020 Review Conference (Government of Sweden, 2024). It is co-led by Sweden and Germany, and initially comprised of 16 States, from different regions and with different positions on how to advance towards disarmament. The initiative began with meetings of foreign ministers in Stockholm in 2019 and Berlin in 2020, where a political declaration and 22 concrete and realistic steps, called «Stepping Stones», were agreed as a proposal to advance the NPT's goals. These measures cover issues such as encouraging further reductions in nuclear arsenals, moving towards the entry into force of the CTBT, promoting the negotiation of an agreement banning the production of fissile material for military purposes (FMCT), the establishment of a nuclear-weapon-free zone (NWFZ) in the Middle East and greater involvement of youth in nuclear disarmament, among many other issues. Later, at the 2022 Review Conference, the working papers *Stepping stones for advancing nuclear disarmament*[17] and *A nuclear risk reduction package*[18]were presented.

[17] See: https://documents.un.org/doc/undoc/gen/n21/348/45/pdf/n2134845.pdf
[18] See: https://documents.un.org/doc/undoc/gen/n22/461/45/pdf/n2246145.pdf

Within the context of the current NPT review cycle, the SI has continued to work on proposals that contribute to nuclear disarmament by submitting the paper *Stepping up efforts: towards a successful review cycle*[19], which updates the 2020 *Stepping Stones* paper and incorporates certain elements of the 2023 document on reflections by the chair, mainly related to increased transparency and accountability.

1.8 Threat of nuclear use

While the taboo on nuclear use remains in place and no tests have been conducted after North Korea in 2017, another worrying trend that has been very present in all multilateral forum meetings is the growing threat of nuclear use, which has been raised in recent years by Russia (in the context of the war in Ukraine), by Israel (in the context of the conflict in the Middle East following the 7 October 2023 attacks), and by North Korea. In addition, changes in North Korea's and Russia's nuclear doctrines in 2024 increase tension and strategic instability.

1.9 Pact for the Future

This concern was reflected in the Pact for the Future[20], signed at the United Nations in September 2024, where world leaders agreed on several measures to work together in the areas of peace, security, sustainable development, climate change, digital cooperation, human rights, gender, youth and the transformation of global governance. Regarding nuclear disarmament, UN member States expressed their «deep concern» about the state of nuclear disarmament and reaffirmed their support for the common goal of a nuclear-weapon-free world and for the fulfilment of nuclear disarmament obligations and commitments set out in the NPT and other instruments. They also agreed on the need to «take all measures to prevent nuclear war».

The UN Secretary-General Antonio Guterres (2024) stressed that the pact represents the «first agreed multilateral support for nuclear disarmament in over a decade». Action 25 sets out the commitment to advance the goal of a nuclear-weapon-free world through, *inter alia*, honouring and respecting security assuran-

[19] See: https://documents.un.org/doc/undoc/gen/n24/149/52/pdf/n2414952.pdf
[20] See: https://documents.un.org/doc/undoc/gen/n24/272/25/pdf/n2427225.pdf

ces undertaken, strengthening the disarmament and non-proliferation architecture and the full and effective implementation of respective nuclear disarmament and non-proliferation obligations and commitments.

2 The future of the non-proliferation regime

Based on the instability in the international non-proliferation and nuclear disarmament architecture, it is necessary to envisage the possible evolution scenarios of the entire institutional framework. This exercise is not only of theoretical interest; rather it is necessary to understand the security environment at which this work is aimed. As seen at the beginning of this chapter, despite all its vicissitudes, the nuclear regime built around the centrality of the NPT has been an unquestionable success: the number of countries with nuclear weapons is considerably lower than was envisaged almost 65 years ago. This demonstrates that there is a link between a sound institutional architecture and the achievement of specific security objectives, such as preventing the proliferation of nuclear weapons.

What has fortunately not been tested since the NPT entered into force in 1970 is the evolution of nuclear arsenals in the absence of institutional instruments to prevent their proliferation. All this at a time of great international instability, combined with the increasing diffusion of nuclear technologies, which are no longer an arcane reserved only for the most advanced States. It may be assumed, however, that a situation that could be described as nuclear anomie would have a highly negative impact on international peace and security.

2.1 Return from the abyss

An initial scenario to consider would be the so-called return from the abyss. It is an optimistic scenario in which a situation of imminent nuclear crisis triggers a reaction to reinvigorate the international non-proliferation architecture. While it seems unlikely that this will be the case, it is not entirely out of the question.

On the one hand, there is historical precedent that certain moments of nuclear tension have served to boost the fight against the proliferation of nuclear weapons. The negotiations that culminated in the signing of the NPT itself began in 1965, shortly

after China's nuclear test on 16 October 1964 (Garrido, 2009b). This test, known as CHIC-1 or Project 596, was a setback for the US intelligence community, which had estimated that China was still far from developing a nuclear bomb (Burr, 2014). This setback, which also seemed to confirm President Kennedy's earlier predictions, led the United States and the other nuclear powers to become convinced of the need to negotiate a treaty to prevent the proliferation of nuclear weapons, a concept that was beginning to take shape at the time.

Even before the NPT, the Cuban missile crisis of 1962 led to the negotiation and signing of the 1967 Treaty of Tlatelolco as a reaction (Román-Morey, 2022: 51-77). This Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean created the NWFZ in Latin America and the Caribbean, a model for other regions, which are fundamental elements of the nuclear non-proliferation architecture. The treaty also created the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL), an organisation whose mandate is to ensure the implementation of this treaty to which all regional states are party, following its ratification by Cuba in 2002. Again, one sees how a moment of crisis encouraged the implementation of novel diplomatic mechanisms.

Beyond historical examples, the experience of the X NPT Review Conference, where, despite previous pessimism, a consensus was almost reached (Mukhatzhanova, 2022), demonstrates that institutional crises can also push States into efforts and commitments that they would not accept in times of lower risk. In the run-up to the review conference, held in New York from 1 to 26 August 2022 (United Nations, 2022), the possibility of finding enough points of convergence for a consensus document seemed remote. Consultations led by the conference chair, the Argentinean diplomat Gustavo Zlauvinen, showed wide differences between positions, with a growing gap between pro-TPNW countries and those advocating for a more progressive approach to nuclear disarmament. Successive delays in convening the conference —which should have taken place in May 2020— due to COVID-19 restrictions allowed for a more structured consultation process. However, this did not lead to reconcile positions, but rather to typecast them. In addition to this negative trend, the full invasion of Russia against Ukraine on 24 February 2022 had a highly negative impact on the entire nuclear non-proliferation and disarmament architecture. Within this context, there was a notable pessimism at the start of the review conference.

However, one of the most highlighted topics throughout the review cycle and in the various national interventions was the need to avoid a second consecutive failure following that of the IX Review Conference in 2015, which would take the nuclear institutional architecture down an uncharted path. Amidst calls for accountability and under the skilful guidance of the conference chair, a draft outcome document was produced in the final days, making significant progress on key issues such as risk reduction or legal instruments for verification. Only Russian intransigence at the last moment prevented the adoption of this document (Hernández and Kimball, 2022). Once again, finding themselves on the edge of the cliff, most States, in an exercise of responsibility, demonstrated a capacity for commit to strengthen the regulatory framework, which would not have been expected a few weeks before. Although the draft outcome document was not adopted by consensus due to the express opposition of the Russian delegation, the constructive attitude of the other delegations permits some optimism. This situation of being on the brink of the abyss may be repeated, as highlighted above, in the first half of 2026, culminating in the review conference expected to take place in April or May of that year.

The abyss of a third failure of the NPT review cycle could lead to it being questioned from different sides. On the one hand, proponents of the TPNW may be tempted to view the NPT as an obsolete instrument that has ceased to build consensus and is incapable of making progress towards the elimination of nuclear weapons, leaving the TPNW as the only path to such elimination. On the other hand, within a context of competition between major powers and an incipient nuclear race, nuclear-weapon States' lack of commitment to their disarmament obligations, and the progressive international normalisation of non-signatory States may prompt certain States that already have latent nuclear capabilities to activate Article X of the NPT and withdraw from it. Either of these two options implies serious risks for international peace and security, therefore it cannot be ruled out that States, on finding themselves on the brink of this abyss, may repeat the exercise of responsibility of the 2022 Review Conference and reach a consensus that would enable substantial progress on disarmament and nuclear non-proliferation, and the survival of the NPT itself.

A series of steps may lead to this scenario and represent a reversal of the negative trend of recent years. The first one would be a

return to nuclear diplomacy with Iran. The JCPOA (United Nations Security Council, 2015) and Security Council Resolution 2231 of 2015[21] provides that the termination day (17 October 2025) will be reached ten years after the adoption day (17 October 2015), when JCPOA will no longer be in force and the Security Council will no longer consider the Iranian nuclear dossier. The parameters of an eventual agreement with Iran to extend or replace the current agreement should therefore be defined before that date. Although diplomatic negotiations have been on hold for several months, the lack of alternatives to a deal with Iran may serve as an incentive to negotiate a solution to this dossier that would allow the IAEA to obtain sufficient assurances of the exclusively peaceful nature of Iran's nuclear programme. Technical developments in Iran's nuclear programme make it difficult to replicate the conceptual basis of the JCPOA, which focuses on a combination of quantitative limitations on the production and storage of enriched uranium stocks, as well as on research and development activities, coupled with a strengthened transparency and verification regime. Nevertheless, the technical challenge is not insurmountable in the face of improvements in verification methods developed by the IAEA since 2015. A nuclear deal with Iran would strengthen the international non-proliferation regime both politically, by showing once again the potential to resolve proliferation crises through diplomatic means, and technically, since, as with the JCPOA, novel verification tools must be developed that may serve as an example for the verification and safeguards system at the global level[22].

Secondly, the New START treaty (US State Department, 2023) will expire on 5 February 2026. Although it is at a critical stage in the face of Russia's non-compliance and the announced suspension of its implementation on 21 February 2023, it remains one of the basic instruments of the international nuclear arms control regime. The prospects for its renewal do not seem too optimistic, but it should be recalled that its extension, agreed in February 2021, also seemed a long way off. The change in the US presidency allowed the United States and Russia to agree on its extension until 2026 on 25 January 2021, entering into force on 3 February 2021, just two days before it was due to expire (Garamone, 2021). At the moment, it is Russia that has

[21] See: https://documents.un.org/doc/undoc/gen/n15/225/31/pdf/n1522531.pdf

[22] For more information on the Iranian nuclear dossier, see Peña Ruizen's chapter «Iranian-Israeli antagonism within a nuclear context» in this notebook.

sent clear signals about its lack of interest in the renewal of New START, including the removal of any reference to its arms control commitment in its recently published nuclear doctrine (Russian Ministry of Foreign Affairs, 2024).

Thirdly, if the NPT review conference in 2026 succeeds in reaching a consensus with concrete steps forward in all three pillars and, above all, on disarmament, it would revitalise the non-proliferation and disarmament architecture and strengthen the non-use of nuclear weapons, which has been in place since 1945.

The Stockholm Initiative's *Stepping Stones for Advancing Nuclear Disarmament* (2021) includes many of the concrete measures that have the potential to build consensus:

1. Risk reduction. Risk reduction measures are viewed with apprehension by advocates of accelerated disarmament as legitimising the possession of nuclear weapons. But there is no doubt that, until the goal of a world without nuclear weapons is achieved, nuclear risk reduction must be a priority, especially for nuclear-weapon States. It is key that the P5 process, in which the five nuclear-weapon States exchange information on their respective nuclear doctrines and policies, is maintained.
2. Transparency and accountability. Closely related to risk reduction, there is a growing consensus on the need for greater transparency by all States, but especially by those with nuclear weapons. Given the frustration with the lack of progress on disarmament, as well as the failure to resolve open proliferation crises, setting transparency mechanisms, such as standardised periodic reporting systems or peer reviews to analyse the degree of compliance with commitments, can reinforce the NPT review cycle.
3. Progress towards universalisation of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). As discussed above, the CTBT, together with its International Monitoring System, is a key element of the international nuclear disarmament architecture. However, it suffers from the legal weakness of not having entered into force. If, as part of the process of resolving some of the open proliferation crises, any of the Annex II States were to ratify the Treaty, this would be a major step towards its entry into force and, above all, towards the consolidation of the international moratorium on nuclear testing.

4 Reactivation of FMCT negotiations. The deadlocked negotiations regarding this Treaty constitute a further symptom of the crisis in the international non-proliferation and disarmament system, and especially in the Conference on Disarmament. While the formalisation of a Treaty banning the production of fissile material for use in nuclear devices is a long-term goal due to its technical complexity, the mere resumption of negotiations would create a much more favourable climate for redressing the systemic crisis and building confidence among the various parties.

2.2 Deepening crisis

However, if the international context causes that the more positive scenario does not materialise, we could move towards a succession of crises leading to the collapse of the existing institutional system. The likelihood that each crisis —that will be discussed— below may occur is very high. If all of them occur, the likelihood of a general systemic crisis would be very high. If, on the contrary, any of them is avoided, the chances of avoiding a general crisis and therefore of moving towards a more positive scenario that allows some instruments of the system to survive, will increase.

Another element that increases the risk of systemic crisis stems from the fact that there is a nuclear dimension in three of the areas of conflict or tension. First, Russia's nuclear rhetoric within the context of its war against Ukraine, which is aimed at deterring Western support for Ukraine, has the secondary and intended effect of eroding international nuclear non-proliferation norms. In the Middle East, the confluence of several interlinked conflicts overlaps with the existence of a nuclear-weapon State outside the NPT, such as Israel, and the lack of resolution of the Iranian nuclear dossier. In this case, the nuclear dimension adds to and feeds back into regional conflicts. In the Indo-Pacific region, the absence of an open conflict cannot hide tensions, again intensified by a nuclear dimension: from China's nuclear rearmament programme to the periodic tensions between India and Pakistan, not to mention the doubts raised by the new Trump administration regarding its commitment to extended deterrence *vis-à-vis* its allies in the region.

These potential crises may include:

– North Korea returns to nuclear testing. To date, North Korea has conducted six nuclear tests, the latest on 3 September 2017.

Since then, the North Korean regime declared a voluntary moratorium on nuclear testing in the run-up to the Singapore summit with the United States in June 2018, which it subsequently withdrew on 31 December 2019. This fact, coupled with the increasing sophistication of North Korea's military nuclear programme, makes it likely that nuclear testing will resume at some point (Gramer, 2022).

– Other countries return to nuclear testing. Following Russia's withdrawal of the CTBT ratification in November 2023, further nuclear testing would have a very negative impact not only on the treaty's entry into force, but even on the very survival of nuclear test moratoria. Statements made by the Russian Deputy Foreign Minister Sergey Riabkov in November 2024 that Russia would consider nuclear testing, especially if the US would conduct one, demonstrate that this is not a remote possibility. In this regard, the United States, despite not having ratified the CTBT, has maintained a policy of support for it. However, it should be noted that during the previous Trump administration, as well as in the months leading up to the 2024 presidential election, there have been statements from Trump's entourage in favour of resuming nuclear testing (Kimball, 2024). If the United States and Russia resume their nuclear tests, it is not out of the question that other countries, especially China, will follow suit. In such a situation, and in an extreme case, the credibility of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) would suffer greatly, over and above the usefulness of its IMS in detecting various nuclear tests.

– The suspension of nuclear diplomacy with Iran. The JCPOA envisages a very specific timetable in which 17 October 2025 will mark its «termination day», when most of the restrictive measures provided for in the plan will cease to apply, as well as the institutional mechanisms created by the agreement itself, such as the snapback mechanism which would allow the Security Council to re-impose sanctions on Iran provided for in the resolutions suspended by Resolution 2231 of 2015, without the possibility of a veto by Russia or China. It is hardly foreseeable that, in the absence of significant progress in resolving this issue, the E3 countries will not reactivate the snapback mechanism, which could lead to an intensification of the proliferation crisis and Iran's eventual withdrawal from the NPT. If, moreover, Iran moves towards a militarisation of

its nuclear programme, it could decide to withdraw from the NPT (Brewer, 2020), leading to a possible domino effect and regional instability.

- Non-extension of New START and the decision not to respect the quantitative limits provided for in it, with an increased risk of a nuclear arms race (Pérez, 2019).
- Failure of the NPT review conference in 2026, which would lead to a questioning of its usefulness in responding to current challenges.

The consequences of this situation, with a concatenation of crises (Pérez, 2024a) and a collapse of the institutional architecture, could lead a significant number of States with the necessary technical capabilities to take the step of incorporating nuclear weapons into their security doctrines. A scenario of nuclear multipolarity, within a context of international strategic tension and instability, would increase the risk of nuclear use to much higher levels than in the Cold War, where the duopoly in practice of the United States and the Soviet Union allowed for strategic stability. And all of this without the guardrails of a solid institutional architecture.

2.3 Managing the crisis

The very high risks posed by the worst-case scenario (deepening crisis) to maintaining international peace and security create incentives to avoid falling into it. Therefore, the most likely scenario is one in which the international nuclear non-proliferation and disarmament architecture does not break the deadlock in which it finds itself, but a minimum institutional framework remains in place to manage the crisis.

Within this scenario, at the multilateral level, the NPT would remain the centrepiece of the architecture. Regardless of whether the 2026 Review Conference reaches a consensus document or not, the review cycles will continue to provide a forum for States Parties to engage in dialogue on nuclear issues, which would enhance transparency. The IAEA would also continue to fulfil its verification mandate under the NPT by implementing safeguards agreements and the Additional Protocol, thereby helping to detect and prevent undeclared military nuclear programmes. Even with an NPT in crisis, the IAEA has demonstrated its ability to prevent nuclear proliferation. Although the CTBT has

not yet entered into force, its Preparatory Commission and the International Monitoring System will be essential instruments for maintaining the moratorium on nuclear testing. Both in the case of the IAEA and the CTBT, their advanced verification capabilities make it virtually impossible for a country to develop a nuclear weapon without detection. It must therefore be a priority not to only maintain support for both organisations, but also to strengthen them so they may continue to fulfil their mission, especially when other elements of the architecture are in crisis.

From the perspective of nuclear-armed States, regardless of the degree of existing institutionalisation, the key is to keep channels of communication open. The non-extension of New START, while serious, can be compensated with the continuation of the US-Russia strategic dialogue and even with an understanding whereby both sides apply voluntary limits to their nuclear arsenals. Maintaining the P5 dialogue, albeit at a technical level, will continue to have value as a forum for creating some level of transparency.

Ultimately, the most likely scenario leads to a much more fragile system, with a greatly weakened institutional structure and based largely on voluntary measures, even if this is sufficient to maintain a certain stability and, above all, preserve the taboo on nuclear use.

Conclusions

Since its establishment, the current international disarmament and non-proliferation architecture has achieved great success in limiting the number of States that currently have nuclear weapons in their arsenals. However, in recent years and mainly due to the growing security crises, this architecture is being strained, and questions are beginning to arise regarding its survival.

Given this uncertain future, and regardless of the different scenarios analysed, there is a clear trend towards a progressive weakening of the international architecture of arms control, non-proliferation and nuclear disarmament.

This situation should lead, in the first instance, to making every effort to maintain the current regime, always through realistic and progressive proposals that consider the current security context. The lack of transparency, rearmament programmes and modernisation of nuclear arsenals by some of the P5 countries,

especially Russia and China, attack the basis of the agreements reached in the NPT. But the answer must be to continue to focus on gradual processes, as the search for shortcuts, however laudable the intentions of their advocates, may contribute to eroding the system.

However, the international security situation does not permit completely ruling out a collapse of the system. In this case, it will be necessary to devise ad hoc measures, such as those outlined above, to maintain a minimum of stability to prevent the use of nuclear weapons, in the absence of an institutional structure.

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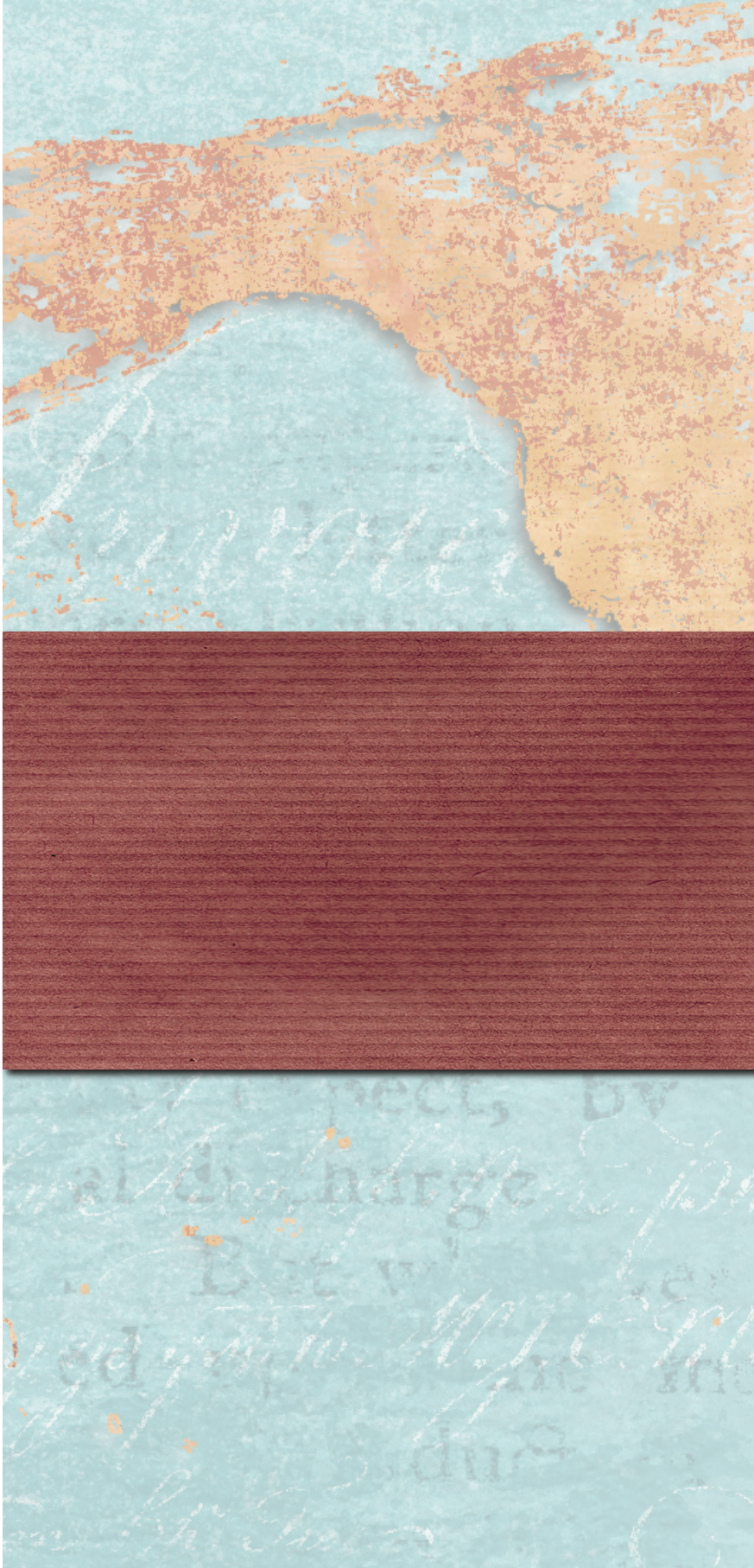

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