Journal of the Spanish Institute for Strategic Studies
ISSN-e: 2255-3479

Dmitri Sergueyevich Amirov Belova
Graduated in Political Science and Law. Pablo de Olavide University. Mastering in Peace, Security and Defence

E-mail: dmitriamirovbelova@gmail.com

Tactical Nuclear Weapons: History, State of Matter, Armaments, and Strategies of the Major Nuclear States

Abstract

From the early days of the US-Soviet nuclear arms race to the present day, Tactical Nuclear Weapons (TNW) have been a source of concern and analysis by academics and experts. However, the unquestionable opacity from the possessor States and theoretical doubts about their very existence as 'tactics' make this a particularly complicated and obscure pomological subject. This article traces the history of TNW during its three nuclear eras (1950s-1980s, 1990s-mid-2010s, and the present), establishes its theoretical state of art, the amount and type of tactical nuclear armaments of various countries (some of them *de facto* nuclear states), and finally, sets out the challenges and possible trends in the near future.

Key words

Tactical Nuclear Weapons (TNW), United States, Russia, Pakistan, India, Israel, China, North Korea, deterrence, TPNW.

Cite this article:

SERGUEYEVICH, DMITRI. "Tactical Nuclear Weapons History, State of Matter, Armaments, and Strategies of the Major Nuclear States". Spanish Institute for Strategic Studies Journal. 2021, issue 17, pp. 547-584

Introduction

Since the first and only use of the atomic bomb in a military conflict at the end of World War II, the strategic concepts of the major and middle powers have had to adapt to a new era in military strategy and warfare. In this, weapons of mass destruction were both a threat and a deterrent to the adversary, with nuclear weapons playing a key role in both.

Atomic weapons are known for their deterrent and highly destructive capabilities, but they have evolved in two ways over the past seventy-six years. The first of these refers to (i) their destructive capacity (21 kilotons of the Fat Man versus 50 megatons of the Tsar Bomba, the most destructive bomb ever created), (ii) the origin of the explosion (fission or "A" bombs versus fusion or "H" bombs), as well as (iii) the mechanisms for firing the device (such as cruise missiles launched from land vehicles, submarines, or aircraft bombs) – delivery vectors.

All these advances have developed the strategic capabilities of nuclear weapons, and therefore the capabilities of nuclear states, and have been the subject of various treaties such as the Non-Proliferation Treaty (NPT), which celebrated its 50th anniversary in 2020, or the START nuclear arms reduction treaties, especially during the Cold War and between the two major nuclear powers: the United States and the Soviet Union (later the Russian Federation).

However, this has not been the only dimension in which military nuclear technology has developed. For decades now, the possibility of creating weapons closer to conventional weapons, but of a nuclear type, has also been envisaged, which would be the second evolutionary dimension. Such weaponry would be described as "tactical" by experts, defence departments and the press, although from the beginning (even in the 1950s) there was a still-developing debate about the concept itself. The problem is that the use of nuclear weapons, even assuming that low-yield[1] (as opposed to high-yield) operational nuclear weapons could be developed in a "tactical" manner, is considered by some to be impossible due to the very nature of the weapon, both in terms of its destructive capacity in relation to the delivery device and the radiological dimension of the weapon[2].

The classical division in strategic studies between the tactical and the strategic, already well defined by von Clausewitz: "[T]actics, the theory of the employment of troops in combat; and strategy, the theory of the employment of combatants for the

1 Scale measuring the size of the nuclear explosion with its equivalent in tonnes of TNT [or terajoules (TJ)], although this is approximate, due to the Fermi problem. There is also a yield-weight scale that compares the explosion with the weight of the nuclear weapon.

2 Nuclear weapons have an impact that can be divided into four parts: the blast wave from the explosion; the heat pulse; the ionising radiation; and the electromagnetic pulse (EMP).

purpose of war[3].” Clearly, these concepts have evolved, adding the operational level, and adapting to new technological realities and different theatres of operations. Even so, we can understand for this article that a “tactical” nuclear weapon would have a potential to be used as a means to achieve objectives in low to medium scale operations, i.e. “battles”, properly speaking.

Thus, these weapons would not, *sensu contrario*, be “strategic” in nature, or in other words, their mere existence would not affect the outlines of the strategic plans of both the holder and the adversary. This evident and aforementioned clash between the nature of a nuclear device and the definitions that are usually used as “tactical”, generate today problems such as its inclusion or omission from the “official” arsenals of the States, among many other problems.

In any case, the nuclear devices that are usually described as tactical nuclear weapons refer mainly to short-range ballistic missiles (SRBMs) or intermediate-range ballistic missiles (IRBMs or MRBMs), although other types of weaponry have even been developed. The problem is that due to technological difficulties, the limits of international law on “strategic” weaponry, as well as the interest of states in keeping their non-strategic capabilities secret, tactical nuclear weapons suffer from a major difficulty in their study, due to a lack of transparency and universally accepted definitions.

Indeed, this is the case, as established above, to the extent that some consider that such weapons do not really exist, as the possession, stationing, and use of nuclear weapons are always of strategic importance[4]. The Russian academy itself also discusses the extent to which nuclear weapons can be merely tactical, specifying, for example, that the atomic bombs dropped on Hiroshima and Nagasaki (16 kilotons from Little Boy, 23 from Fat Man), although not particularly destructive compared to later warheads, had a strategic result: to take the Japanese Empire out of the war[5]. For its part, the 2020 Nuclear Matters report notes that:

> “At the beginning of the nuclear age, the US nuclear weapons programme focused on producing enough nuclear material to build enough weapons for a second-strike – the ability to strike after absorbing a total first strike – as well as deploying weapons on nearly every type of military delivery system available, including nuclear depth charges and nuclear artillery shells. By 1967, the United States had more than 30,000 nuclear weapons in its arsenal. Many of them were “tactical”: non-strategic nuclear weapons of lower range and low-yield. The United States relied on nuclear

3 VON CLAUSEWITZ, Carl. *De la Guerra*. Barcelona: Ediciones Obelisco, 2015, p. 93.

4 SCHOGOL, Jeff. “Why there’s no such thing as ‘tactical’ nuclear weapons”. *Task & Purpose, 19/09/2020*. https://taskandpurpose.com/analysis/no-tactical-nuclear-weapons/ Accessed: 24/03/2021.

5 BELOUS, Vladimir. “Las armas nucleares tácticas en las nuevas condiciones geopolíticas”. In *Centro de investigación político-militar del MGIMO*, 2000. http://eurasian-defence.ru/?q=node/23371 Accessed: 24/03/2021.

> weapons as the only means available to counter the dominance of Soviet conventional forces, particularly in Europe"[6].

According to this report, which has been quoted in many editions, from the beginning there was a need for TNWs as mass weaponry in order to be able to respond to a Soviet offensive in Western Europe. Massive, because the conquest or destruction of the European nerve centres would not be sufficient to neutralise Soviet second-strike capability.

Thus, the subject of this article is the study of tactical nuclear weapons, a concept that we intend to approach using various definitions used by authors and reference websites in studies on the control and proliferation of weapons of mass destruction.

According to the *Nuclear Threat Initiative*'s glossary, tactical nuclear weapons (TNW) are "short-range nuclear weapons, such as artillery shells, bombs and short-range missiles, deployed for use in battlefield operations". Whereas a strategic warhead would be "A high-yield nuclear warhead placed on a long-range delivery system, such as a land-based intercontinental ballistic missile [hereafter ICBM], a submarine-launched ballistic missile [SLBM] or a strategic bomber"[7].

On the other hand, in a more explicit definition, Millar described TNWs for the *Arms Control Association* as follows:

> "The definition of 'tactical' or 'sub-strategic' nuclear weapons is somewhat tenuous and can include many criteria, such as range, yield, target, national ownership, delivery vehicle and capability. For the most part, tactical nuclear weapons have a lower explosive power than strategic nuclear weapons and are generally intended for use on the 'battlefield' against enemy forces, not against enemy cities or strategic nuclear forces. Tactical nuclear weapons include a wide range of devices, from so-called nuclear landmines and nuclear artillery shells to air- and missile-launched nuclear warheads. Its yield can be relatively low (0.1 kilotonne), equal to that of the bombs dropped on Hiroshima and Nagasaki (15-20 kilotonne), or very large (1 megaton)"[8].

Finally, Tulliu and Schmalberger, in their dictionary on arms control, disarmament and confidence-building for the United Nations Institute for Disarmament Research,

6 U.S. OFFICE OF TH DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR MATTERS. *Nuclear Matters Handbook 2020*, p. 4. https://fas.org/man/eprint/nmhb2020.pdf Accessed: 24/03/2021.

7 JAMES MARTIN CENTER FOR NONPROLIFERATION STUDIES. Glossary. In Nuclear Threat Initiative, 2021. https://www.nti.org/learn/glossary/#tactical-nuclear-weapons Accessed: 24/03/2021.

8 MILLAR, Alistair. The Pressing Need for Tactical Nuclear Weapons Control. *Arms Control Today*, June 2002. https://www.armscontrol.org/act/2002-05/features/pressing-need-tactical-nuclear-weapons-control Accessed: 24/03/2021.

distinguish between the two types of armaments. Strategic nuclear weapons (SNW), on the one hand, would be:

> "Nuclear weapons designed to strike major enemy targets at very long ranges, usually intercontinental. They are usually designed to threaten the enemy's strategic nuclear forces and related infrastructure, as well as the population and industrial centres. Strategic nuclear weapons are generally carried by long-range ballistic missiles. See also intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs)"[9].

For their part, the TNWs would be:

> "Nuclear weapons designed to engage enemy targets on the battlefield at close ranges. They are typically used to attack enemy conventional forces on the front line and their related structure. For this reason, tactical nuclear weapons are sometimes called battlefield weapons. TNWs are delivered by short-range ballistic and cruise missiles, fighter-bomber aircraft and/or long-range artillery"[10].

Objectives, hypotheses and methodology

The objectives of this article are to establish the status of the issue of TNW after a historical review, to analyse which states may have them and what weapons they possess, the disarmament measures that have been taken (and whether these have been agreed), to determine their importance in the national security strategies of states, and to infer why these weapons are systematically left out of negotiations, as well as the weight of the two most important nuclear states in relation to this legal absence.

The hypotheses to be tested are:

I. The existence of conventional (delivery systems capable of carrying low-yield nuclear payloads) and/or purely nuclear weapons both during the Cold War and today, which can be used in conflict situations as "tactical" nuclear weapons. Their dimensions will be the state of play, typology and current armaments.
II. Tactical nuclear weapons have been systematically left out of the major non-proliferation and arms reduction treaties and have been excluded from the negotiations, and there is manifest ambiguity among the nuclear powers about this weaponry, especially on the part of Russia and NATO.

9 Tulliu, Steve and Schmalberger, Thomas. *En buenos términos con la seguridad: diccionario sobre control de armamentos, desarme y fomento de la confianza*. Instituto de las Naciones Unidas para la Investigación sobre el Desarme, 2003, p. 121. https://www.files.ethz.ch/isn/92883/Full-text_ES.pdf Accessed: 24/03/2021.

10 Tulliu, Steve and Schmalberger, Thomas. Ibid.

III. The only significant period of tactical nuclear arms reductions has involved unilateral reductions, never linked to the NPT, START, or the Treaty on the Prohibition of Nuclear Weapons (hereafter, TPNW).
IV. We are at the dawn of a third era for tactical nuclear weapons, following the interregnum of US global hegemony, which will be characterised by vertical and horizontal proliferation, hybrid threats and the ambiguity of state-of-the-art delivery systems.

The method is *eclectic* (both classical, study of legal documents – international treaties – and specialised reports and articles relating to the types of weapons under study), and experimental, comparative analysis of the actions of *de jure* and *de facto* nuclear states in terms of their arms race.

In terms of methodology, the starting point will be the Systemic Approach of (i) Richard Brody, based on Guetzskow, in his study of the effect on systems of the dispersion of nuclear technologies; and (ii) John Herz, in his conception of nuclear deterrence as a long-term destabilising factor, as well as Patrik Morgan, Daniel Rajmil and Guillem Colom, in relation to nuclear deterrence on a historical and contemporary level.

Variables to be considered: (1) Conventional (or nuclear-only) armaments that can be used as support devices for using nuclear weapons of relatively low destructive (hence "tactical") power; (2) definition of which nuclear-weapon states have such armaments; (3) attempts to include them in international treaties; (4) factors preventing their entry.

The State of Play of Tactical Nuclear Weapons: Background and News

The history of tactical nuclear weapons (also called non-strategic or sub-strategic nuclear weapons) can be traced back to the very beginning of the Cold War.

In the early 1950s, the Americans developed the first nuclear-capable weapons considered tactical: the M-65 *Atomic Cannon* (the only artillery piece to have fired an officially known nuclear warhead projectile) and the M-31 Honest John rocket, to counter the Soviet advantage due to their proximity to the heart of the European continent, and the need to ensure the protection of their allies in the event of a possible conflict with the USSR[11].

In other words, the Americans began to deploy these weapons as measures to defend their allies against a possible invasion, although their position on the old continent has an undeniable component of reinforcing their *First Strike Capabilities*. This

11 FRÍAS SÁNCHEZ, C. J. Perspectivas de la proliferación nuclear en Estados Unidos, Rusia y China. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 35.

means the power to eliminate an adversary's retaliatory capabilities through a massive attack on its nuclear assets[12].

> "TNWs have a shorter range than SNWs, but the most important difference is that their purposes are different from those of SNWs, as they are intended to be used on the front and back lines for the purpose of winning local battles. SNWs are by far the largest component of the nuclear arsenal of countries officially possessing nuclear weapons. However, they are difficult and expensive to manufacture and maintain and, since the end of the Cold War, their numbers have been dramatically reduced"[13].

Russia, for its part, realising that, in the event of conflict, NATO would use tactical nuclear weapons on the battlefield (which it had in the first place) rather than risk a global thermonuclear war, also equipped its military with such weapons. This logic applies to both the Soviet and later periods[14]. Thus, one can speak of a first era of NPT emergence and proliferation, from the 1950s to the end of the Cold War in the mid to late 1980s, and, although this period covers the *Dètente* (1969-1979), none of the political outcomes related to this détente between the two superpowers (such as the Non-Proliferation Treaty, hereafter NPT) implied a change in the proliferation or maintenance of tactical nuclear weapons, as a fundamental element of *First Srike*'s capability.

Several types of devices were developed during the First Cold War (1945-1969), and not only projectiles intended to be fired as medium- and long-range missiles (B-57, B-61, or Red Beard). In fact, it is known that NATO, mainly by the United States and the United Kingdom, has developed several projects in this direction. From the late 1950s to the 1980s, the Americans developed six types of nuclear mines (or tactical explosives) (a group of weapons known as *Atomic Demolition Munition*), including the last two models, the MADM*(Medium Atomic Demolition Munition*), with a yield of between 1 and 15 kilotons, and the SADM *(Special Atomic Demolition Munition*), with a yield of less than one kiloton thanks to the use of the W-54 warhead. This same type of warhead would be used by another tactical nuclear weapon, the David Crokett nuclear rocket launcher, which had a yield of around 0.02 kilotons. Other devices were the W-7/ADM-B (1954-1967), the T-4 (1957-1963), the W-30/TADM (1961-1966), and the W-31/ADM (1960-1965)[15].

12 Tulliu, Steve and Schmalberger, Thomas. *En buenos términos con la seguridad: diccionario sobre control de armamentos, desarme y fomento de la confianza*. Instituto de las Naciones Unidas para la Investigación sobre el Desarme, 2003. https://www.files.ethz.ch/isn/92883/Full-text_ES.pdf Accessed: 24/03/2021.

13 Tulliu, Steve and Schmalberger, Thomas. *Op. Cit.*, pg. 85.

14 FRÍAS SÁNCHEZ, C. J. Perspectivas de la proliferación nuclear en Estados Unidos, Rusia y China. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 46.

15 BIRD, Matthew. "Nuclear History Note US Atomic Demolition Munitions 1954-1989". In *The RUSI Journal*, No. 153:2, 2008, p. 64. DOI: 10.1080/03071840802103306.

For their part, the British began to develop (but did not implement) the *Blue Peacock* project, which would involve laying atomic mines in northern Germany, which would not only destroy "the infrastructure and facilities of a large area, but would deny an enemy occupation of the area for an appreciable time because of contamination"[16].

During the Korean War, which followed the end of the US nuclear monopoly, the Truman administration considered the "tactical" use of nuclear weapons, which were as yet unsophisticated. However, for both political reasons, such as a likely loss of UN support, and technical reasons, given the widespread doubt about the use of such weapons in tactical environments without causing extensive indirect human and material damage, the possibility was ruled out. Even so, this conflict and the end of the nuclear monopoly would lead to a race to develop nuclear weapons that could be used in tactical operational environments, thus more sophisticated than strategic bombs[17].

During another of the tensest periods of the Cold War, the Cuban Missile Crisis, the United States deployed tactical B-61 nuclear bombs to the Republic of Turkey and other NATO countries, bombs that were not part of the agreements to resolve the crisis. That is, the agreements that channelled it included the Soviets withdrawing the R-12 [SS-4 *Sandal*] and R-14 [SS-5 *Skean*] medium-range ballistic missiles (MRBMs) (the NATO designation of the equipment mentioned has been added to the quotation in square brackets), while the Americans did not withdraw their tactical nuclear weapons from Turkey, a country bordering the USSR. These 50 B-61 tactical bombs have remained at the Incirlik air base in Incirlik[18].

Within this period, until the late 1970s and early 1980s, the USSR lagged behind the Atlantic Alliance in terms of tactical nuclear arsenal, something that was to change further from that time onwards[19].

The quantity and, above all, the composition of the Soviet and Russian non-strategic nuclear arsenal is much more difficult to analyse than that of NATO due to the lack of transparency on the part of its administrations, although it has been demon-

16 WILSON, Jamie. "Nuclear mines 'to stop Soviets'. Cold war plan to bury atomic bombs in Germany". In *The Guardian*, 17/07/2003. https://www.theguardian.com/uk/2003/jul/17/world.jamiewilson Accessed: 24/03/2021.

17 CALINGAERT, Daniel. "Nuclear weapons and the Korean War", *Journal of Strategic Studies*, No. 11:2, 1988, pp. 181,182, 186-188, 200. DOI: 10.1080/01402398808437337

18 SANGER, David E. "Trump Followed His Gut on Syria. Calamity Came Fast". *The New York Times*, 14/10/2019. https://www.nytimes.com/2019/10/14/world/middleeast/trump-turkey-syria.html Accessed: 24/03/2021. KRISTENSEN, Hans M. "Urgent: Move US Nuclear Weapons Out Of Turkey". On *FAS.org*, 16/10/2019 https://fas.org/blogs/security/2019/10/nukes-out-of-turkey/ Accessed: 24/03/2021.

19 GRIGORIEV, Alexei Iu. "Evolution of the status of the US tactical nuclear arsenal in Europe". In *Almanac of Modern Science and Education*, 2014, No. 5-6, 2014, p. 61.

strated that the USSR developed such weapons and deployed them in virtually all Warsaw Pact satellite states[20].

According to Belous, as a result of the deployment of both tactical and strategic nuclear warheads in Europe and the concentration of US troops on the continent:

> "Strong measures were taken to create and deploy numerous types of [TNWs]. This led to the arrival of the Scud [SS-1c *Scud B*], Frog, Moon*[Frog* and *Frog-M*] tactical missiles and the first nuclear-capable Su-7 fighter-bomber[Fitter-A] in the early 1960s. Later, the nuclear arsenal included RSD-10 [SS-20 *Saber*], R-12 [SS-4 *Sandal*], R-14 [SS-5 *Skean*] medium-range missiles, Tu-22 [*Blinder*], Tu-16 [*Badger*] medium-range bombers, OTR-22 [SS-12/SS-22 *Scaleboard*], OTR-23 [SS-23 *Spider*] operational tactical missiles, R-17 tactical missiles, Tochka [SS-21 *Scarab*], 152,203 and 240 mm nuclear artillery, Su-17 [*Fitter*], Su-24 [*Fencer*], MiG-21 [*Fishbed*], MiG-23 [*Flogger*] tactical aircraft and sea-based equipment" *[21].

At the height of the Second Cold War (1979-1980), in 1980, the Soviet Union had between 13,000 and 22,000 tactical nuclear weapons, while its counterpart, the United States, had 7,000 to 9,000[22].

The first period analysed in this article cannot, however, be considered to have been homogeneous in its tendency towards proliferation. In fact, by the end of the 1970s, NATO itself changed its nuclear arsenal strategy to one of downsizing and modernisation due to three factors: (i) the need to remove nuclear weapons from Europe without practical applications; (ii) to respond to new Soviet tactical nuclear weapons; (iii) and to the need to take an advantageous position vis-à-vis the USSR before signing an arms reduction treaty[23]. This shows an internal NATO trend towards what will be the next period, with a view to a possible reduction of tactical armaments through international treaties along the lines of START.

After the end of the conflict between the two superpowers, given the demise of the Soviet Empire, there has been a drastic reduction in the number of tactical nuclear

20 BELOUS, Vladimir. "Las armas nucleares tácticas en las nuevas condiciones geopolíticas". In *Centro de investigación político-militar del MGIMO*, 2000. http://eurasian-defence.ru/?q=node/23371 Accessed: 24/03/2021.

21 BELOUS, Vladimir. Ibid. The NATO designation has been added to the quotation in square brackets.

22 BELOUS, Vladimir. "Las armas nucleares tácticas en las nuevas condiciones geopolíticas". In *Centro de investigación político-militar del MGIMO*, 2000. http://eurasian-defence.ru/?q=node/23371 Accessed: 24/03/2021. DEUTSCHER BUNDESTAG. *Zu Fragen der Stationierung von taktischen Atomwaffen in Deutschland im Rahmen der nuklearen Teilhabe*, 2020. https://www.bundestag.de/resource/blob/702320/8ca6fb8cdd46ae43ae9fc16f14054e2e/WD-2-041-20-pdf-data.pdf Accessed: 24/03/2021.

23 GRIGORIEV, Alexei Iu. "Evolution of the status of the US tactical nuclear arsenal in Europe". In *Almanac of Modern Science and Education*, 2014, No. 5-6, 2014, p. 61.

weapons by the two nuclear superpowers. However, this reduction was not due to the START treaties, but were unilateral reductions parallel to these agreements. Specifically, Russia has reportedly reduced its capabilities by 75 per cent from 2000 to 2012, with 2,000 weapons that it considers nuclear and tactical, and maintaining that figure until 2018[24]. On the other hand, during this period the US withdrew its B-61 tactical bombs from the military bases at Araxos in Greece, Ramstein in Germany and Lakenheath in the UK[25]. *Atomic Demolition Munitions* were to be withdrawn from Europe in 1986 (and similarly from the Korean peninsula, according to official sources), while SADM devices (which were never deployed) were withdrawn from service in 1989[26].

The end of the Cold War thus ushered in a second era for the TNW, consisting of tactical nuclear arms reductions, which would last from the 1990s (or even from the 1980s, with the signing of START I) until around the mid-2010s or the present day.

This second period would accompany American hegemony in the world, an apparently growing role for public international law, and states' reliance on each other's international obligations. Even if the treaties concluded during this period did not end up including concrete measures relating to TNWs, a general tendency (implicit and more informal than legal) to promote the reduction of nuclear armaments as a whole can be observed. Even so, this trend never went beyond statements, telephone conversations, or press releases.

Despite the NPT being a first-rate legal tool to limit the proliferation (especially horizontal) of nuclear weapons,[27] the clear international disaffection with the Treaty after decades of no progress on TNWs (and the increase in horizontal proliferation), despite the relatively successful 2012 conference to establish a Nuclear Weapon Free Zone (NWFZ) in the Middle East[28] may have been one of the factors behind the creation and approval of the TPNW, which, unlike the former, does aim to prohibit, with the goal of their disappearance, all types of nuclear weapons, although, again, there is no explicit reference in the Treaty or its protocols to tactical nuclear weapons.

As Galán points out, while the adoption of the TPNW is not meaningless, it can hardly produce legal effects, particularly in relation to the major nuclear powers, on

24 DEUTSCHER BUNDESTAG. *Zu Fragen der Stationierung von taktischen Atomwaffen in Deutschland im Rahmen der nuklearen Teilhabe*, 2020, p. 14.

25 GOUYEZ BEN ALLAL, Anass. "La política nuclear de la OTAN: la amenaza de las armas nucleares tácticas para la seguridad internacional y el régimen de no proliferación nuclear". In *Paix et Sécurité Internationales-Journal of International Law and International Relations*, No. 02, 2014, p. 70. https://doi.org/10.25267/Paix_secur_int.2014.i2.04.

26 BIRD, Matthew. "Nuclear History Note US Atomic Demolition Munitions 1954-1989". In *The RUSI Journal*, No. 153:2, 2008, p. 67. DOI: 10.1080/03071840802103306.

27 ORTEGA GARCÍA, Julia. "Proliferación Nuclear en el siglo XXI". In Spanish Institute for Strategic Studies, Framework Document, April 2016, p. 5.

28 ORTEGA GARCÍA, Julia. *Op. Cit.*, pp. 11, 12.

the one hand, to various international organisations such as the Atlantic Alliance, which considers nuclear weapons as "indispensable to maintain peace", and finally, to the evident intention of several states to acquire nuclear weapons for their own regional deterrence policies[29]. It is especially clear that if NATO does not review its nuclear deterrence posture, the future of the TPNW could easily go the way of the NTP.

The Nuclear Matters 2020 report divides the history of nuclear weapons into three eras: the first is from 1945 to 1992, as the Cold War Era; the second, from 1992 to 2018, as an Era of legacy management and disarmament in the *Pax Americana*; and a third, incipient phase from 2018 to the present, as the Era of rearmament, modernisation, the introduction of cyberspace as a military domain, and multipolar competition[30].

The question arises as to whether there is a paradigm shift in terms of TNW, and thus a third stage, or whether, due to ambiguity or omission regarding these weapons since the beginning of the nuclear era, we are still in a second stage, albeit an evolved one, with new elements such as cyberspace and new delivery systems or more advanced missiles (aircraft such as Mig-29 *[Fulcrum*] or Su-27*[Flanker*] or battleships).

Thus, we could have launch systems and missiles that in principle would be "neutral" (they may or may not carry nuclear warheads), such as the super and hypersonic missiles[31] X-90 [AS-X-21], 3M22 Zircon [SS-N-33], 3M-54 Kalibr [SS-N-27 *Sizzler*] or some of the famous Iskander [SS-26 *Stone*]. Many, if not all, of these could be defended by their respective administrations as conventional short-, medium- or long-range missiles, but they are nonetheless capable of carrying low-yield nuclear devices. This will be dealt with later.

In any case, despite the enormous non-proliferation importance of multilateral treaties such as the NPT and TPNW, the trail of TNWs must be traced more through *omissions* in US-Russian bilateral treaties, unilateral reductions, and the (usually ambiguous in this respect) security strategies of the de facto nuclear powers.

TNWs and the theory of deterrence

Deterrence is one of the fundamental elements in strategic studies of nuclear weaponry, and while its full history and theoretical development could well occupy an en-

29 GALÁN, Elena C. Díaz. Tratado sobre la Prohibición de las Armas Nucleares (TPAN): un paso más en la ilicitud del empleo del arma nuclear. *RESI: Revista de estudios en seguridad internacional*, 2019, vol. 5, issue 2, p. 52-53.

30 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, pp. 3-7. https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF Accessed: 24/03/2021.

31 The former exceed the speed of sound, while the latter are new generation missiles that exceed the speed of sound by at least 5, i.e. reach a speed of Mach 5.

tire article, this concept should be mentioned as it is one of the keys to the behaviour of nuclear states.

Morgan points out that deterrence is both a tactical element of national security strategy and a component of international system security[32]. On the other hand, as Colom points out, deterrence would rest fundamentally on capacity (nuclear), credibility (of use) and communication (assumptions of deterrence)[33], and while there are:

> "(...) multiple ways of defining deterrence, there is broad consensus in recognising that its main purpose is to discourage a potential aggressor from disrupting the *status quo* by demonstrating one's capabilities and the determination to use them. As opposed to *compellence*, where one actor forces another to act in accordance with his or her claims, this persuasion is achieved by (...). Both strategies –indistinguishable in the Chinese conception *(weishe)*, which combines deterrence, persuasion and coercion, and complementary in the Russian vision of prevention *(sderzhivanie)* and intimidation *(ustrashenie)* – can be combined to exercise coercive diplomacy"[34].

According to Colom, the evolution of strategic security concepts and hybrid threats, including those from cyberspace, but also terrorist groups such as DAESH or Hezbollah, as well as the actions of states such as Iran or North Korea, has led to the evolution from an initial first and second wave (classic between the two great superpowers) to a fourth wave in deterrence theory, proposing a conjunction of classic deterrence theories between great powers with the inclusion of elements of "strategic culture – especially the role of national identity, historical tradition and military culture in deterrence and debates on the psychology of deterrence to elaborate specific models *for each actor, circumstance or scenario*"[35].

However, TNWs have not been considered as an object of study *per se* in the field of nuclear deterrence studies, although this does not imply that they were not present at the height of Cold War tensions, as Morgan reports on the Cuban missile crisis:

> "The US leaders did not fully understand Khrushchev's motives. They were very concerned that actions that killed even a few Russians could provoke an escalation. The Russians, for their part, worried about Castro, who had no qualms about starting a nuclear war and pushed for actions that would have made war more likely. The initial instructions to Soviet

32 MORGAN, Patrick M. Deterrence now. Cambridge University Press, 2003, p. 4.

33 COLOM PIELLA, Guillem. "Haciendo posible lo impensable: opciones selectivas, disuasión a medida y fallos en la disuasión nuclear (1974-1994)". *Revista española de ciencia política*, 2020, no 54, p. 126.

34 PIELLA COLOM, Guillem. Ibid.

35 PIELLA COLOM, Guillem. *Op. Cit.* p. 130. [italics added].

> forces in Cuba were to use their *tactical nuclear weapons* to *resist* a US invasion without prior approval. Eventually, Moscow realised that this was terribly dangerous and the instructions were withdrawn. The Americans, for their part, did not know of the existence of these weapons until well into the crisis, yet once they were discovered, the invasion plans went ahead"[36].

Later, in the most sensitive moments of Cold War II, there were strong internal pressures within the United States, as well as externally, both for and against "Extended Deterrence" (defined as "an attack against a second state that could be detrimental to the country's own sovereignty")[37], which implied proliferation of weapons of mass destruction in Europe. Thatcher's Britain supported strengthening the arsenal in Europe and maintaining an eventual conflict with the USSR on European territory, while Europe (especially Germany) was in favour of negotiating the reduction of conventional forces in Europe as well as the TNWs on the continent, in order to facilitate the end of Soviet power in Central and Eastern Europe[38].

However, the START treaties, together with the INF and the Conventional Armed Forces in Europe Treaty, as well as unilateral reductions in Russian and US tactical nuclear weapons, led to the end of the Cold War. Thus, returning to the fourth wave of deterrence studies, as Palomares and García point out:

> "Today, considering the rise of nuclear tensions in the Middle East and the proliferation of WMD, it seems obligatory to discuss deterrence theory and policies based on deterrence principles. This process appears subject to basic questions such as whether deterrence works or whether it has become an irrelevant guide to defence strategies, especially in some regional contexts, as in the case of the Middle East"[39].

Current TNW stockpiles and their role in security strategies

The analysis of Tactical Nuclear Weapons capabilities and stockpiles by actor will be structured. First, the big nuclear states, the US and Russia, then other relevant nuclear states, China, Pakistan and India, and, finally, two difficult-to-approach cases, Israel and North Korea.

36 MORGAN, Patrick M. Op. cit., p. 205. [italics added].

37 RAJMIL, Daniel. "NEAR EAST; NUCLEAR DISUASION AND DISUASION", Spanish Institute for Strategic Studies, No. 6 / 2015, p. 1-23.

38 PALOMARES LERMA, Gustavo and GARCÍA CANTALAPIEDRA, David. *Imperium. La Política Exterior de los Estados Unidos del Siglo XX al XXI*, Valencia: Tirant Humanidades, 2019, pp. 161, 162.

39 RAJMIL, Daniel. "NEAR EAST; NUCLEAR DISUASION AND DISUASION", *Spanish Institute for Strategic Studies*, Issue 6 / 2015, pp. 4, 5.

United States of America

The United States has an arsenal of TNW, which it calls *Non-Strategic Nuclear Weapons* that, while considerable during the Cold War, has been greatly reduced in recent decades[40].

The US tactical nuclear arsenal currently consists of 230 B61-3 and B61-4 bombs, 150 of which are located at six overseas military bases, namely Aviano and Ghedi in Italy, Büchel in Germany, Incirlik in Turkey, Kleine Brogel in Belgium and Volkel in the Netherlands. The remaining 80 are reportedly located at US bases. These bombs are designed to be dropped from the F-15E, F-16C/D, F-16MLU, and PA-200 fighters[41], although development of a new model of this bomb (B61-12) is apparently being finalised to replace the B61-3 and -4. This new version of the weapon would be equipped "with a guided tail kit that allows it to hit targets more accurately, meaning it could be used with a lower yield and potentially produce less radioactive fallout"[42]. In addition, work is underway to enable them to be used by fighters such as the *Eurofighter Typhoon*.

In terms of US nuclear security strategy, 2017 and 2018 are seen as a shift in direction towards rearmament and modernisation in the face of new threats, the major powers, including China and Russia, due to the loss of "the conventional arms superiority it enjoyed since the end of the Soviet Union"[43]. In fact, since the early 2010s there has been debate about the US intention to renew its *first-strike capabilities*[44], which would clearly coincide with this renewal of its tactical nuclear weapons.

The United States is at a clear disadvantage vis-à-vis Russia in the field of NPT, which it considers to be in flagrant breach of the INF Treaty (Intermediate-Range Nuclear Forces Treaty), both in terms of the number of such bombs and in terms of delivery systems. The 2018 *Nuclear Posture Review* includes a comparison according to which the United States has only one type of TNW, gravity weapons, compared to

40 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, p. 48.

41 KRISTENSEN, Hans M. I. US nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019a, p. 334. KRISTENSEN, Hans M. and NORRIS, Robert. S. United States nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018b, vol. 74, Issue 2, pp. 120-131.

42 KRISTENSEN, Hans M. I. US nuclear forces, p. 334.

43 FRÍAS SÁNCHEZ, C. J. Perspectivas de la proliferación nuclear en Estados Unidos, Rusia y China. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 40.

44 MORGAN, Patrick M. The state of deterrence in international politics today. *Contemporary Security Policy*, 2012, vol. 33, no. 1, pg. 91. https://doi.org/10.1080/13523260.2012.659589

Russia, which has 11 types, including torpedoes, SRBMs and air-to-surface missiles, among others[45].

It is striking, in any case, that the US sees itself as a reactive actor in the face of the Russian threat, without establishing a special role for TNWs in its security strategy.

> "Russia possesses significant advantages in its nuclear weapons production capabilities and non-strategic nuclear forces over the United States and its allies. It is also building a large, diverse and modern set of non-strategic systems that have a dual capability (they can be armed with nuclear or conventional weapons). These theatre and tactical systems are not eligible for the New START Treaty and Russia's modernisation of its non-strategic nuclear weapons is increasing the total number of these weapons in its arsenal, while significantly improving its delivery capabilities"[46].

With respect to NATO, taking into account the deployment of TNWs at US bases on the continent and the fact that there are two other *de jure* nuclear countries (France and Great Britain) in the Alliance, it is particularly striking that no doubt or formal opposition has been raised about the permanence of the current B61 and the future B61-12. The EU seems to be satisfied with this fact while seeking to advance its common defence policy, but neither in one area nor in the other has there been any reference to TNWs as a problem in their own right.

Russian Federation

Russia has an estimated 1875 operational non-strategic nuclear weapons, including nuclear warheads on submarines, various types of aircraft, ships, conventional missiles and air defence systems[47].

These would be distributed as follows: more than 900 TNWs would be in the possession of the navy (cruise, anti-ship, or anti-submarine missiles); some 500 warheads would be in the air force, to be used by Tu-22M3*[Backfire-C*], Su-24M*[Fencer-D*], Su-34*[Fullback*], MiG-31K*[Foxhound*], or the new Su-57*[Felon*]; about 400

45 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, 53. https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF Accessed: 24/03/2021.

46 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, 9. https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF Accessed: 24/03/2021.

47 KRISTENSEN, Hans M. II. Russian nuclear forces. in "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, p. 343.

would belong to the air, coastal and missile defence armies; and about 90 to the land army[48].

To a connoisseur of Russian history and strategic doctrine, this will be striking, as it appears to be a revolution in that Russia has always projected itself as a land power. Today, emulating the United States, the structure (at least quantitatively) of what are considered operational TNWs appears to be more that of a modern thalassocracy, with the navy and air force predominating.

There would also be some 2,000 TNWs in the process of decommissioning[49]. In fact, in the future, due to the modernisation process of Russian nuclear weaponry, the number will be reduced in favour of more sophisticated systems. As Podvig says:

> "The number of operational warheads deployed on strategic and non-strategic systems is unlikely to change significantly, as the deployment of new systems in the course of strategic modernisation will be balanced by the retirement of old warheads. The total number of warheads is likely to decrease in the coming years as Russia continues to dismantle its warheads. The current dismantlement rate is believed to be around 400-500 warheads per year (this number includes warheads that are being remanufactured)"[50].

Russia has been undergoing a decade-long process of military 'revolution', focused on modernisation and the abandonment of certain parts of the heavy Soviet legacy (in pomological terms: troop numbers, inefficiency, among others).

A central area of development has been new delivery vehicles based on new technologies, such as the *Avangard [SS-19 M4]* and Kh-47M2 *Kinzhal* [*Dagger* - probably a version of the *Iskander*] hypersonic missiles, Poseidon *[Kanyon*], an unmanned underwater vehicle powered by a nuclear reactor, and the *Burevestnik* [SSC-X-9 *Skyfall*] cruise missile. Russia is developing in the fields of air, ground and submarine-launched missiles.

The big issue is not what weapons the Russian Federation has that can be considered TNWs, but that, due to advances in delivery systems (delivery vehicles) and different devices, both conventional and nuclear, many weapons can be considered,

48 KRISTENSEN, Hans M. II. Russian nuclear forces. in "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, pp. 343, 344. KRISTENSEN, Hans M. and NORRIS, Robert. S. Russian nuclear forces, 2018. In *Bulletin of the atomic scientists*, 2018a, vol. 74, Issue 3, p. 186.

49 PODVIG, Pavel. "Russia". In PYLAK, Allison. & ACHESON, Ray. (2020). *Assuring Destruction Forever: 2020 edition*. Women's International League for Peace and Freedom, June 2020, p. 87.

50 PODVIG, Pavel. Ibid.

or not, as virtually Russian TNW arsenal. These include missiles (ballistic and cruise), torpedoes, or anti-aircraft missiles[51].

Several of Russia's missiles that can be considered as potential tactical nuclear weapons include, notably, the 9K79 *Tochka* [NATO: SS-21 *Scarab*]; 9K720 *Iskander-M* [SS-26 *Stone*]; 9M728 [*SSC-7*]; 9M729 [*SSC-8*]; 3M14 *Kalibr* [SS-N-30A]; 3M-22 *Tsirkon* [SS-NX-33]; *Tochka* [SS-21]; 3M-14 [*SS-N-30a*]; or the 3M-55 [SSC-5 *Stooge*][52].

Regarding the INF, Russia accuses the US of breaking the treaty by pulling out of it, although this legal wrangling is more of a kind of "smokescreen", so that both countries can be free of the treaty they signed in the Cold War, when China and other de facto nuclear powers did not exist as such. Russia states in its nuclear strategy that it will use its force in the event of nuclear aggression against the country or its allies, or if the existence of the Federation is threatened in a confrontation with conventional weapons[53].

The US perceives this military renewal as an almost existential threat, considering that Russia is far ahead of NATO in TNW due to its dual-capability systems and the ineffectiveness of the START agreements:

> "Moscow believes that these systems can provide useful options for gaining an escalation advantage. Finally, despite Moscow's frequent criticism of US missile defence, Russia is also modernising its nuclear-armed ballistic missile defence system and designing a new ballistic missile defence interceptor"[54].

People's Republic of China

China maintains a relatively modest role in the contemporary nuclear race, although it has a clear roadmap to modernise and improve its defensive capabilities, including in the field of nuclear weapons and delivery vehicles, with the aim of being a major military power by 2050[55].

51 FRÍAS SÁNCHEZ, C. J. Perspectivas de la proliferación nuclear en Estados Unidos, Rusia y China. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, pp. 50, 52.

52 FRÍAS SÁNCHEZ, C. J. Ibid., pp. 50-51. KRISTENSEN, Hans M. II. Russian nuclear forces. in "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, pp. 343-345.

53 FRÍAS SÁNCHEZ, C. J. *Op. cit.*, pp. 46, 47.

54 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, p. 9.

55 OFFICE OF THE SECRETARY OF DEFENSE. *Op. cit.*, p. 11.

By January 2020, China had around 320 nuclear warheads, up from 260 in 2015, evidence of their growing importance, as the People's Republic "is modernising and diversifying its nuclear forces as part of a long-term programme to develop a more robust and survivable deterrence posture, consistent with its nuclear strategy of assured retaliation"[56].

With regard to TNW, the problem is that, while there are known Chinese missiles capable of carrying a nuclear device, including land-based ballistic missiles such as the DF-4 [CSS-3] or DF-5B [CSS-4 *Mod 2*], or sea-based missiles such as the JL-2 [CSS-NX-14] or the H-20 [B-20], and even airborne means such as the H-6N, there is no evidence of Chinese tactical nuclear devices (or low-yield bombs)[57]. This is consistent with China's nuclear policy, which is reactive, renouncing the first strike. There has been speculation and doubt, however, based on the existence of bombs and bombers in Chinese military museums with "both strategic and tactical" capabilities, although these would be several decades old[58]. Likewise, China is known to have collaborated with Pakistan in the development of its nuclear programme[59], which also facilitates the emergence of reasonable doubt about China's inability to deploy non-strategic nuclear weapons.

In any case, it is clear that China has developed (and continues to develop) new intercontinental ballistic missiles (ICBMs), as well as:

> "A new multi-warhead version of its DF-5 silo-based ICBM, and its most advanced ballistic missile submarine armed with new submarine-launched ballistic missiles (SLBMs). It has also announced the development of a new nuclear-capable strategic bomber, giving China a nuclear triad"[60].

The Chinese scenario in relation to TNWs shows, as we have seen, ambiguity. However, we can virtually classify China as a nuclear power with TNWs. Evidence shows that China has among its capabilities the development or purchase of low-yield nuclear weapons, as well as delivery vehicles of various types (including medium- and long-range missiles). On the other hand, the People's Republic does not seem to be particularly interested, for now, in standing out in an area such as TNWs, its main ri-

56 KILE, Shannon. N. and Kristensen, H. S. V. Chinese nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019a, p. 354.

57 ZHANG, Hui. "China", in PYLAK, Allison. & ACHESON, Ray. *Assuring Destruction Forever: 2020 edition*. Women's International League for Peace and Freedom, June 2020, p. 31.

58 KRISTENSEN, Hans M. and NORRIS, Robert. S. Chinese nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018c, vol. 74, Issue 4, p. 293. DOI: 10.1080/00963402.2018.1486620

59 Torres Vidal, C. India y Pakistán, potencias nucleares de facto. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 135.

60 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, p. 11.

vals being India (for whose containment it collaborates with Pakistan), and the United States, with which, militarily, it competes for high technology in areas exogenous to nuclear weapons, for which there is already Russia.

In short, China is a state with a virtual tactical nuclear weapon, which it will develop if necessary, with likely efficiency and speed, due to the following factors:

I. While it does not appear to have TNWs at present, its acquisition and/or development is well within its technological and commercial capabilities;
II. Its geo-strategic partnership with Russia allows it to outsource the field of TNW in that country in competition with NATO;
III. Cooperation with Pakistan, a de facto nuclear power with TNWs (and a focus of horizontal proliferation), is evidence that China has had access to this type of weaponry, as its involvement in the Pakistani programme was crucial;
IV. Finally, China has not been a party to any of the nuclear capability limitation treaties (SALT, START, INF), and is recognised by the NPT as a legitimate nuclear weapons holder, so a reduction in its arsenal cannot be expected as a consequence of signing a multilateral treaty.

This coincides with its policy of bilateral trade and security agreements, ergo, only a bilateral agreement could force China to reduce its armaments, assuming they are made public.

Islamic Republic of Pakistan

Pakistan, a *de facto* nuclear power, possesses between 150 and 160 nuclear warheads and 3.5 tonnes of highly enriched uranium, and is expected to have between 220 and 250 warheads by 2025[61].

Pakistan's nuclear programme, and thus its nuclear capabilities, are developed *vis-a-vis* India, although it is India that tends to be more advanced, both because it tests earlier and because it has greater nuclear power. This may be a factor in Pakistan's development of nuclear missiles, with less technological capability than India, but with international support from countries such as China and North Korea, but also the US. Its position in the international technology (and nuclear) market is also relevant. Thus, Pakistan has focused on forcing nuclear deterrence on its neighbour by investing heavily in Tactical Nuclear Weapons, these being short-range tactical missiles armed with low-yield nuclear warheads (low-yield SRBMs).

61 Torres Vidal, C. India y Pakistán, potencias nucleares de facto. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 135. KRISTENSEN, Hans M. and KILE, Shannon. N. VII. Pakistani nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, p. 368.

As can be easily deduced from the type of missiles in question, the purpose of these weapons would be defence in a military conflict with India, and it can be deduced that the mission of these weapons would be a second-strike response to an Indian aggression, given the operability and small size of the nuclear warheads, apparently of a tactical nature[62]. Clearly, first-strike use at strategic points in India cannot be ruled out either. In this regard, Barry also points out that:

> "Over the past decade or so, Pakistan has focused considerable energy and resources on the development of tactical nuclear weapons, in particular the short-range ballistic missile *Nasr*. This has been driven by the belief that India has a doctrine for rapid ground attacks on Pakistan, known as "Cold Start"[63], and that India's capacity to carry out such an operation is increasing"[64].

On the other hand, Pakistan has no formal nuclear doctrine, so it is unclear in which cases it will decide to use its weaponry, and whether it is of a first or second-strike nature. While it is true that the Islamic Republic has expressed the threat of using nuclear weapons if the existence of the Pakistani state "were at stake"[65].

Moreover, the great concern for the US administration (and much of the international community) from 2007 until the Trump era has been the possible theft (or simple trespassing) of the TNWs by terrorist groups, although Pakistan has reiterated that penetration of its "sophisticated facilities" is impossible[66].

Among the missiles available to Pakistan that could be considered low-yield weapons if the nuclear device were sufficiently low-yield (between 5 and 10 kilotons, in these cases) are the Hatf-2 [US: *Abdali*]; Hatf-3 [*Ghaznavi*]; *Hatf-4* [*Shaheen-I* et seq]; especially *Hatf-9* [*Nasr*]; and *Hatf-7* [*Babur* GLCM][67].

As no TNWs have yet been deployed in combat or training operations, this remains somewhat speculative, although it is clear that Pakistan has developed nuclear weapons faster than any other country in the world, tactically, operationally and strategically[68].

62 Torres Vidal, C. *Op. Cit*, p. 135.

63 Indian military doctrine in the event of conflict with Pakistan based on an "integrated" battle group offensive that avoids the use of nuclear weapons by the opponent.

64 BARRY, Ben. "Pakistan's Tactical Nuclear Weapons: Practical Drawbacks and Opportunity Costs". In *Survival*, Issue 60:1, 2018, p. 75. DOI: 10.1080/00396338.2018.1427365.

65 Torres Vidal, C. *Op. Cit*,. p. 136.

66 Torres Vidal, C. *Op. Cit*,.p. 137.

67 KRISTENSEN, Hans M. and KILE, Shannon. N. VII. Pakistani nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, p. 372.

68 KRISTENSEN, Hans M., NORRIS, Robert. S. and DIAMOND, Julia. Pakistani nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018, vol. 74, No. 5, pp. 349-352, DOI:10.1080/00963402.2018.1507796.

Republic of India

India, because it is not a *de jure* but a *de facto* nuclear state like its neighbour (and strategic rival) Pakistan, has not announced the number of nuclear warheads it possesses, although it is estimated to have at least 130-140 warheads, plus 600 kilograms of ready-to-use plutonium, which is apparently the basis for its warheads[69].

India's nuclear weapons (which Kristensen and Kile count at 150, based on their own calculation) are mainly spread over airborne systems, such as the *Mirage 2000H* and Jaguar *IS* (48 between them) as well as land and sea-based ballistic missiles, including the *Prithvi-II* (with a yield of 12 kilotons), or the *Agni I to V* series, with yields from 10 to 40 kilotons, among others[70].

The very nature of these weapons, whose estimated minimum yield is 10 kilotons, as well as the *raison d'être* of the Indian nuclear programme, makes it difficult to speak of Indian tactical nuclear weapons *stricto sensu*, as is the case with the United States *(motu proprio* and objectively), Russia (objectively) and Pakistan (as announced by the Muslim country itself).

However, India's ambiguity in dealing with its nuclear policy contrasts with its superiority vis-à-vis Pakistan, in that its missiles are more powerful and its nuclear programme more advanced.

> "India's nuclear doctrine is evolving to accommodate new regional and global strategic scenarios, and to respond to immediate national security priorities: Pakistan's growing nuclear arsenal and tactical nuclear capabilities, as well as China's evolving nuclear doctrine and capabilities. Despite the fact that all India maintains a deliberate ambiguity about the actual use of its nuclear weapons, it has neither reviewed nor modified its nuclear doctrine since 2003"[71].

The case of India indicates that, at least for the moment, and according to the information available through OSINT sources, it is not a state with a relevant TNW capability, although there could be a premeditated concealment of capabilities thanks to the collaboration of an external actor (Russia or the United States). However, the

69 Torres Vidal, C. India y Pakistán, potencias nucleares de facto. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 126.

70 KRISTENSEN, Hans M. and KILE, Shannon. N. VI. Indian nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019a, pp. 362-365. KRISTENSEN, Hans M. and KORDA, Matt. Indian nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, No. *74*(6), 2018, p. 362.

71 Torres Vidal, C. India y Pakistán, potencias nucleares de facto. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 127.

complicated geopolitical relations in the region do not help to foresee India's nuclear *iter* in the short to medium term, except for the need to counter Pakistan's tactical capabilities, and strategically, China's.

Other actors

Israel

Israel's nuclear programme and weaponry are a *necessary* element of Israel's security concept, given its geopolitical situation, so it is not surprising that from the outset, Israel has made every effort to develop a powerful nuclear arsenal to deter rival states and reduce the possibility of new Arab-Israeli wars.

Israel has also intervened abroad to prevent the development of nuclear programmes in rival states, such as Iraq, Syria (Deir al-Zour nuclear reactor, 2007), and Iran (Stuxnet, Flare). This is because Israel has for decades maintained the so-called "Begin Doctrine", which implies that Israel will not allow any hostile regional actor to acquire a nuclear capability that can be used against the Hebrew state[72].

It should be noted that there is indeed a regional consensus to establish a nuclear-weapon-free zone as a result of the TPNW, as Rajmil points out:

> "The Nuclear Weapons Ban Treaty, like the proposed NWFZ, has gained general regional consensus, albeit disturbed by opposition from Israel and Turkey. In this regard, the Arab Group has used its majority to impose diplomatic pressure on Israel's policy of nuclear opacity and to establish the TPNW as a complement to existing legal instruments"[73].

Israel is among the *de facto* nuclear states, having signed neither the NPT nor the TPNW, since giving up nuclear capability could be seen as suicide for the state, given that adversaries such as Iran aim to eliminate it.

The Hebrew state went from ambiguity about its nuclear *capabilities* to outright opacity, neither denying nor affirming the size and potential of its arsenal, as a form of psychological deterrence for its adversaries. This is the well-known "amimut" doctrine[74].

All this makes it very difficult to deal with Israel's nuclear arsenal through OSINT sources, as very little is confirmed, and, as the doctrine claims, much is speculation,

72 CASTRO, José Ignacio. "Israel y la postura «amimut». In Garrido, Vicente". (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 176.

73 RAJMIL, Daniel, et al. "The Middle East challenge to the Nuclear Weapons Ban Treaty". *Revista de Estudios Internacionales Mediterráneos*, 2020, no 28, p. 104-120. http://dx.doi.org/10.15366/reim2020.28.006

74 CASTRO, José Ignacio. *Op. Cit.*, p, 17

especially after the damage of the "Obama Doctrine" regarding the recognition of Iran as a regional actor – promoting multilateralism in the Middle East[75] – against which a "pre-emptive" attack along Begin's lines may not succeed:

> "The Israelis face a new dilemma with Iran, since in addition to the fact that any action under the "Begin Doctrine" is not guaranteed to succeed, Iranian retaliatory capabilities should be taken into account. While Iran has a significant missile programme, this would not be the only option to consider, as the Iranians could act against Israel through their proxies or allies of convenience, such as Hizbullah or Hamas"[76].

In any case, Israel has been able to develop or purchase tactical nuclear weapons and equipment since the 1970s. Subsequent to the 1973 war, Israel reportedly deployed "at least three 175 mm self-propelled atomic-capable gun batteries, equipped with a total of no less than 108 warheads"[77], and "laid atomic landmines in the Golan Heights in the early 1980s"[78].

If true, "these low-yield tactical nuclear artillery rounds could reach at least 25 miles (40 km), while according to some sources it is possible that the range was extended to 45 miles (72 km) during the 1990s"[79]. There has also been speculation about miniaturised nuclear bombs developed in 1973, which could fit in a suitcase[80].

Israel benefited from the cooperation of several countries during the development of its nuclear programme, such as Norway (which provided heavy water) and France, which provided engineers for weapons development. Israel's nuclear breakthrough, however, has always been under the scrutiny of both the Soviets and the Americans.

On 22 September 1979, the Vela 6911 satellite detected an apparent nuclear explosion between the Indian Ocean and the South Atlantic, which would have been approximately 3 kilotons. Although it remains controversial so far, Israeli-South African nuclear cooperation is often pointed to as the origin of this cooperation[81]. In relation to the incident, US intelligence produced a report stating:

75 CASTRO, José Ignacio. *Op. Cit*, p, 181.

76 CASTRO, José Ignacio. *Op. Cit*, p, 180.

77 Global Security. "Strategic Doctrine". In *fas.org*, 2021. https://www.globalsecurity.org/wmd/world/israel/doctrine.htm Accessed: 24/03/2021.

78 FEDERATION OF AMERICAN SCIENTISTS. "Strategic Doctrine". At *Fas.org*, 2021. https://fas.org/nuke/guide/israel/doctrine/ Accessed: 24/03/2021.

79 FARR, Warner D. "The third temple's holy of holies: Israel's nuclear weapons". In *The counter proliferation papers -Future Warfare Series-*, Issue 2, 1999. Maxwell Air Force Base, Alabama: USAF. https://fas.org/nuke/guide/israel/nuke/farr.htm Accessed: 24/03/2021.

80 HERSH, Seymour. *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy*, New York City: Random House, 1991, p. 220.

81 SUBLETTE, Carey. "Report on the 1979 Vela Incident", in *Nuclear weapons archive*, 2001, p. 220. http://nuclearweaponarchive.org/Safrica/Vela.html Accessed: 24/03/2021.

> "The Israelis could have foreseen needs for more advanced weapons, such as low-yield nuclear weapons that could be used on the battlefield. Or they could have considered deriving a small tactical nuclear warhead for Israel's short-range *Lance* surface-to-surface missiles. Israeli strategists might even have been interested in developing the fission trigger for a thermonuclear weapon. Moreover, if they had developed reliable nuclear devices for any of these weapons without access to proven designs, Israeli nuclear weapons designers would probably have wanted to test the prototypes. A low-yield nuclear test conducted clandestinely at sea could have allowed them to make basic measurements of the device's performance"[82].

In 1986 it became definitively clear that Israel had a nuclear reactor and weapons capability, thanks to the revelations of Israeli engineer Mordecai Vanunu[83].

Before going into the actual weaponry, the "Samson Doctrine" (in reference to the Biblical episode of Samson, recounted in Judges 16) should be cited: 28-31, where Samson tears down the pillars of the temple to kill all the Philistines with him in revenge for their capture and enslavement), whereby Israel, if populations or the state were threatened, would launch an all-out attack against regional rivals or the attacker, including its nuclear weaponry[84]. This doctrine, however, apparently contradicts the Israeli state's implicit insistence on a renunciation of first strike capabilities.

Israel has two developments in its proliferation race; on the one hand, pre-emptive strikes to prevent a nuclear attack on Israeli territory; and on the other, the development of powerful second-strike capabilities, without clearly stating the strength and number of its weapons. This, in turn, has two objectives: (1) to serve as a deterrent to the adversary and; (2) as an *ultima ratio*, to ensure the destruction of the enemy if Israel is to disappear.

Based on international relations theories, from an offensive realist point of view, Israel would gain advantage as a relative power by destroying rival nuclear capabilities, without the need to significantly expand its absolute power[85], which, however, it also does to secure its existence in the event of an attack.

By 2020, Israel is estimated to have approximately 90 operational nuclear weapons: 30 gravity bombs for F-16I or even F-15 fighters; and up to 50 which would be nuclear

82 DIRECTOR OF CENTRAL INTELLIGENCE. *The 22 September 1979 Event*, 1980, p. 9. https://nsarchive2.gwu.edu//NSAEBB/NSAEBB190/03.pdf Accessed: 24/03/2021.

83 CASTRO, José Ignacio. Israel y la postura «amimut». In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, p. 176.

84 Global Security, Ibid.

85 LAMY, Steven L. Contemporary mainstream approaches: neo-realism and neoliberalism, BAYLIS, John, SMITH, Steve, and OWENS, Patricia. *The Globalization of World Politics: An Introduction to International Relations*. Oxford University Press, 2014, p. 130.

warheads to be launched from Jericho I (SRBM) II (IRBM) and III (ICBM) ballistic missile systems[86]. Again, it should be noted that there is a common problem in several countries with regard to TNWs. In this case, Jericho missiles were developed by French engineers to carry both conventional and nuclear warheads[87], and were therefore conceived as dual-capability systems.

In addition to this, it is estimated that the remaining 10 weapons could be SLCM (submarine-launched cruise missile) warheads from five *Dolphin* and *Dolphin-2* type submarines, particularly suitable for the second-strike capabilities apparently sought by Israel[88].

It is therefore quite likely that Israel has, or may soon develop, significant tactical nuclear weapons *capabilities* for such a tactical nuclear triad: (i) short-range (SRBM) and medium-range (MRBM) dual-capable ballistic missiles (*Jericho* I and II), capable of carrying payloads like the one detonated in the Vela incident or less; (ii) nuclear warheads for F-16 and F-15 fighters; and (iii) *Dolphin* submarine-launched ballistic missiles (SLBMs).

North Korea

North Korea, officially the Democratic People's Republic of Korea, is the newest *de facto* nuclear power, having begun nuclear testing in 2006. It is perceived by the US as a serious threat both to the region and to its own national security.

The country's nuclear programme, which has conducted up to six nuclear tests, has tended to increase the power and range of its ICBM missiles high-yield type when it comes to nuclear munitions). Although they are still different things, the power of the munition, and the delivery system, in general it would not seem optimal to use low-yield nuclear munitions in an ICBM.

The concern in the US is due to the continued increase in the nuclear programme, the production and export of enriched uranium and plutonium, as well as the development of intercontinental ballistic missile capabilities[89].

By January 2020, the DPRK was estimated to have 30 to 40 nuclear weapons, numbers inferred from the amount of fissile material – plutonium and highly enriched

86 KILE, Shannon. N. and Kristensen, H. S. VIII. Israeli nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019, pp. 375-376.

87 DIRECTOR OF CENTRAL INTELLIGENCE. *Special National Intelligence Estimate: Prospects for Further Proliferation of Nuclear Weapons*, 1974, p. 24. https://nsarchive2.gwu.edu//NSAEBB/NSAEBB240/snie.pdf Accessed: 24/03/2021.

88 KILE, Shannon. N. and Kristensen, H. S. *Op. cit.*, p. 377.

89 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, p. 11.

uranium – North Korea is believed to have produced for use in nuclear weapons, as well as assumptions about its weapons design and manufacturing abilities[90].

North Korea is thus identified as a major player in "horizontal proliferation" (increasing the number of states with access to nuclear arsenals or material), as it can deliver nuclear materials (the aforementioned Plutonium and enriched uranium), as well as nuclear weapons themselves, to strategic rivals of the United States, such as Syria or Iran[91]. This does not detract from its role in "vertical proliferation", since:

> "North Korea is expanding and modernising its ballistic missile force, which consists of home-produced short-, medium- and long-range missile systems that are deployed or under development. In recent years it has serially developed several missile systems with progressively longer ranges and increasingly sophisticated launch capabilities"[92].

With regard to ICBMs, which remain North Korea's top priority as they could potentially hit the US mainland, new developments include the *Hwasong-10* (known as *Musudan* or BM-25), the *Hwasong-12* [*KN-17* for the US], and the *Bukkeukseong-2* missile under development [*KN-15*][93]. However, these missiles are not usually considered as possible delivery vehicles for TNWs.

It might therefore appear that North Korea is not a relevant actor in terms of TNWs, but the recent development of three types of SRBM missiles, and a first North Korean model of SLBM, serve as a warning in this regard. These short-range missiles (sometimes referred to as tactical missiles) would be (in DOD designations – U.S. Department of Defense): the KN-23, similar to the Russian *Iskander-M* missile; the KN-24, which is apparently based on the US *MGM-140 ATACMS* launch system; and the KN-25[94], a type of MLRS *(Multiple launch rocket system*). The problem, especially with regard to the KN-23 and KN-24, is that they may be dual-capable systems, again, as in other cases, they could be the delivery vector for both conventional and nuclear warheads[95].

As in the case of Russia, we are faced with the ambiguity of dual-capability systems in short-range (SRBM) and medium-range (MRBM) missiles. Add to this North Korea's relationship with China and Russia, and one is warned of the possibility of North Korea becoming a player with a certain capacity in terms of TNW, even greater than that of China, given their different conceptions of security and development of nuclear programmes.

90 KILE, Shannon. N. and KRISTENSEN, Hans M. IX. North Korea's military nuclear capabilities. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019c, p. 378.

91 OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018, p. 12.

92 KILE, Shannon. N. and KRISTENSEN, Hans M. IX. North Korea's military nuclear capabilities p. 379.

93 KILE, Shannon. N. and KRISTENSEN, Hans M. *op. cit.,* p. 383.

94 KILE, Shannon. N. and KRISTENSEN, Hans M. *op. cit.*, p. 381.

95 KILE, Shannon. N. and KRISTENSEN, Hans M. *op. cit.*, p. 382.

In addition, we believe that the same doubt that has been raised about SRBMs can be raised about the North Korean SLBM system, called *Bukkeukseong* (or Bukgeukseong-1) [*DOD KN-11*][96], given that North Korea has several strategic adversaries against which it could use this weapon with a low-yield nuclear payload, such as South Korea, Japan, or even the United States. The recent development of these weapons indicates the need for particularly close international monitoring of new North Korean delivery systems that will undoubtedly continue to be developed in the coming years.

TABLE I. SUMMARY OF CURRENT TACTICAL NUCLEAR ARMAMENTS

Country	Availability of TNWs	Number and type of TNWs	Launch vectors
United States	**Yes**	**230** gravity pumps B61-3 and B61-4 B61-12 (under development)	**Hunters:** F-15E, F-16C/D, F-16MLU, and PA-200. Eurofighter Typhoon (under development as a launch system)
Russian Federation	**Yes**	**-1875 operational** to be launched from multiple systems **-2000** in decommissioning	**Hunters and bombers:** Backfire-C, Fencer-D, Fullback, Foxhound and Felon [NATO designation]. **Advanced vectors:** SS-19 M4 [Avangard], Dagger [Kh-47M2 Kinzhal], Kanyon [Poseidon], SSC-X-9 Skyfall [Burevestnik]. **Dual-capable missiles:** SS-21 Scarab, SS-26 Stone, SSC-7, SSC-8, SS-N-30th, SS-NX-33, SS-21, SS-N-30th, and SSC-5 Stooge. **-Others:** torpedoes for submarines and anti-aircraft missiles.
People's Republic of China	**No** (but do have the ability to procure and launch dual-capability launch systems)	**0** (tactics)	**Various possible vectors:** CSS-3, CSS-4 Mod 2, CSS-NX-14, B-20 and H-6N, as well as new developments.
Islamic Republic of Pakistan	**Yes**	Between **150** and **160** nuclear warheads (up to 250 by 2025) **- 3.5** tonnes of highly enriched uranium	-Missiles: Abdal, Ghaznavi i, Shaheen-I et seq., Nasr and Babur GLCM.
Republic of India	**No** (there may be concealment of TNW capabilities)	**0** (tactical, ambiguity due to the power of their strategic heads)	**Airborne systems:** Mirage 2000H and Jaguar IS. **Ballistic missiles:** Prithvi-II and Agni series I to V.
State of Israel	**Yes**	**90** (**30** gravity bombs, **50** nuclear warheads, and possibly **10** warheads for SLCM	**-Hunters:** F-16I and F-15 **Ballistic missiles:** Jericho I (SRBM) II (IRBM) and III (ICBM) **Submarines:** Dolphin and Dolphin-2.
Democratic People's Republic of Korea	**No** (but there are launch vectors that may indicate an arming trend).	**0** (apparently)	**- SRBM missiles** -23, KN-24, KN-25 **- SLBM system:** KN-11 [Bukkeukseong]

Source: Prepared internally.

96 KILE, Shannon. N. and KRISTENSEN, Hans M. *op. cit.,* p. 385.

Key variables for the present and future of TNWs

We could be at the dawn of the third nuclear era in tactical nuclear weapons, one that has moved beyond the phase of institutionalism, reliance on global anti-nuclear treaties and the reduction *(motu proprio)* of TNWs by Russia and the United States. Disaffection with the NPT, the US exit from the INF and Open Skies Treaty, accusing Russia of its violation, and the Nuclear Matters reports, signal this change of era from the US point of view.

During the final period of D. Trump's term in office, the US has tried to create a new tier of treaties to three, including China, which has not been possible. On the other hand, the US administration tried to force the inclusion of TNW in treaties such as New START, without success. Under the Biden administration, the effects of the New START Treaty have been extended for 5 years, although this has not implied any new conditions, as the former president tried to introduce[97], but maintains its targets on ICBMs, SLBMs and strategic bombers. The Biden administration has thus "securitised" the legal situation with respect to the classic Cold War nuclear triad, ignoring new delivery vehicles, including short- and medium-range missiles, as well as other modern weaponry that did not exist in the 20th century.

One might wonder whether Trump's accusations against Russia in relation to the INF were well-founded. However, given the technological advances in the military field of the major powers, and the significant increase in *de facto* nuclear powers, some with low-yield capabilities, it does not seem reasonable to continue measuring nuclear proliferation with the armaments of two powers, while the rest have been developing the same type of weapons for years, as is apparently the case with the Israeli *Jericho* I and II systems. To demand the dispossession of dual-capable weaponry is to demand, in the final analysis, no conventional weaponry, and that will always be the defence of any state with such delivery systems. This does not preclude Russia (or other actors) from exploiting the ambiguity of dual-capability systems as a reinforcement of their deterrent capability.

However, the current Secretary of State in the Biden administration, A. Blinken, has demonstrated the apparent US interest, once the danger of START's demise is removed, in creating a new treaty to regulate "all of Russia's weapons", which may include its TNW and dual-capability systems[98].

Russia, for its part, is unlikely to sign agreements that bind only these two parties, as it has been advocating multilateralism and an end to Cold War logic for decades. Moreover, a US-proposed Treaty whose subject matter is delimited by reference to Russian armaments will be rejected on obvious grounds as an attempt at US imposition, while NATO continues to fail to address the issue of TNWs.

97 SONNE, Paul. "United States extends nuclear treaty with Russia for five years", in *The New York Times*, 03/02/2021.https://www.washingtonpost.com/national-security/us-russia-new-start-nuclear-treaty/2021/02/03/4293d0fa-6638-11eb-bf81-c618c88ed605_story.html Accessed: 24/03/2021.

98 SONNE, Paul. Ibid.

Moreover, depending on how such a hypothetical treaty is established, if one starts from the Trump-era accusations that Russia violates the non-proliferation and arms control treaties with dual-capable MRBM and SRBM systems, Russia may simply deny that it has violated any part of the INF, and that disarming dual-capable systems would be suicidal given that there would be 29 states in NATO that would not sign a "tactical START" that included dual-capable systems.

To complicate matters further, it should be pointed out, as Republican Senator Tom Cotton did, the sterility of Biden's early moves, after years of pointing to an alleged Putin-Trump alliance:

> "This agreement does not include tactical nuclear weapons, of which Russia has a vast arsenal, or the latest Russian delivery vehicles (such as submarine systems). It does not include nuclear-powered missiles or hypersonic weapons, which is why Vladimir Putin was so eager to expand it"[99].

The end of the INF and the extension of New START only seem to indicate a certain continuity with the Cold War mentality in the US administration, and, above all, a return to some of the dynamics of the "Obama Doctrine" (as the appointment of General Lloyd Austin as Secretary of Defence may indicate), including dialogue with Iran and special attention to Russia's borders (Ukraine, Georgia, Baltic States...), could leave the United States behind in the new era of tactical nuclear weapons. Meanwhile, proliferation, both vertical and horizontal, continues to increase thanks to the actions of countries such as China, North Korea, Israel and Pakistan.

No nuclear states, including the United States, and no other NATO states have joined the TPNW, which is likely to be ineffective in real terms. As for the NPT, it continues to generate tension in Germany, a signatory to the treaty and a country with US tactical nuclear weapons on its territory, as well as in Belgium, Italy, Turkey and the Netherlands[100].

At NATO the issue of NPT remains unaddressed, and given the apparent continuity of the US nuclear 'umbrella' mindset, this is unlikely to change, unless the European states involved in NATO's nuclear policy (France, Germany, Italy, Belgium and the Netherlands) push for this (unlike the UK, which is strategically aligned with the US), in which case NATO's resilience as an alliance of equals would be tested. In fact, on 14 April 2011, Germany, Poland, the Netherlands and Norway issued the

99 MIRZARYAN, Gevorg. "La prolongación del Tratado START será una excepción en las relaciones entre Rusia y Estados Unidos". In *Vzgliad*, 27/01/2021. https://vz.ru/politics/2021/1/27/1082171.html Accessed: 24/03/2021.

100 KÜTT, Moritz, HOEKEMA, Jan, and SAUER, Tom. (22 January 2021). "Atomwaffen sind jetzt verboten. Halten wir uns daran". In *Der Spiegel*, 22/01/2021. https://www.spiegel.de/politik/ausland/atomwaffen-sind-jetzt-verboten-halten-wir-uns-daran-a-d00a0906-bcc3-44b0-8ac8-edaebbe2e3be Accessed: 24/03/2021.

so-called non-paper on TNW (supported by six other Alliance members) to demand more transparency on these weapons from both the US and Russia[101]. In the case of the United States, this is obviously a "taboo" subject, since the withdrawal of its TNWs from Europe would weaken its power on the continent, while Russia would remain, with more or less armaments, on its borders, and therefore much closer to the heart of the continent.

On the European side, there are three main factors that explain this *status quo*: (i) Atlanticist immobility, that is, the comfort that the current situation generates in countries such as Poland, Estonia and Belgium; (ii) Germany's reluctance to promote (and lead) a bloc – even within NATO – with military and strategic objectives (with nuclear means), a legacy of its result in the last world war, and; (iii) France's indecision, where Atlanticism has for years imposed itself on the strategic lines that have traditionally conditioned its foreign policy, through rapprochement with Russia, and the distrust of the Anglo-Americans, as in the paradigmatic case of General De Gaulle. The latter, in fact, was warned by Brzezinski as a threat to US hegemony in the world[102].

One possible risk of TNW proliferation is the re-deployment of US launch systems on European territory, which would generate significant anxiety in the Russian Federation. In any case, this threat of reconversion is and will be a constant in the years to come, for all nuclear actors and their strategic adversaries.

On the other hand, the possible return to the "Obama Doctrine", with the subsequent development of Iran's nuclear programme, will give Israel more reasons to accumulate nuclear weapons, including possible (almost probable) TNWs. In addition, Saudi Arabia, another strategic rival of Iran, could also be tempted to develop its own programme, although it is not currently considered a possible future nuclear power.

Russia will continue to develop its programme as it has been doing for years, modernising its systems, and challenging US hegemony, if the Biden administration reverts to a policy of 'containment' interventions in the post-Soviet space or other states, such as Syria, that are allies of Russia.

As for China, it is inevitable that it will accumulate tactical nuclear weapons over time, although this depends on multiple factors, such as its relationship with Russia, its collaboration with Pakistan and North Korea, and internal threats to its territorial integrity (Tibet and Sinkiang). However, it is not an TNW powerhouse today, because it does not need to be. We believe that when China begins to develop such weaponry

101 KRISTENSEN, Hans M. "10 NATO Countries Want More Transparency for Non-Strategic Nuclear Weapons". In *Fas.org*, 24/04/2011. https://fas.org/blogs/security/2011/04/natoproposal/ Accessed: 24/03/2021.

102 BRZEZINSKI, Zbigniew. (1998). *El gran tablero mundial: la supremacía estadounidense y sus imperativos geoestratégicos,* Grupo Planeta, 1998, p. 50.

it will be with SRBMs, MRBMs, and especially dual-capable SLBMs, as soon as it detects significant risks on its southern and south-eastern sea front.

The Cold War "method" of bilateral treaties for the whole world has no place in the new era of tactical nuclear weapons. While a comprehensive multilateral treaty such as the TPNW on a type of tactical nuclear weapon, which would also have to entail a precise definition of what it would be, is theoretically possible, we do not consider it likely.

Once again, the definition of TNW is one of the major sticking points (as is the case with other types of armaments), and the advances in launch systems, particularly dual-capability SRBMs and MRBMs, which are no longer limited by any treaty, mean that the only way to reduce this type of armament is through bilateralism at the regional level: India and Pakistan, Iran (in the not too distant future) and Israel, China-North Korea and the United States, and Russia and NATO (ultimately the United States). Another possibility is a post-Merkel Franco-German axis agreement, forcing NATO to take a position on the TNW.

On the other hand, there could be a case for a multilateral treaty at the global level with regard to horizontal proliferation, especially with regard to possible major strategic imbalances in a region through the spontaneous emergence of a new *de facto* nuclear power (such as Iraq, Syria or Saudi Arabia), but also with regard to terrorist groups such as Daesh in a region such as Central Asia or North Africa.

TABLE II. STRATEGIC POSITIONS VIS-À-VIS TNWS

Country	Positioning
United States	- Enhancing capabilities to reduce the gap in equipment and launch systems with Russia, within the NATO framework. - First and Second-Strike capabilities
Russian Federation	Quantitative reduction and improvement of systems to maintain superiority over NATO. - First and Second-Strike capabilities
People's Republic of China	- Modernisation and increase of the strategic arsenal, but renunciation of first-strike and consequently of TNWs.
Islamic Republic of Pakistan	- Lack of specific nuclear doctrine, but focus on TNW as a means of second-strike in particular, without renouncing first-strike.
Republic of India	- Ambiguity in its nuclear doctrine. Maintaining superiority over Pakistan, although this does not appear to include TNW.
State of Israel	- Opacity and ambiguity, - "Amimuth" and "Samson" doctrines, involving first and second-strike capabilities. - The entire nuclear arsenal serves as a last resort if Israel's existence is threatened.
Democratic People's Republic of Korea	Focus on strategic capacity building and horizontal proliferation. - New possible launch systems indicate a future development of TNWs.
NATO allies	- There is no debate on TNWs in Europe, status quo in spite of various specific complaints in some states.

Source: Prepared internally.

Conclusions

Parallel to the development of strategic nuclear weaponry, with ever more powerful payloads and more sophisticated delivery systems, especially during the Cold War, a nuclear weaponry closer to the conventional one, the so-called "tactical" nuclear weaponry, has been developed in parallel. This has included mines, MADM, SADM, and warheads of less than 5 to 10 kilotons.

On the other hand, international concern succeeded in securing the adoption of the NPT, and more recently the TPNW, as well as various agreements between the two nuclear superpowers in the START and INF treaties. However, in none of these cases has there been any question of reducing or limiting TNWs, the concept of which remains elusive to this day, not helped by state secrets and ambiguity on the part of some powers. In fact, the most significant reductions took place between the end of the Cold War and the late 2000s on a unilateral basis by Russia and the US.

In addition, the issues of dual-capable delivery systems, horizontal proliferation, the end of the INF and the non-adherence of the nuclear powers to the TPNW indicate that the taboo on dealing with them at the international level will remain a constant.

Russia currently has a significant lead over its strategic rival in terms of TNWs, modernising its delivery systems and including types that fall far short of US gravity bombs, although the US has made timid attempts in recent years to bring TNWs within the scope of treaties with Russia.

China, for its part, explicitly renounces first strike and TNW, although this can be seen simply as a concealment of its capabilities (which in any case provide for easy and rapid acquisition if necessary). Pakistan does not define its deterrence policy, but is fully confident of its capabilities in terms of TNWs, while India, with a clearly superior programme (in terms of strategic armaments), can be considered in limbo due to the type of weaponry at its disposal.

Israel maintains potent TNW capabilities that will increase, particularly if its strategic rival, Iran, gains access to an internationally legitimised nuclear programme. North Korea finally seems to be focusing on its strategic capabilities, although a reinforcement of these is feasible with the development of TNWs.

We asked at the beginning of this article whether we were in a new era of TNWs, or whether we were still in the post-Cold War period, with some new elements, albeit not substantially different from the decades of the *Pax Americana*.

From this analysis, one can only conclude that we are in the third era of tactical nuclear weapons, arising from the technological development of the last two decades, in a new phase of both vertical and horizontal proliferation. Its key features would be:

Multilateralism: the end of the exclusive protagonism of the United States and Russia, the relevant role of the *de facto* nuclear powers, and China as a «virtual» TNW power.

Arms *reductions* – as a possibility – following regional logics, through bi- or trilateral treaties to «securitise» peace in the region: Middle East; Indian Subcontinent; Europe; Asia-Pacific; Arctic.

Ambiguity in terms: the problem of defining *tactical* nuclear weapons, their types, delivery systems and payloads remains.

Uncertainty in the analysis: new delivery systems are often considered *de jure* by the State possessing them to be conventional weapons, but they can in turn deliver low-yield nuclear warheads. Therefore, as long as the exact number of nuclear devices in a country is not known, uncertainty about their number will prevail due to dual-capability systems.

A new arms race between Russia and the United States, especially in the SRBMs, MRBMs, and SLBMs, although the United States will experience quantitative proliferation, while Russia will continue to upgrade its weaponry, destroying or converting outdated nuclear weapons. Moreover, a political earthquake is conceivable in NATO if the Franco-German axis were to start making demands on US TNWs in Europe.

Increased proliferation by *Israel* due to the possibility of a strategic shift in the region with the development of Iran's nuclear programme, as well as by *Pakistan* and *India* due to their mutual dislike of each other, and North *Korea*.

TNWs will undoubtedly be a vital element in global security for decades to come, and although it may try to remain a "taboo" subject for some years, technology will eventually create the need for strong international action against this new threat of nuclear proliferation. We must not resign ourselves to a future without international control of tactical nuclear weapons, whether by relying on global deterrence in a multipolar context that puts the entire planet at risk, or on strategies to create Nuclear Weapon Free Zones, as the case of the Middle East demonstrates, progress is possible.

Bibliographic references

BARRY, Ben. "Pakistan's Tactical Nuclear Weapons: Practical Drawbacks and Opportunity Costs". In *Survival*, Issue 60:1, 2018, pp. 75-81, DOI: 10.1080/00396338.2018.1427365.

BELOUS, Vladimir. "Las armas nucleares tácticas en las nuevas condiciones geopolíticas". In *Centro de investigación político-militar del MGIMO*, 2000. http://eurasian-defence.ru/?q=node/23371 Accessed: 24/03/2021. [БЕЛОУС, Владимир. "Тактическое ядерное оружие в новых геополитических условиях, Центр военно-политических исследований МГИМО", 2000. http://eurasian-defence.ru/?q=node/23371].

BIRD, Matthew. "Nuclear History Note US Atomic Demolition Munitions 1954-1989". In *The RUSI Journal*, Issue 153:2, 2008, pp. 64-68. DOI: 10.1080/03071840802103306.

BRZEZINSKI, Zbigniew. (1998). *El gran tablero mundial: la supremacía estadounidense y sus imperativos geoestratégicos,* Grupo Planeta, 1998.

CALINGAERT, Daniel. "Nuclear weapons and the Korean War", *Journal of Strategic Studies*, Issue 11:2, 1988, pp. 177-202, DOI: 10.1080/01402398808437337.

CASTRO, José Ignacio. Israel y la postura «amimut». In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, pp. 167-184.

COLOM PIELLA, Guillem. "Haciendo posible lo impensable: opciones selectivas, disuasión a medida y fallos en la disuasión nuclear (1974-1994)". *Revista española de ciencia política*, 2020, no 54, p. 121-148.

DEUTSCHER BUNDESTAG. *Zu Fragen der Stationierung von taktischen Atomwaffen in Deutschland im Rahmen der nuklearen Teilhabe*, 2020. https://www.bundestag.de/resource/blob/702320/8ca6fb8cdd46ae43ae9fc16f14054e2e/WD-2-041-20-pdf-data.pdf.

DIRECTOR OF CENTRAL INTELLIGENCE. *Special National Intelligence Estimate: Prospects for Further Proliferation of Nuclear Weapons*, 1974. https://nsarchive2.gwu.edu//NSAEBB/NSAEBB240/snie.pdf.

DIRECTOR OF CENTRAL INTELLIGENCE. *The 22 September 1979 Event*, 1980. https://nsarchive2.gwu.edu//NSAEBB/NSAEBB190/03.pdf.

FARR, Warner D. "The third temple's holy of holies: Israel's nuclear weapons". In *The counter proliferation papers -Future Warfare Series-,* Issue 2, 1999. Maxwell Air Force Base, Alabama: USAF. https://fas.org/nuke/guide/israel/nuke/farr.htm.

FEDERATION OF AMERICAN SCIENTISTS. "Strategic Doctrine". At *Fas.org*, 2021. https://fas.org/nuke/guide/israel/doctrine/.

FRÍAS SÁNCHEZ, C. J. Perspectivas de la proliferación nuclear en Estados Unidos, Rusia y China. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, pp. 21-68.

GALÁN, Elena C. Díaz. Tratado sobre la Prohibición de las Armas Nucleares (TPAN): un paso más en la ilicitud del empleo del arma nuclear. *RESI: Revista de estudios en seguridad internacional*, 2019, vol. 5, issue 2, p. 39-58.

Global Security. "Strategic Doctrine". In *fas.org*, 2021. https://www.globalsecurity.org/wmd/world/israel/doctrine.htm.

GOUYEZ BEN ALLAL, Anass. "La política nuclear de la OTAN: la amenaza de las armas nucleares tácticas para la seguridad internacional y el régimen de no proliferación nuclear". In *Paix et Sécurité Internationales-Journal of International Law and International Relations*, Issue 02, 2014, pp. 65-80. https://doi.org/10.25267/Paix_secur_int.2014.i2.04.

GRIGORIEV, Alexei Iu. "Evolución del estatus del arsenal nuclear táctico de EE.UU en Europa". In *Almanac of Modern Science and Education*, 2014, Issue 5-6, 2014, pp. 60-62. [ГРИГОРЬЕВ, Алексей. Ю. "Эволюция статуса тактических ядерных арсеналов США в Европе, Альманах современной науки и образования", 2014, Issue 5-6, стр. 60-62].

HERSH, Seymour. *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy*, New York City: Random House, 1991.

JAMES MARTIN CENTER FOR NONPROLIFERATION STUDIES. Glossary. In Nuclear Threat Initiative, 2021. https://www.nti.org/learn/glossary/#tactical-nuclear-weapons.

KILE, Shannon. N. and Kristensen, H. S. V. Chinese nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019a, pp. 354-361.

KILE, Shannon. N. and Kristensen, H. S. VIII. Israeli nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019b, pp. 375-377.

KILE, Shannon. N. and KRISTENSEN, Hans M. IX. North Korea's military nuclear capabilities. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security,* 2019c, pp 378-385.

KRISTENSEN, Hans M. "10 NATO Countries Want More Transparency for Non-Strategic Nuclear Weapons". In *Fas.org*, 24/04/2011. https://fas.org/blogs/security/2011/04/natoproposal/.

KRISTENSEN, Hans M. "Urgent: Move US Nuclear Weapons Out Of Turkey". At *FAS.org,* 16/10/2019c https://fas.org/blogs/security/2019/10/nukes-out-of-turkey/.

KRISTENSEN, Hans M. I. US nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019a, pp. 327-335.

KRISTENSEN, Hans M. II. Russian nuclear forces. in "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, pp. 336-345.

KRISTENSEN, Hans M. and KILE, Shannon. N. VI. Indian nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019a, pp. 362-368.

KRISTENSEN, Hans M. and KILE, Shannon. N. VII. Pakistani nuclear forces. In "World nuclear forces", *SIPRI Yearbook 2020, Armaments, Disarmaments, and International Security*, 2019b, pp. 369-374.

KRISTENSEN, Hans M. and KORDA, Matt. Indian nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, No. *74*(6), 2018, pp. 361-366.

KRISTENSEN, Hans M. and NORRIS, Robert. S. Chinese nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018c, vol. 74, No. 4, pp. 289-295, DOI: 10.1080/00963402.2018.1486620.

KRISTENSEN, Hans M. and NORRIS, Robert. S. Russian nuclear forces, 2018. In *Bulletin of the atomic scientists*, 2018a, vol. 74, Issue 3, pp. 185-195.

KRISTENSEN, Hans M. and NORRIS, Robert. S. United States nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018b, vol. 74, Issue 2, pp. 120-131.

KRISTENSEN, Hans M., NORRIS, Robert. S. and DIAMOND, Julia. Pakistani nuclear forces, 2018. In *Bulletin of the Atomic Scientists*, 2018, vol. 74, No. 5, pp. 348-358, DOI:10.1080/00963402.2018.1507796.

KRÜGER, Paul-Anton. "Fünf weitere Jahre". In *Süddeutsche Zeitung,* 22/01/2021. https://www.sueddeutsche.de/politik/ruestungskontrolle-atomwaffen-usa-russland-1.5183235.

KÜTT, Moritz, HOEKEMA, Jan, and SAUER, Tom. (22 January 2021). "Atomwaffen sind jetzt verboten. Halten wir uns daran". In *Der Spiegel*, 22/01/2021. https://www.spiegel.de/politik/ausland/atomwaffen-sind-jetzt-verboten-halten-wir-uns-daran-a-d00a0906-bcc3-44b0-8ac8-edaebbe2e3be.

LAMY, Steven L. Contemporary mainstream approaches: neo-realism and neo-liberalism, BAYLIS, John, SMITH, Steve, and OWENS, Patricia. *The Globalization of World Politics: An Introduction to International Relations*. Oxford University Press, 2014, pp. 127-140.

MILLAR, Alistair. The Pressing Need for Tactical Nuclear Weapons Control. *Arms Control Today*, June 2002. https://www.armscontrol.org/act/2002-05/features/pressing-need-tactical-nuclear-weapons-control.

MIRZARYAN, Gevorg. "La prolongación del Tratado START será una excepción en las relaciones entre Rusia y Estados Unidos". In *Vzgliad*, 27/01/2021. https://vz.ru/politics/2021/1/27/1082171.html Accessed: 24/03/2021. [МИРЗАРЯН, Геворг. "Продление ДСНВ станет исключением в отношениях России и США". В Взгляд, 27/01/2021].

MORGAN, Patrick M. *Deterrence now*. Cambridge University Press, 2003.

MORGAN, Patrick M. The state of deterrence in international politics today. *Contemporary Security Policy*, 2012, vol. 33, issue 1, p. 85-107. https://doi.org/10.1080/13523260.2012.659589

OFFICE OF THE SECRETARY OF DEFENSE. *Nuclear Posture Review*, 2018. https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

ORTEGA GARCÍA, Julia. "Proliferación Nuclear en el siglo XXI". In Spanish Institute for Strategic Studies, March Document, April 2016, pp. 1-34. http://www.ieee.

es/Galerias/fichero/docs_marco/2016/DIEEEM05-2016_Proliferacion_Nuclear_JulioOrtega.pdf

PALOMARES LERMA, Gustavo and GARCÍA CANTALAPIEDRA, David. *Imperium. La Política Exterior de los Estados Unidos del Siglo XX al XXI*, Valencia: Tirant Humanidades, 2019.

PODVIG, Pavel. "Russia", in PYLAK, Allison. and ACHESON, Ray. (2020). *Assuring Destruction Forever: 2020 edition*. Women's International League for Peace and Freedom, June 2020, pp. 87-95.

RAJMIL, Daniel, et al. "The Middle East challenge to the Nuclear Weapons Ban Treaty". *Journal of International Mediterranean Studies*, 2020, no 28, p. 104-120. http://dx.doi.org/10.15366/reim2020.28.006

RAJMIL, Daniel. "Oriente próximo; disuasión y disuasión nuclear", *Spanish Institute for Strategic Studies*, 6: 1-23.

SANGER, David E. "Trump Followed His Gut on Syria. Calamity Came Fast". *The New York Times*, 14/10/2019. https://www.nytimes.com/2019/10/14/world/middleeast/trump-turkey-syria.html.

SCHOGOL, Jeff. "Why there's no such thing as 'tactical' nuclear weapons". *Task & Purpose, 19/09/2020*. https://taskandpurpose.com/analysis/no-tactical-nuclear-weapons/.

SONNE, Paul. "United States extends nuclear treaty with Russia for five years", in *The New York Times*, 03/02/2021. https://www.washingtonpost.com/national-security/us-russia-new-start-nuclear-treaty/2021/02/03/4293d0fa-6638-11eb-bf81-c618c88ed605_story.html.

SUBLETTE, Carey. "Report on the 1979 Vela Incident", in *Nuclear weapons archive*, 2001. http://nuclearweaponarchive.org/Safrica/Vela.html.

Torres Vidal, C. India y Pakistán, potencias nucleares de facto. In Garrido, Vicente. (Ed). *La no proliferación y el control de armamentos nucleares en la encrucijada*. Spanish Institute for Strategic Studies, Strategy Papers, Issue 205, 2020, pp. 115-163.

Tulliu, Steve and Schmalberger, Thomas. *En buenos términos con la seguridad: diccionario sobre control de armamentos, desarme y fomento de la confianza*. Instituto de las Naciones Unidas para la Investigación sobre el Desarme, 2003. https://www.files.ethz.ch/isn/92883/Full-text_ES.pdf.

U.S. OFFICE OF TH DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR MATTERS. *Nuclear Matters Handbook 2020*. https://fas.org/man/eprint/nmhb2020.pdf.

VON CLAUSEWITZ, Carl. *De la Guerra*. Barcelona: Ediciones Obelisco, 2015.

WILSON, Jamie. "Nuclear mines 'to stop Soviets'. Cold war plan to bury atomic bombs in Germany". In *The Guardian*, 17/07/2003. https://www.theguardian.com/uk/2003/jul/17/world.jamiewilson.

ZHANG, Hui. "China", in PYLAK, Allison and ACHESON, Ray. *Assuring Destruction Forever: 2020 edition*. Women's International League for Peace and Freedom, June 2020, pp. 27-35.

Article received: 24 March 2021.
Article accepted: 4 May 2021.