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Reassessing Europe's Nuclear Order:

Perspectives for a Nuclear Weapons Free Zone

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Abstract

Non-nuclear weapon states across Europe are uniquely positioned to contribute to nuclear disarmament activities by evaluating, among others, the prospects and perspectives for nuclear weapons free zones (NWFZ) on the continent and beyond. This paper examines this question with respect to Europe and reviews lessons learned from the process of establishing NWFZ in the Global South and in Central Asia. The paper also examines a possible political framework on the relevance and feasibility of a zone in the context of events inclusive through December 2021. These questions are brought to the forefront and are further compounded by the Review Conferences of the Non-Proliferation Treaty (NPT) and the first meeting of States Parties of Treaty on the Prohibition of Nuclear Weapons (TPNW) in June 2022.

The paper argues that past NWFZ – and respective prohibited activities within respective regional limits – have primarily functioned as instruments to prevent nuclear proliferation and support the political emancipation of sub-regions in the face of global great power competition. By contrast, the main challenges in Europe today are the reduction of already deployed sub-strategic nuclear weapons and the prevention of nuclear escalation amidst such competition on the continent. In this context, the paper discusses the feasibility of zone concepts as applied in Europe by highlighting obstacles and preconditions. If non-nuclear weapon states (NNWS) want to use NWFZ as an instrument for further nuclear disarmament, they will need to take security considerations seriously and emphasize risk reduction measures and the military redundancy of deployed weapons.

This explorative paper remains solely the assessment of the authors in an independent capacity under the auspices of the Arms Control Negotiation Academy (ACONA); the piece should not be considered reflective of their personal views nor of their respective institutions.

Abbreviations

ANZUS	Australia, New Zealand, United States Security Treaty
CSA	Comprehensive Safeguards Agreement
CST	Collective Security Treaty
CSTO	Collective Security Treaty Organization
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DDPR	Deterrence and Defence Posture review
GDR	German Democratic Republic

IAEA	International Atomic Energy Agency
NPT	Nonproliferation Treaty
NATO	North Atlantic Security Organization
NED	Nuclear Explosive Devices
NNWS	Non-Nuclear Weapon State
NWFZ	Nuclear Weapons Free Zone
NWS	Nuclear Weapon State
OSCE	Organization for Security and Co-operation in Europe
PNE	Peaceful nuclear explosives
PNI	Presidential Nuclear Initiative
PrepCom	Preparatory Committee
SNOWCAT	Support of nuclear operations with conventional air tactics
SSBN	Submersible Ship Ballistic Nuclear
SSNW	Sub-strategic Nuclear Weapons
START	Strategic Arms Reduction Treaty
TPNW	Treaty on the Prohibition of Nuclear Weapons
WMD	Weapons of Mass Destruction
WTO	Warsaw Treaty Organization

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Introduction

This paper explores the possibility or role of select non-nuclear weapon states in Europe that could further contribute to nuclear disarmament by evaluating the perspectives for nuclear weapons free zones (NWFZ) on the continent. Leveraging the Stockholm initiative in support of nuclear disarmament from Summer 2019,[1] Germany and Sweden in February 2020 launched concrete stepping stone proposals, including the pledge to promote "the establishment of Nuclear Weapons-Free Zones *in all regions of the world* on the basis of arrangements freely arrived at among States of the region concerned."[2] With this pledge in mind, we assess provisions of established NWFZ in the Global South and in Central Asia by non-nuclear weapon states (NNWS) and consider their potential application to existing security challenges in Europe. Even though the latter idea is not new, recent political conditions are unique and differ from the political context almost three decades ago when NWFZ in Europe were discussed last, particularly in the face of additional challenges to the continent that evolved in spring 2022. These ever-changing political conditions warrant a reassessment of existing opportunities and limitations.

In this context, the NWFZ concept remains theoretically underdeveloped, as it brackets the tension between non-proliferation and disarmament. While the former remains an ever-pressing topic globally, main challenges in Europe as of 2021 encompass the reduction of already deployed weapons (particularly sub-strategic nuclear weapons, or SSNW), and the reduction of nuclear escalation risks. In this regard, the renewed prevalence of strategic interests and conflict between nuclear weapon states (NWS) on the continent poses unique challenges. In the past, similar constellations have resulted in either delayed zone creation or an unwillingness of NWS to provide negative security guarantees, although at times states have overcome these initial obstacles.

To be sure, a NWFZ either within parts of Europe or covering the entire continent, is not a novel concept. In simple terms, the push dates back to the late 1950s and Soviet efforts to prevent the deployment of nuclear weapons in Germany. Similar proposals covering Central and Eastern Europe, the Arctic, Scandinavia, the Balkans and the Mediterranean followed in subsequent decades through the late 1990s. This historical prominence, however, contrasts with the virtual absence of NWFZ discussions in Europe over the past two decades.[3] This is compounded by the decades-long question of establishing similar zones in other world regions, such as a zone free of weapons of mass destruction (WMD) in the Middle East. Over the past five years, the pressure to develop creative ideas for nuclear disarmament in Europe has elevated further due to the demise of the INF treaty in August 2019 and the coming into force of the TPNW in January 2021. The NWFZ concept goes well beyond humanitarian or moral concerns of the disarmament and non-proliferation

communities especially on a continent that has once again become the hotbed for great power competition. This said, the reimagining of the European security order caused by the Russian invasion of Ukraine in February 2022 will certainly affect the parameters for thinking about NWFZ outlined in this paper.

Overall, the paper seeks to explore the historical development of the NWFZ concept over recent decades and assess its present relevance in the European context. Against this backdrop, the next section of this paper assesses the status of the European nuclear order as of December 2021 in more detail, both by highlighting the significant disarmament process over the last three decades and the continuous relevance of SSNW for both Russia and North Atlantic Treaty Organization (NATO). Following this, the third section explores the provisions of existing NWFZ in the Global South and in Central Asia and discusses the lessons learned from the respective negotiation processes and their outcomes. Indeed, there are a number of lessons to be gleaned from existing NWFZ treaties, including the activities or state behavior prohibited under respective zones in addition to the response by NWS to these limitations. In particular, this part outlines conditions regarding (1) the boundary and scope of the zone, (2) transit rights, (3) existing security commitments, (4) negative security guarantees (by states beyond the zone), and (5) the means of verification. Finally, the fourth part explores historical proposals to establish a NWFZ in Europe during and after the Cold War and points to enduring challenges and opportunities.

The Nuclear Balance in Europe

Since the end of the Cold War, the nuclear components of the European security order have changed in significant ways. Until very recently, the role of nuclear weapons in regional defence and deterrence postures have been constantly decreasing. In contrast to the Cold War, when the main security risks derived from the overall imbalance in force levels between two military alliances, today these risks increasingly stem from imbalance in the U.S. and Russian SSNW arsenals located in Europe and mistrust regarding nuclear doctrines of both states. These factors could be mitigated by the introduction of more stringent limitations on the European continent through state declared territorial nuclear weapon free zones or other curbing measures, while still factoring for conventional deterrence and potential entanglement.

Nuclear Stockpiles

In overall numbers, deployed nuclear warheads on the continent have decreased substantially over the last 30 years.[4] During the Cold War, the U.S. nuclear stockpile in Europe peaked with approximately 7,300 deployed warheads in 1971.[5] By May 1990, this number decreased to about 4,000.[6] In summer 1991, less than 2,500 U.S. nuclear

warheads remained.[7] The unilateral Presidential Nuclear Initiative (PNI), announced by U.S. President George H.W. Bush in September 1991 (and reciprocated by Soviet President Mikhail Gorbachev on October 5), led to the withdrawal of a significant number of U.S. SSNW from Europe, including nuclear artillery shells, short-range missile warheads, and naval nuclear depth bombs.

Following this, only about 1,400 gravity bombs (B-61) in seven European states remained.[8] Since then, the number has been reduced further. In 2001 and 2005, the United States removed the last gravity bombs from Greece and the Ramstein Air Base in Germany, respectively. In 2008, the remaining nuclear weapons from the Royal Air Force Lakenheath airbase 70 miles northeast of London were withdrawn.[9] Today, only about 100 gravity bombs remain deployed at six bases in five states: Belgium, Germany, Italy, the Netherlands, and Turkey.[10] The nuclear warheads are assigned to NATO aircraft and stored in vaults in aircraft shelters, ready for immediate deployment.

In addition to these capabilities as part of NATO nuclear sharing policy, France has an estimated weapons stockpile of 290 warheads, of which about 280 are operational with the remainder in reserve. Most French warheads are deployed on four nuclear submarines (SSBN) and on a rotational basis, with an estimated one at sea at a time.[11] The United Kingdom currently possesses about 195 nuclear warheads, 120 of which are operationally deployed on submarines.[12] The British government, however, recently announced that it will raise the previous ceiling on its nuclear warhead stockpile by more than 40 percent, to a total of 260 warheads.[13]

Similarly to the United States, the Soviet Union (and later Russia), decreased the number of nuclear warheads in Europe substantially after 1991, including the removal of SSNW from the former member states of the Warsaw Treaty Organization (WTO) and the former Soviet republics by May 1992. This included removal and dismantlement, with U.S. technical assistance, of strategic nuclear warheads from Belarus, Kazakhstan, and Ukraine by July 1996. With regard to the reciprocal pledges made by Mikhail Gorbachev and, subsequently, Russian President Boris Yeltsin under PNI on SSNW, the exact number of reductions are unknown due to a lack of official information and the absence of verification or transparency measures. However, official statements by several Russian officials suggest a reduction of about 75% compared to 1991.[14]

Today, Russia retains an estimated number of about 2,000 SSNW.[15] Russian officials assert that all are "non-deployed", being located in central storage facilities on the mainland and away from the military units that could use them.[16] This is unlike NATO's sub-strategic nuclear arsenal, which consist of only one type of weapon (gravity bombs

for aircraft), where Russian SSNW are more diverse and (potentially) include short-range ballistic missiles, air-, sea-, and ground-launched cruise missiles, anti-ship, air-defence, and anti-submarine missiles, torpedoes, gravity bombs, and artillery shells for field guns.[17]

In addition, Russia deploys parts of its operational strategic nuclear forces, which are subject to quantitative limitations under the 2010 Strategic Arms Reduction Treaty (New START),[18] across at least nine national level storage sites and estimated 21 operational depot storages[19] in the European part of its territory. While deterrence provided by sub-strategic nuclear weapons remains deeply embedded in security strategies, considerations today still differ in comparison to the Cold War era.

Extended Deterrence and Nuclear Sharing

Over the past decade, NATO member states have confirmed that the basis of the alliance will remain nuclear, so long as nuclear weapons exist. Both the 2010 strategic concept and the Deterrence and Defence Posture review (DDPR) from 2012, however, delegate the "supreme guarantee of the security of the Allies" to "the strategic nuclear forces of the Alliance, particularly those of the United States." The documents also acknowledge the "independent strategic nuclear forces of the United Kingdom and France" and their contribution to "overall deterrence."[20]

Historically, the deployment of U.S. SSNW in Europe had been an important component of U.S. non-proliferation efforts to prevent NATO allies from acquiring nuclear weapons. Yet, this rationale changed in the late 1960s due to the signing of the Non-Proliferation Treaty (NPT) and considerable Soviet conventional rearmament at the time. Until 1989-1991, SSNW dominantly represented a counterweight to the perceived conventional superiority of the WTO, which were to be used within the context of the strategy of *flexible response* that NATO officially adopted in May 1967.

By contrast, today, nuclear sharing primarily expresses, as NATO's current Strategic Concept puts it, the "broadest possible participation of Allies in collective defence planning on nuclear roles, in peacetime basing of nuclear forces and in command, control and consultation arrangements." In this context, NATO nuclear sharing arrangements include not only the deployment of about 100 gravity bombs in five member states, which in times of crisis would be delivered to targets by European fighter aircraft. These arrangements are inclusive of seven additional European states (Czech Republic, Denmark, Greece, Hungary, Norway, Poland, and Romania) that provide "support of nuclear operations with conventional air tactics" (SNOWCAT), i.e. by escorting bombers with fighter aircraft.

Ironically, since the end of the Cold War NATO's nuclear sharing seems to have become even more important for providing

coherence and solidarity within the alliance. The more diverse threat perception among NATO members, the higher its symbolic-political value. Indeed, the previous strategic concept from 1999 states this directly by arguing that "NATO will maintain […] adequate sub-strategic forces based in Europe, which will provide an essential link with strategic nuclear forces, reinforcing the transatlantic link".[21] In short, nuclear sharing represents intra-alliance burden-sharing, and moreover, the status of U.S. security commitments to Europe.

It signifies political order-making above military security but differs conceptually from extended deterrence. The latter is neither reducible to nuclear options, nor limited to states directly involved in nuclear sharing. In fact, since 1979, all NATO members (with the exception of France) have participated in the consultative process within the Nuclear Planning Group (NPG), including those states that officially prohibit the deployment of nuclear weapons on their territory in peacetime (inclusive of Denmark, Iceland, Lithuania, Norway, Spain). Extended deterrence derives from the ability to project military force across the entire NATO territory in a swift and credible way.

In this context, Article 5 of the North Atlantic Treaty stipulates that "an armed attack against one or more" NATO members "shall be considered an attack against them all." The means and scope of mutual assistance, however, are left open for interpretation.[22] Indeed, U.S. nuclear weapons in Europe symbolize this commitment politically, but are not the commitment itself. Therefore, it is incorrect to explicitly state that the withdrawal of these weapons would subsequently lead to the end of extended deterrence. Nevertheless, a NWFZ in Europe would impact nuclear sharing within NATO, as NWFZ obligations go beyond the requirements of the NPT by prohibiting the stationing of nuclear weapons on the territory of NNWS.

In turn, Russia has made no political commitments to geographically limit nuclear deployments, neither on its own sovereign territory, nor within the context of the Collective Security Treaty Organization (CSTO).[23] Yet the CSTO, in contrast to NATO, practices no nuclear sharing and the existing commitments to extended (nuclear) deterrence remain relatively weak. The 1992 Collective Security Treaty (CST) stipulates general solidarity among members in case of military aggression. Article 4 considers an armed attack against one of them as an aggression to all,[24] but in practice these provisions have never been tested.

In addition, both the Russian Military Doctrine (2010 and 2014)[25] and the more recently published *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence* (2020) extend nuclear deterrence to Russian allies (which do not necessarily need to be congruent with CSTO member states), including the "right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass

destruction" against them.[26] In February 2010, then CSTO Secretary General Nikolai Bordyuzha emphasized this point with reference to the 2010 Military Doctrine, suggesting that Moscow's nuclear umbrella had now been extended to other CSTO members.[27] It is unclear, however, whether CSTO members attribute military value to these political declarations. More particularly, Moscow's pledges of extended nuclear deterrence interfere with legal provisions of the NWFZ in Central Asia with Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan as members. Indeed, as will become clear, it appears that extended deterrence can be compatible with commitments to NWFZ, setting a precedent for future arrangements that incorporate or adapt to these elements.

Established NWFZ: Lessons Learned

In Europe, the idea of using regional zones to limit the deployment of nuclear weapons was first articulated by Polish Foreign Minister Rapacki in October 1957 with the goal to ensure the nuclear-free status of both West Germany and the German Democratic Republic (GDR), which in turn would have supported similar efforts in Poland and then Czechoslovakia.[28] Two months later, Soviet Prime Minister Nikolai Bulganin backed the idea of a Central European NWFZ in a letter addressed to U.S. President Eisenhower.[29] The next year, in February 1958, Rapacki doubled down with another concept that also addressed Western concerns, including the provisions of 'no first use' commitments, the use of nuclear weapons against zone members, inspection arrangements and questions of recognition.[30]

A third plan presented by Rapacki in Autumn 1958 linked the NWFZ to the level of conventional forces in the region, but the evolving Berlin crisis and the ongoing storage of U.S. and Soviet nuclear weapons in Central Europe ended further considerations of the proposal.[31] Instead, the zone concept appealed to African states opposing French nuclear testing. On 24 November 1961, eight African states presented a draft resolution to the UN General Assembly First Committee "calling for all states to refrain from testing, storing, or using nuclear weapons in Africa and to regard Africa as a 'nuclear free zone."[32] Brazil supported the 1961 African NWFZ resolution and proposed a similar zone within its region. In March 1963, a collective that included Bolivia, Brazil, Chile, and Ecuador joined Mexico in supporting a Latin American NWFZ.[33]

Four years later, the Treaty of Tlatelolco from 1967 established a precedent for the meaning of the concept, covering the territories of Latin America and Caribbean countries. Building upon the proposals by Rapacki and Bulganin in Central Europe, the joint attempt by states in Latin America addressed the aftermath of the 1962 Cuban missile crisis.[34] By signing onto the NWFZ

concept, the participating states primarily developed a means of preserving a nuclear weapon-free status for their region. Thus, NWFZ were from the start linked to non-proliferation efforts, rather than disarmament or simply the reduction of nuclear risks.[35] Nevertheless, zonal states were ultimately able to "extract negative security guarantees from nuclear powers [...] and to secure the right to peaceful nuclear development, even including the exchange for support of such peaceful endeavours".[36]

Moreover, the Treaty of Tlatelolco subsequently inspired similar treaties in the South Pacific, Southeast Asia, Africa, and Central Asia.[37] Today, legal agreements prohibit the acquisition, manufacturing, testing, possession of nuclear weapons and nuclear explosive devices (NED) in the entire southern hemisphere, with few exceptions. In addition, the NWFZ in Central Asia (Treaty of Semipalatinsk), which covers Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, and the Treaty of Pelindaba with 41 African state parties to date also prohibit research and development on NED (Table 1).[38]

Table 1: Established Regional NWFZ at Present

Treaty	Region	Year (signature)	Year (ratification)	State Parties
Treaty of Tlatelolco	Latin America & Caribbean	1967	1969[39]	33
Treaty of Rarotonga	South Pacific	1986	1986	13
Treaty of Bangkok	Southeast Asia	1995	1997	10
Treaty of Pelindaba	Africa	1996	2009	41
Treaty of Semipalatinsk[40]	Central Asia	2006	2009	5

The processes of establishing NWFZ in the Global South and Central Asia point to the salience of five essential dimensions that need to be addressed: (1) boundary and scope of the zone, (2) transit rights, (3) existing security commitments, (4) negative security guarantees (by states beyond the zone), and (5) means of verification.[41]

Boundary and Scope

The five existing NWFZ not only cover a large geographic area, but also share a commonality in the behavior prohibited within respective regional limits. By design, the scope *inter alia* forbid the use, testing, manufacturing, production and acquisition as well control of, storage and transport of any nuclear weapon or other nuclear explosive devices through the territory of state parties (Table 2). At the same time, the zones also sometimes diverge on some provisions concerning boundary and obligations, which, ultimately, do reflect local geostrategic conditions and the regional balance of power. Similarly, the political arrangements for monitoring and compliance differ for each zone.

Table 2: Prohibited Behavior of State Parties to existing NWFZ

Prohibited Behavior	*Tlatelolco*	*Rarotonga*	*Bangkok*	*Pelindaba*	*Semipalatinsk*
Use/Test	X	X	X	X	X
Manufacturing/ Production	X	X	X	X	X
Acquisition	X	X	X	X	X
Control		X	X	X	X
Deployment/Storage/Stationing/Transport	X	X	X	X	X
Encourage prohibited behavior	X	X[42]	X	X	X
Seek/receive assistance in conducting		X	X	X	X

prohibited behavior					
Research & Development				X	X
Waste Disposal		X	X	X	X

First, the geographical scope of all five zones include respective sovereign land territory, internal water, territorial sea, and archipelagic waters as well as all airspace above them. Yet, the Treaty of Bangkok also extends to the exclusive economic zone (EEZ) as prescribed by the UN Convention on the Law of the Sea (UNCLOS); that is, the 200 nautical miles from the coastal baseline of State Parties, and their continental shelf. This provision stalled support by the P5 for the zone, none of which has yet signed the respective protocol providing negative security guarantees.[43] In this vein, China objects to the scope, because it includes parts of the South China Sea that remain subject to territorial disputes. Meanwhile, the United States has argued that the provision effectively bans transit of nuclear-armed surface ships and submarines within an area of strategic significance.[44] This reservation also relates to another unique provision of the protocol that not only prohibits NWS to use or threaten to use nuclear weapons against any State Party, but also "within the Southeast Asia Nuclear Weapon-Free Zone", which could formally ban the launch of (nuclear) missiles from the zone against targets outside of it. In turn, to France and the United Kingdom, the inclusion of the EEZ and the continental shelf contradicts UNCLOS, which only allows littoral states to explore natural resources in the area but does not provide for political control.[45]

Second, in addition to the list of prohibited behavior mentioned above, the Treaty of Pelindaba and the Treaty of Semipalatinsk diverge from other zones by not allowing for research and development on nuclear weapons or NED. This provision goes beyond NNWS obligations under the NPT, "whose prohibition only applies to the activity of manufacturing."[46] In the former case, the group of experts responsible for the text that would establish the African NWFZ intentionally outlined the inclusion of "research," which dates back to the initial Harare draft produced in October 1993.[47] The desire for a fully comprehensive prohibition of activities, possibly goes back to experiences with the South African nuclear weapons program. Similarly, the inclusion of research in the list of prohibited actions in the Central Asian NWFZ might have been motivated by the experience of nuclear weapons testing in Kazakhstan.

Third, as the first regional NWFZ, the Treaty of Tlatelolco (still) permits peaceful nuclear

explosives (PNE) under Article 18 and does not specifically regulate the disposal of radioactive waste. The former had been controversial from the beginning with several state parties, particular Mexico as the leading nation during the negotiations, arguing that it would contradict the definition of nuclear weapons in Art. 5 and thus be prohibited. Such reservations rested on the idea that to differentiate peaceful from non-peaceful explosions would be empirically impossible.[48] For the same reason, both the United States and the Soviet Union upon ratifying Protocol II to the Treaty specifically added interpretive statements to the effect that the development and explosion of any nuclear device would count as a violation.[49] The relevance of this point became most apparent within the context of the South African nuclear weapons program, which the government initiated in 1970 with the officially stated goal to produce a PNE for mining applications.[50] The Indian nuclear explosion in 1974, which was presented as "peaceful," reinforced the norm to exclude PNE in subsequent NWFZ treaties, as well as in the **NPT Context**[51]

Transit Rights

As touched upon in the previous section, maritime and airspace transit rights for third parties are among the most contentious issues for NWFZ frameworks. For all existing zones, with the exception of the Treaty of Tlatelolco, decisions on transit rights are explicitly left to the discretion of State parties. Moreover, these decisions also cover the visit of ports by foreign vessels (which could possibly be equipped with nuclear weapons), inclusive of travel through territorial waters and airspace. By contrast, within the Treaty of Tlatelolco, the issue of transit is not directly addressed. From 1965 to 1967, the Treaty's preparatory Commission, however, considered alternative versions of article 1 that would have prohibited the parties from permitting transport of nuclear weapons in their territories.[52]

The United States, which actively participated in the consultation process, clarified its intentions already in 1966, however, by informing the Preparatory Commission that the treaty should impose "no prohibition that would restrict the freedom of transit within the Western hemisphere."[53] Ultimately, the Preparatory Commission chose to address the issue with an explanatory note in its Final Act by suggesting that transit and transport "must be understood to be governed by the principles and rules of international law". It thereby delegated the decision to the sovereign right of State parties.[54]

The NWS have explicitly relied on this statement to legitimize their policies. Upon signing Protocol II to the Treaty in 1971, the United States, for example, declared that doing so would neither affect the exclusive power of a State to grant or deny transit and transport privileges, nor affect the exercise of the freedom of the seas, or, regarding

passage through or over waters.[55] Similarly, France (1974) officially 'took note' of the interpretation in the Final Act by emphasizing the right of treaty members to grant free transit by third parties.[56] By contrast, the Soviet Union, when signing the same protocol in 1978, noted that permission of transit was subject to sovereign decision-making and recognized that such authorization would be "contrary to the objectives of the Treaty."[57] The People's Republic of China (1974) even pledged not to "send her means of transportation and delivery carrying nuclear weapons to cross the territory, territorial sea or air space of Latin American countries."[58] Both statements lack explicit ability for action, however, since such promises are neither enforceable, nor verifiable (without applying highly intrusive measures) and arguably reflect the different level of security interests of both states in the Western hemisphere.[59]

In fact, where strategic interests are prevalent, the issue of transit rights takes on significant importance. The Treaty of Rarotonga and the position of New Zealand illustrate existing political sensitivities. In this case the refusal of the Labour government to allow port access to the American warship USS Buchanan in February 1985 (on the grounds that it might be carrying nuclear-capable weapons) prompted the United States to suspend cooperation, including intelligence sharing, with New Zealand under ANZUS (Australia, New Zealand, United States Security Treaty 1951) in 1987.[60] New Zealand nevertheless continued on its path towards full nuclear-free status and in June 1987 enacted legislation to this end.[61]

Existing Security Commitments

In light of this episode, there is little doubt that states assume existing treaties and security norms take precedence when negotiating NWFZ. New agreements shall not supersede existing ones or allow parties to renege from current commitments, particularly within formal, established security and defence alliances. The 1975 UN study on NWFZ noted, for example, that "treaties establishing nuclear-weapon-free-zones should be consistent with other treaty obligations of the zonal States."[62] At the same time, the authors clarified that once obligations within a NWFZ had been established, no other agreements could justify exceptions.[63]

In this context, the Treaty of Semipalatinsk provides an interesting case for the compatibility of NWFZ with existing security alliances, as three of its state parties (Kazakhstan, Kyrgyzstan, and Tajikistan) are members of the CSTO. As mentioned above, Russian doctrines formally extend nuclear deterrence to allies, interpreted to be inclusive of CSTO partners. Moreover, Article 4 of the CST from May 1992 entails a collective defence clause similar to Article 5 of the North Atlantic Treaty (as previously mentioned): any aggression against one member state will be considered as an aggression to all treaty members, which are

entitled to provide "support [...] by all means available in exercise of the right of collective defence under Article 51 of the Charter of the United Nations."[64]

Interestingly, Article 12 of the NWFZ in Central Asia holds that the treaty will not affect the[se] rights and obligations that its members might have assumed under prior accords.[65] While CSTO membership as such appears to be unproblematic as long as no nuclear weapons are stationed on the territory of NWFZ members, France and the UK upon signing the additional protocol to the NWFZ in May 2014 hedged against potential misunderstandings by emphasizing that Article 12 would prohibit all actions described in Article 3 and 5 of the Treaty.[66] Likewise, the State Department proposed that the United States, whose ratification of the protocol is still pending, should include a similar statement.[67]

Australia's membership in the Treaty of Rarotonga provides another example of the compatibility of NWFZ with existing alliance membership. The NWFZ negotiations from 1983 to 1985 were "crafted in such a way as to harmonise its obligations with existing ANZUS practice,"[68] owing much to Australia's willingness to preserve its security relationship with the United States and to "pre-empt more comprehensive regional denuclearization."[69] Similar to the CST and NATO, the ANZUS Treaty views any attack in the Pacific, including those on metropolitan areas or islands of any of the signatories, as a "common danger" but falls short of prescribing concrete recipes for action.[70] As such, the Treaty is largely declaratory and symbolic, as it does not guarantee automatic military support and does not directly address nuclear power or (nuclear) deterrence.[71] Nevertheless, the bilateral security relationship between Australia and the United States certainly encompasses nuclear issues short of use and deployment of weapons, but including the hosting of Command, Control and Communications Intelligence bases, the acceptance of nuclear ship visits, and other relevant activities (including a deal on nuclear powered submarines in 2021).[72] Hence, both examples demonstrate that NWFZ do not necessarily contradict alliance membership, and even allow for nuclear linkages, that enable the practice of extended deterrence.

Negative Security Guarantees

The relationship between NWS and zonal members extends beyond such nuclear linkages, however. All existing NWFZ contain additional protocols with relevance for external states and, in particular, NWS. These provisions include primarily two kinds of negative security assurances: the extension of the NFWZ to overseas territories within the zone and the obligation to refrain from the threat and use of nuclear weapons against state parties to the Treaties. Three NWFZ (Tlatelolco, Rarotonga, Pelindaba) include protocols that extend their basic provisions to territories "for which, de jure or de facto" external states are "internationally responsible and

which lie within the limits of the geographical zone." These primarily cover overseas territories of France and the United Kingdom, but also the United States, the Netherlands, and Spain. To date, only the respective protocol (Protocol I) of the Treaty of Tlatelolco has been ratified by all relevant states, including France, the Netherlands, the United Kingdom, and the United States.

In the case of both France and the United States, the process of finding agreement and ensuring ratification of Protocol I to the Treaty of Tlatelolco was a lengthy ordeal over the course of several years. Initially, the United States objected to the incorporation of Guantanamo (Cuba), Puerto Rico, the U.S. Virgin Islands, and the Panama Canal in the zone.[73] After long and complex negotiations, it was the personal support of President Carter that tipped the balance by signing Protocol I in May 1977, declaring that the United States "will not deploy nuclear weapons in the Caribbean or in the Central or Southern American Continents".[74] Four years later, the U.S. Senate ratified the decision. Likewise, the French position changed only in March 1979 after President Valery Giscard d'Estaing indicated the intentions of the government to do so in a speech to the 10th UN Special Session of the UN General Assembly on Disarmament in May 1978.[75] Nevertheless, it took another twelve years before France finally ratified the Protocol in August 1992 by virtue of which the overseas departments of French Guiana, Martinique and Guadeloupe became nuclear-free zones. Thus, both France and the United States, but also the United Kingdom, have in practice accepted the existence of varying NWFZ commitments for parts of sovereign territory, which creates possible precedent for similar arrangements elsewhere.[76]

This broad consent, however, does not come without requirements or conditions. In fact, all four states mentioned above have attached either explanatory notes, statements or declarations of reservation to their signature or depository action. For example, upon ratification in France, it was officially declared that doing so shall not "impair the full exercise of the right of self-defence as provided for in Article 51 of the Charter of the United Nations," nor shall it "oppose the transit through the Territories of the French Republic situated within the zone covered by the Treaty."[77] The latter reservation goes further than the transit right clause in the Treaty, as it explicitly excludes the application of Article 1 (basic provisions) and Article 13 (IAEA Safeguards). Hence, in times of war the defence of French territory in the zone, including with nuclear weapons, remains possible while the movement of weapons in and out the zone, though not the deployment, is explicitly allowed. By the same token, existing assurances within the respective protocols to NWFZ "not to use or threaten to use nuclear weapons against" any State Party and those overseas territories for which extra-territorial states have become responsible,[78] are only valid in peacetime. Given the focus of NWFZ on nuclear non-

proliferation, questions of (military) capabilities and their control and/or verification are not addressed.

Verification Mechanisms under International Oversight

To date, verification of NWFZ agreements relies principally on the adoption of IAEA safeguards measures to conclude peaceful purposes of nuclear materials, facilities or applications, and to encourage or require adoption of a Comprehensive Safeguards Agreement; only in the case of the Treaty of Semipalatinsk (NWFZ in Central Asia) is there an additional requirement to adopt the IAEA's Additional Protocol, allowing for broader access on the ground within a certain territory and more information of a state's nuclear fuel cycle and materials, to include pursuits of energy, research and other related development activities. While international organisations currently monitor the status of safeguards compliance and potential for divergence of peaceful activities or global nuclear weapons tests, no entity or monitoring body has been officially appointed to enforce or verify treaty compliance within these zones.

In fact, the IAEA does not serve as an internationally appointed "nuclear watchdog" as per its mandate, although this role is sometimes informally assigned to it. Instead, the IAEA serves as an administrator of international nuclear safeguards of peaceful activities as enabled under the NPT. As Tamara Patton et al. put it, the organisation's efforts are "limited in scope" when non-military applications are concerned, while "covering either nascent or renounced programs," which highlights the IAEA's sole role in only confirming peaceful purposes of nuclear energy and applications.[79] Confirming absence of capabilities for nuclear weapon development is a product of its mandate, though it is not explicitly within the driving factors or scope of its mechanisms. The latter encompass the application of international nuclear safeguards, which states parties are subject to, and depend on the agreements concluded bilaterally between states parties and the IAEA.

This distinction is crucial when talking about the conceptual difference between existing NWFZ and the potential for such zone scope in Europe: The IAEA serves the international community by verifying compliance of peaceful purposes of nuclear activities and therefore could be seen as supporting non-proliferation ideals. However, it has neither the capabilities, nor the mandate to address military, arms control or disarmament uses. Although the IAEA and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) can provide important lessons learned on non-proliferation topics through limited inspections, site-specific exercises, facilitation of information exchange and sharing of good practices, each has its own clearly defined mandates that do not encompass the verification needs for NWFZ, nor is there a focus on disarmament. In this context, verification procedures would need

to be oriented at ensuring the total absence of nuclear weapons.

NWFZ Proposals for Europe: Enduring Challenges

International debates both within the framework of the UN Conference on Disarmament (Committee on Disarmament) and during NWFZ negotiations have frequently pointed to the fact that the conditions for the establishment of NWFZ are inherently disparate, differing in conditions from continent to continent or even from state to state. Hence, despite shared principles, it is not possible to devise a single formula or to lay down general principles, which could cover all cases. Divergent security interests between NATO and Russia, but also a patchwork of nuclear statuses among European states further complicate the regional situation in Europe. Indeed, the conceptual shift from proliferation to disarmament sets Europe apart from both existing NWFZ discussed above and previous proposals for the establishment of NWFZ in Europe from the 1950s to the mid-1990s.

Historical Zone Concepts

Since the mid-1950s, many states have presented numerous proposals for the establishment of NWFZ in Europe, all of which predominantly focused on either symbolic, political gains, the prevention of nuclear proliferation on the continent or the pursuit of concrete national security interests as part of alliance politics. Apart from general calls for action, most concepts covered either central Europe or the Nordic region, including the Arctic (Table 3). Within the context of the Cold War, these areas, however, were simultaneously of particular relevance to the security interests of both politico-military blocs and, hence, were widely seen as inapplicable for the establishment of zones.

For example, in October 1963 during the UN discussion on the Latin American initiative to establish a regional NWFZ, U.S. Ambassador Stolle remarked that "some of the proposals [...] would alter the balance of power in a way which would be detrimental to world peace" pointing "specifically to proposals calling for nuclear-free zones in Europe and also in Asia and the Pacific."[80] In other words, whereas in the Treaty of Tlatelolco and elsewhere the main problem had been to prevent member states from acquiring nuclear weapons, European NWFZ would have primarily constrained and influenced the activities of nuclear weapon states.[81]

Given these sentiments and the structural limitations of the Cold War, two sets of states sought to establish NWFZ in Europe: First, domestic peace movements and general support of détente motivated non-aligned (neutral) states, particularly Sweden and Finland. In addition, for these states the establishment of a Nordic NWFZ could have contributed or enhanced perception of their 'neutral' status and thus serve national security interests. At the time, this idea was

considered despite ongoing concerns about Soviet nuclear weapons deployed on the Kola peninsula, which remains a critical point and highly sensitive to relevant parties. Second, the Soviet Union until the mid-1960s aimed at ensuring the denuclearized status of Germany (and possibly Central Europe and the Balkans) in order to lock-in military advantages due to superiority in conventional weapon. Some formal Soviet allies within the WTO (Romania, Poland) also sought to use the NWFZ concept in order prevent the stationing of Soviet nuclear weapons on their territory and to curb the then accelerating arms race.

Table 3: Selected official NWFZ proposals for/by Europe 1957-1996

Nr	Year	State	Territorial Scope	Aims/Content
1	1957-1964	Poland	Central Europe	non-proliferation, preventing nuclearization of Germany; freezing of nuclear arsenals in Central Europe
2	1957	Soviet Union	Central Europe	No use of nuclear weapons, cessation of testing, no stationing of nuclear weapons in Germany
3	1957,1959	Romania	Balkan	peace zone free of foreign military bases[82]
4	1959	Soviet Union	Balkan-Adriatic region	banning nuclear weapons and rockets, preventing deployment of U.S. missile installations in Greece[83]
5	1958-1961	Ireland	Regional and global	banning manufacturing, purchase and possession of nuclear weapons by NNWS; Non-proliferation of nuclear weapons and technology by NWS; prohibition of testing
6	1961	Sweden	Global	banning production, acquisition, hosting and testing of nuclear weapons by NNWS
7	1963	Finland	Northern Europe	banning the production, deployment and transfer of nuclear weapons

8	1963/1969	Soviet Union	Mediterranean region, including North Africa, Balkan	non-deployment of nuclear weapons, a ban on transfer and negative security guarantees of the NWS
9	1970-1974	Romania	Balkan	nuclear weapons free zone of peace, regional cooperation[84]
10	1982	UN	Central Europe	battlefield-nuclear weapons-free zone along the NATO-WTO contact zone
11	1987	Soviet Union	Arctic	international zone of peace, limiting naval activity in adjacent seas, peaceful cooperation in exploiting resources, scientific research etc.
12	1990	Belarus	Central and Eastern Europe	nuclear weapon free belt, no stationing of nuclear weapons by NNWS in the region
13	1995	Belarus	Central and Eastern Europe	banning of possession, development, testing and stationing of nuclear weapons
14	1996	Belarus, Ukraine	Central and Eastern Europe	see above, three different membership categories with different obligations

By contrast, the proposal by the Independent Commission on Disarmament and Security Issues (also referred to as the Palme Commission) under the chairmanship of Swedish Prime Minister Olof Palme went further. In 1982, it recommended the establishment of a battlefield-nuclear-weapon-free zone in Central Europe (that is the inner German border and then Czechoslovakia), which would be ultimately extended to cover the contact zone between NATO and the WTO from the north to the south. In this context, the proposal differed considerably from both the Treaty of Tlatelolco and most previous proposals or ideas for NWFZ in Europe. Rather than nuclear non-proliferation, it aimed at explicit disarmament measures by reducing the numerous forward positioned nuclear weapons at the time, which included short-range rockets, mines, and artillery with ranges of up to 150 kilometres on each side. Thus, the Palme commission envisioned the battlefield-nuclear weapons-free zone primarily as an "important confidence-building measure that would raise the nuclear threshold and reduce some of the

pressures for early use of nuclear weapons."[85] In this sense, the proposal acknowledged the "illusion of limited nuclear war" and the escalatory dangers associated with such doctrine.

Despite its political significance, the military value of the proposal remained contested even among members of the Commission. The Soviet representative, Georgy Arbatov, for example, "expressed doubts about [its] arms control value," suggesting that "nuclear munitions could be quickly reintroduced into the area." Instead, he proposed "radical reductions up to a complete ban of all medium and tactical nuclear weapons" in Europe.[86] At the time, such more advanced ideas would have to, as even Palme himself acknowledged with regard to the implementation of the zone idea, "materialize in parallel with, but not necessarily after, an all-European arrangement."[87] To some extent, as discussed earlier, this transpired after 1988. First, with the ratification and later implementation of the INF Treaty, and second, due to the end of the Cold War and the mutual U.S.-Soviet/Russian commitments under the PNIs.

Subsequent NWFZ proposals after the Cold War by Belarus[88] in the 1990s (1990, 1995, 1996), which were at times supported by Ukraine,[89] sought to lock-in these gains, yet once again clashed with strategic interests. This iteration came to head in Central and Eastern Europe where states were striving for NATO membership, achieving and ensuring national security while pursuing a Trans-Atlantic political identity. At the NPT Preparatory Committee (PrepCom) in 1998, for example, Poland stated on behalf of nine states in the region (Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia, Macedonia, and Slovenia) that it opposed the NWFZ idea. In the view of states in Central and Eastern Europe NWFZ were "incompatible with our sovereign resolve to contribute to, and benefit from the new European security architecture [...] including the North Atlantic Treaty Organisation and the European Union."[90]

Nuclear Patchwork

In light of the above, the nuclear order today in Europe arrives in the form of a patchwork with different security zones based on various nuclear and nonnuclear commitments. These include both political and legal provisions not to host nuclear weapons, which contrast with both nuclear sharing arrangements and the possession of nuclear weapons under the NPT in case of France, Russia, the United Kingdom, and the United States. The Treaty on the Final Settlement with Respect to Germany (Two Plus Four Treaty) from September 1990, for example, prohibits the stationing of nuclear carriers (and nuclear weapons) on the former GDR territory, which applies to both German and foreign armed forces.

Yet, it allows the deployment of dual capable conventional weapons systems as long as they are only equipped for conventional roles and designated as such (Article 5 (3)).[91]

Furthermore, within the context of the NATO-Russia Founding Act, NATO members in May 1997 declared to "have no intention, no plan and no reason to deploy nuclear weapons on the territory of new members, nor any need to change any aspect of NATO's nuclear posture or nuclear policy and do not foresee any future need to do so."[92] Although this commitment is merely political in nature and thus open to change, it effectively sets up a non-nuclear weapons zone (at least in peacetime) as the current *status quo* in most of Central and Eastern Europe.

In addition, several European states unilaterally deny the stationing of nuclear warheads on their sovereign territory (and, where applicable, passage of nuclear-laden vessels through ports) in peacetime, including Denmark, Norway, and Spain, while Iceland and Lithuania prohibit deployment at any time.[93] The previsions come with several caveats, however. In case of Norway and Denmark such these policies are combined with significant conventional defence contributions, including the decision to leave open the issue of wartime deployment and even the tacit acceptance of transit and port visits.

Moreover, since 1951, Iceland has formally delegated the responsibility for territorial defence to the United States (Table 4). In January 2001, Latvia, too, sought to prohibit nuclear-powered and nuclear-laden warships from entering its internal waters, but eventually reversed its decision the same year to ensure it could participate in joint defence measures with NATO.[94] In addition, the neutrality status, enshrined in the national legislation of Austria and Ireland, prohibits any form of nuclear engagement, including the production of energy by nuclear fission. Both these states (plus Malta and the Holy See) also ratified the TPNW.

Table 4: Existing Commitments to Limiting Nuclear Deployment in Europe

State	Type	Commitment	Document/Source
Austria	Legal	No manufacturing, storage, transport, test or use of nuclear devices, including the transport of fissile materials and nuclear energy[95]	Declaration of Neutrality, Federal Constitutional Law on a nuclear-free Austria, Treaty on the Prohibition of Nuclear Weapons
Denmark[96]	Political	No stationing of nuclear weapons (warheads) in peacetime	Consistent declaratory policy since 1957
Germany[97]	Legal	No stationing of nuclear carriers and nuclear warheads on the former GDR territory	Treaty on the Final Settlement with Respect to Germany

Ireland	Political, Legal	see TPNW provisions	Treaty on the Prohibition of Nuclear Weapons, consistent declaratory policy based on neutrality status[98]
Iceland[99]	Political	not specified	Parliamentary resolution on a national security policy for Iceland 2016, Nr. 10[100]
Lithuania	Legal	No importation, stationing and production of nuclear weapons; No reprocessing of radioactive matter used for the production of nuclear weapons	Law on Environmental Protection, Art. 21[101]
Norway	Political	No stationing of nuclear weapons (warheads) in peacetime, no naval visits with nuclear-laden vessels [102]	Consistent declaratory policy since 1957 (speech by Prime Minister Gerhardsen) and 1961 (Labour Party Congress)[103]
Spain[104]	Political	No stationing of nuclear weapons (warheads) in peacetime	Treaty of Friendship and Cooperation 1976 (US-Spain), Parliamentary Resolution 1981, Public Referendum 1986
NATO	Political	No deployment of nuclear weapons on the territory of new members (in Central and Eastern Europe)	Founding Act on Mutual Relations, Cooperation and Security between NATO and the Russian Federation

On the other hand, public opinion in France, as the only nuclear weapon state in the EU, is largely in favour of the country's status as a possessor. Moreover, most EU member states are also members of NATO, with disarmament policies mostly based on considerations stemming from their commitments as members of the organisation, including, as mentioned above, nuclear sharing and its support by conventional military means.

Verification Strategies and Challenges

These diverse (non-)nuclear commitments illustrate the variety of existing views about the security benefits of nuclear weapons in Europe, but also emphasize the practical and political challenges of ensuring non-nuclear status that go beyond declaratory policy. More recently, two issues have brought the resulting political conflicts to the fore: the demise of the INF Treaty in August 2019 and the public, normative pressure created by

the coming into force of the TPNW in January 2021. Apart from necessary political will, which is the *conditio sine qua non* for any NWFZ, both issues point to the value and importance of viable verification measures in addressing existing security concerns.

The question of verification strategies, more than any other issue, depends on the scope of the proposed zone and upon what is being prohibited.[105] Existing NWFZ, as mentioned earlier, rely on a series of comprehensive safeguard agreements (CSA) and related agreements with the International Atomic Energy Agency (IAEA), in addition to adopting the Additional Protocol (Treaty of Semipalatinsk). A comparable NWFZ zone within Europe would likely have requirements beyond already existing legal frameworks, particularly, if it includes NWS as members or guarantors. In this context, frameworks, such as the Quad Nuclear Verification Partnership (Norway, Sweden, United Kingdom, and United States) or the International Partnership for Nuclear Disarmament Verification (IPNDV), in addition to past verification experiments of naval assets at ports, could provide useful lessons for addressing verification challenges. Moreover, when establishing a NWFZ among NNWS in Europe some states could use novel societal verification efforts to contribute to full compliance with such an agreement.[106]

However, incorporating NWS territory, for example the Kaliningrad region as part of Russia, would pose additional challenges as it shifts the purpose of NWFZ from non-proliferation to disarmament. This would require the verification of the absence of nuclear weapons, given the current deployment of dual-capable delivery vehicles and, possibly, of warheads in storage. The same is true for those U.S. nuclear warheads, which are currently stored in vaults in aircraft shelters on the territory of NATO member states. In both cases, the establishment of a NWFZ would first make it necessary for both the U.S. and Russia to either destroy its SSNW or at least to remove all SSNW to central storage on its own national territory, and in the case of Russia, to the mainland, preferably to regions east of the Ural Mountains. Russia, as in the past, is prone to reject proposals, even if only adjacent to an NWFZ, that may in one way or another become the subject of an agreement that would impose limitations within its borders.[107] In addition, Moscow is currently not willing to reduce its SSNW arsenal, often citing the need to compensate against NATO's numerical advantage in conventional forces. Reductions are currently also likely opposed by major interest groups within the Russian military and nuclear arms industry. Under these circumstances, a massive redeployment of all Russian SSNW or their destruction do not seem achievable at present.

In addition to such political challenges, there are other obstacles to verifying both reductions and absence, some of which are unique to Russian SSNW. In the Kaliningrad

region, verification of Russian weapons can require different technical procedures due to different weapons types. For example, verification of certain naval arms would necessitate special and intrusive procedures such as extracting an item from a ship or a submarine and moving it to a special facility to verify that it is non-nuclear. Nevertheless, the New START practice of submarine-launched ballistic missiles inspection illustrates that even if inspections involve complex and time-consuming operations, the parties are willing to implement them.[108]

At the same time, there are several verification challenges that are common to both Russia and NATO. They include, among others, the verification of the absence of SSNW inside operational depots,[109] the elimination of nuclear weapons storage infrastructure on military facilities in order to reduce the possibility of long-term deployment, the inspections of launchers at nearby bases[110] and the conversion of dual-capable weapons systems to conventional-only systems.[111] To be sure, even such a set of measures could not prevent the future re-deployment of SSNW.[112] However, as Podvig and Snyder suggest, if implemented, particularly in combination, they could still provide a high level of certainty regarding the absence of nuclear weapons within a particular territory or on a class of delivery vehicles or launchers. In fact, "reversibility could also play a certain stabilizing role," because it provides "a hedge that enables progress in disarmament while giving states time to adjust their policies to new political conditions."[113] Yet, the capability problem cannot be solved short of complete nuclear disarmament.

This said, Russia and NATO could still use the above-mentioned steps in order to signal their intentions to avoid nuclear escalation in the region. Realistically, such a policy would need to be agreed and implemented under the umbrella of a bilateral U.S.-Russian agreement. Negotiations about SSNW and nuclear disarmament must be considered within a wider political context, which a political initiative for the establishment of a NWFZ in Europe might provide. One possible starting point to approach and test verification challenges with relevance for the establishment of NWFZ in Europe would be to seriously address the issue of dual-capable ground-launched missiles with intermediate range after the demise of the INF Treaty in August 2019. Russia has reportedly already deployed at least four brigades of 9M729 (SSC-8) cruise missiles,[114] whose range according to NATO exceeds 2,000 km. Moreover, with the RS-26 Rubezh Russia has tested (but not yet deployed) a road-mobile ICBM at INF flight ranges.[115] In September 2019, Russia proposed establishing a moratorium on deployment of INF-range missiles in a letter sent to NATO members and a number of other states, including China.[116]

Building upon this moratorium proposal, Russian President Vladimir Putin in October 2020 invited "all parties concerned to

consider specific options of reciprocal verification measures to remove existing concerns." In particular, he suggested verifying the "absence of ground-based intermediate- and shorter-range missiles at sites" in the Kaliningrad region, including (but not limited to) the 9M729 missiles, in exchange for verifying Aegis Ashore systems with Mk-41 launchers in Romania and Poland.[117] In December 2020, Vladimir Yermakov, the Department Head of for Arms Control and Non-Proliferation at the Russian Foreign Ministry, indicated that Russia would be open to extend verification procedures for systems with the 9M729 missiles to the entire European part of the country.[118] This point was reiterated by Deputy Foreign Minister Sergey Ryabkov in February 2021.[119]

NATO initially reacted negatively to the Russian proposal by pointing to the already deployed Russian systems.[120] In the context of the ongoing political and military escalation between Russia, Ukraine and NATO since November 2021, however, the United States confirmed its readiness to "discuss […] a transparency mechanism to confirm the absence of Tomahawk cruise missiles at Aegis Ashore sites in Romania and Poland, provided Russia offers reciprocal transparency measures on two ground-launched missile bases of our choosing in Russia."[121] Thus, curiously, the U.S. proposal is more limited in scope than the original Russian offer in terms of access to Russian territory. Overall, if such proposal idea would be implemented, it could also provide the context required for verifying the absence of short-range SSNW in Kaliningrad.

From the perspective of establishing a NWFZ in Europe, the absence of nuclear warheads in the Kaliningrad region is of primary importance, as it is located strategically close to European and NATO members. Yet, the deployment of dual-capable short-range missile brigades (SS-26 Iskander-M missiles) and one coastal-defence missile regiment, creates uncertainty.[122] What is more, the Iskander-M missile brigade stationed in the Kaliningrad region has a base-level facility, Kolosovka, which are theoretically designated to store nuclear weapons assigned to all delivery systems deployed on-site. If all Russian SSNW are indeed stored at national-level facilities on mainland Russia, then one could implement comparatively simple verification measures (i.e., using radiation detection equipment) at this operational storage depot to confirm that none of the missiles in Kaliningrad are nuclear-armed.[123]

Conclusion

This paper highlights possible scenarios for establishing a NWFZ in Europe by examining provisions and challenges of existing frameworks under already established treaties. Certainly, the Treaty of Tlatelolco set a precedent that NWS can move towards accepting NWFZ, if specific conditions are in place. Following the successful

establishment of this zone, the discussion indicates that widening the scope of regional NWFZ in Latin America and the Caribbean, the South Pacific, Southeast Asia, Africa and Central Asia, has been contingent on political conditions and exceptions, including additional explanatory notes and statements by NWS to enable certain security practices.

Likewise, the paper outlines that past proposals for establishing NWFZ in Europe were primarily related to concerns about nuclear proliferation and interests to lock in existing nuclear free status *de jure*. Yet, most initiatives were not integrated into long-term strategies of nuclear disarmament that adequately acknowledge the implied changes for the political order on the continent, and therefore, did not lead to a realized zone. Even though it is true that, for example, a NWFZ in Central and Eastern Europe (excluding the Kaliningrad region and Eastern Germany), would simply legally validate the current status quo, such a step would still have significant political implications. First, it might prevent zonal states from participating in NATO's nuclear planning group and would probably be incompatible with conventional contributions to nuclear operations under SNOWCAT. Second, even without the Kaliningrad region as part of such a zone, the NWS – but in particular Russia – would need to provide compelling negative security guarantees, including the assurance not to use or threaten to use nuclear weapons against members of the zone. Under the current geopolitical circumstances, this is unlikely.

In spite of – or maybe rather because of – the deepening crisis of European security since February 2022, NWFZ are still under consideration by a limited number of regional states. Given the nuclear patchwork on the continent, there are several European states poised to initiate and lead such discussions. Ireland, for example, is signatory to the TPNW and views the achievement of a world free of nuclear weapons as one of its five core foreign policy goals. Austria, another TPNW signatory, has supported general nuclear disarmament for decades. Likewise, Malta and Cyprus have forgone reliance on nuclear deterrence in their respective defence policies. The policies of these states demonstrate that while the NWFZ concept in Europe still faces considerable obstacles, the states mentioned above could still work towards a conceptual framework attuned to regional conditions.

At present, decisions regarding WMD policies are still subject to domestic-level politics and are largely made at the national level(s), differing from state to state. Until now, a majority of EU member states advocated a gradual approach to disarmament. Nevertheless, by drawing from historical experiences of negotiating NWFZ agreements in the Global South and in Central Asia for example, NNWS in Europe may consider the following steps:

- drafting statements of collective defence among states parties, such as with ANZUS;
- maintaining the decision on transit rights to be left to state parties;
- adopting international nuclear safeguards and relevant articles such as the IAEA Additional Protocol, where applicable;
- drawing lessons from NNWS that already participate in collective security agreements and can host certain capabilities, such as Australia, while banning weapons themselves on respective territories;

Accounting for the many potential pathways towards a NWFZ, most likely through a gradual approach, diverse threat perceptions and technical limitations will continue to affect the potential success of zonal ideas. Yet, thinking through the conditions necessary for the establishment of a NWFZ – even in a limited context – can serve as one instrument to positively address enduing challenges of a changing European security order, while contributing to both the global disarmament and non-proliferation agenda.

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[31] Stocker, "Accepting," 47.
[32] ibid. 48.
[33] "African-Nuclear-Weapon-Free-Zone (ANWFZ) Treaty (Pelindaba Treaty)," Nuclear Threat Reduction Initiative (NTI), last updated September 23, 2020, https://www.nti.org/learn/treaties-and-regimes/african-nuclear-weapon-free-zone-anwfz-treaty-pelindaba-treaty/.
[34] cf. Arlene Idol Broadhurst, "Nuclear Weapon-Free Zones: A Comparative Analysis of Theory and Practice," Aurora Papers 5, The Canadian Centre for Arms Control and Disarmament (1987): 7.
[35] cf. Broadhurst, "Nuclear Weapon-Free," 1.
[36] Ramesh Thakur (ed.), *Nuclear Weapons-Free Zones* (London: Palgrave Macmillan, 1998): 36.
[37] Outside of traditional geographic boundaries, other international agreements and treaties prohibit the deployment of nuclear weapons in physical spaces such as Antarctica (1959/1961), in the oceans and on the seabed (1971/1972) and in outer space (1967). Finally, several states have also unilaterally declared themselves as territories free of nuclear weapons, including the Philippines, New Zealand, Austria and Mongolia.
[38] This number includes the Sahrawi Arab Democratic Republic, which is recognized by the African Union but is not a UN member state.
[39] The first state to ratify the Treaty has been Mexico (September 1967). Since then the Treaty has been in force individually for single states after ratification. In 2002 the Treaty came into full force throughout the entire region when Cuba deposited its instrument of ratification, see "Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (LANWFZ) (Tlatelolco Treaty)," *Nuclear Threat Reduction Initiative* (NTI), last updated April 29, 2019, https://www.nti.org/learn/treaties-and-regimes/treaty-prohibition-nuclear-weapons-

latin-america-and-caribbean-lanwfz-tlatelolco-treaty/
[40] The city was renamed in 2007 from Semipalatinsk to Semei.
[41] See also Broadhurst, "Nuclear Weapon-Free."
[42] The Treaty of Rarotonga states that the Parties undertake "not to seek or receive any assistance [...]" and "not to take any action to assist or encourage". See South Pacific Nuclear Free Zone Treaty (with annexes), concluded at Rarotonga on 6 August 1985, https://treaties.un.org/doc/Publication/UNTS/Volume%201445/volume-1445-I-24592-English.pdf.
[43] The signing of the protocol had been originally planned for ministerial meeting of the ASEAN regional forum in July 2012 but ultimately did not take place.
[44] Alexander Kolbin, "The Bangkok Treaty Protocol: Why still not Signed by P5?" *Security Index: A Russian Journal on International Security* 19, no. 4 (2013): 64.
[45] Kolbin, "The Bangkok," 64.
[46] Müller et al, "A Nuclear Weapon-Free," 13.
[47] Implementation of the Declaration on the Denuclearization of Africa, United Nations General Assembly, A/48/371. October 18, 1993. https://undocs.org/pdf?symbol=en/A/48/371.
[48] John R. Redick, "The Tlatelolco Regime and Nonproliferation in Latin America," *International Organisation*, Vol. 35, no. 1 (Winter, 1981): 121.
[49] See INFCIRC/262, Communication Received from the Union of Soviet Socialist Republics Regarding the Treaty for the Prohibition of Nuclear Weapons in Latin America (1978), https://www.iaea.org/publications/documents/infcircs/communication-received-union-soviet-socialist-republics-regarding-treaty-prohibition-nuclear-weapons-latin-america and United States of America: Ratification of Additional Protocol II to the Treaty of Tlatelolco," United Nations, Office for Disarmament Affairs, accessed July 20, 2021, https://treaties.unoda.org/a/tlateloco_p2/unitedstatesofamerica/RAT/mexico_city.
[50] Robert E. Kelley, *A Technical Retrospective of the Former South African Nuclear Weapon Progra*mme (Solna: SIPRI, 2020), 9.
[51] Monica Serrano, *Common Security in Latin America. The 1967 Treaty of Tlatelolco* (London: University of London, 1992): 50-1.
[52] Davis R. Robinson, "The Treaty of Tlatelolco and the United States: A Latin American Nuclear Free Zone," *The American Journal of International Law* 64, no. 2 (April 1970): 301.
[53] Letter From the American Ambassador at Mexico (Freeman) to the Chairman of the Preparatory Commission for the Denuclearization of Latin America (Garcia Robles), August 29, 1966, *Documents on Disarmament 1965* (Washington D.C.: United States Arms Control And Disarmament Agency, 1966), 623, https://www.un.org/disarmament/publications/documents-on-disarmament/1965-dod/.
[54] Treaty of Tlatelolco: hearing before the Committee on Foreign Relations, United States Senate, Ninety-fifth Congress, second session, August 15, 1978 (Washington DC: US Government Printing Office, 1978), 47.
[55] "United States of America: Ratification of Additional Protocol II to the Treaty of Tlatelolco," United Nations, Office for Disarmament Affairs, accessed July 20, 2021, https://treaties.unoda.org/a/tlateloco_p2/unitedstatesofamerica/RAT/mexico_city.
[56] "France: Ratification of Additional Protocol II to the Treaty of Tlatelolco," United Nations, Office for Disarmament Affairs, accessed July 20, 2021, https://treaties.unoda.org/a/tlateloco_p2/france/RAT/mexico_city.
[57] Communication Received from the Union of Soviet Socialist Republics Regarding the Treaty for the Prohibition of Nuclear Weapons in Latin America, INFCIRC/262, International Atomic Energy Agency, July 1978. https://www.iaea.org/sites/default/files/infcirc262.pdf.
[58] "China: Signature of Additional Protocol II to the Treaty of Tlatelolco," United Nations, Office for Disarmament Affairs, accessed July 20, 2021. https://treaties.unoda.org/a/tlateloco_p2/china/SIG/mexico_city.
[59] Nevertheless, already at the time the implicit permission of nuclear weapons transfer though the zone was perceived as a problem and contested. In March 1972 the Soviet representative to the Conference of the Committee on Disarmament stated that it "provides an obvious loop-hole for violation of the rules governing that zone. "The transit of nuclear weapons through that zone", he added, "could serve as a screen for the deployment as well as for the use of nuclear weapons from the territory of the nuclear-weapon-free zone". See CCD/PV.553, 36. The Mexican representative conceded that "it is doubtless arguable that the Treaty would have been more perfect if the transport of nuclear weapons had been totally prohibited" but justified the omission with

reference to the equally loose formulation in the NPT allowing the "perpetuation and additional establishment of nuclear bases and installations in all parts of the world." See CCD/PV.55l, 17. The 1975 UN study notes that "some experts expressed the view that the commitments of States bound by the treaty establishing the zone should include the prohibition of transit", See "Comprehensive Study of the Question of Nuclear-Weapon-Free Zones in All its Aspects," Special Report of the Conference of the Committee of Disarmament, October 1976 (A/10027/Add.1): 40.

[60] Security Treaty between Australia, New Zealand and the United States of America (ANZUS), San Francisco, September 1, 1951. http://www.austlii.edu.au/au/other/dfat/treaties/1952/2.html.

[61] New Zealand Nuclear Free Zone, Disarmament and Arms Control Act 1987, https://www.legislation.govt.nz/act/public/1987/0086/latest/DLM115139.html.

[62] "Comprehensive Study of the Question of Nuclear-Weapon-Free Zones," 50.

[63] ibid. 50.

[64] Collective Security Treaty, May 15, 1992. https://en.odkb-csto.org/documents/documents/dogovor_o_kollektivnoy_bezopasnosti/.

[65] Treaty on a Nuclear-Weapon-Free Zone in Central Asia (CANWFZ), September 8, 2006. https://treaties.unoda.org/t/canwfz.

[66] Declaration of the Government of France upon signing the Protocol to the Treaty on a Nuclear-Weapon-Free Zone in Central Asia (CANWFZ). Permanent Mission of France to the Disarmament Conference, May 6, 2014, https://s3.amazonaws.com/unoda-web/wp-content/uploads/2015/02/R%C3%A9serves-fran%C3%A7aises-CANWFZ-Protocol.pdf. Declaration of the United Kingdom of Great Britain and Northern Ireland upon signing the Protocol to the Treaty on a Nuclear-Weapon-Free Zone in Central Asia (CANWFZ). United Nations, Office for Disarmament Affairs, May 6, 2014, https://treaties.unoda.org/a/canwfz_protocol/unitedkingdomofgreatbritainandnorthernireland/SIG/bishkek. The main concern has been Russia's ability to transport, and possibly deploy, nuclear weapons in the zone under the CST.

[67] "Treaty on a Nuclear-Weapon-Free Zone in Central Asia and Protocols," United States Department of State, accessed July 20, 2021, https://2009-2017.state.gov/t/isn/canwfz/index.htm.

[68] Thakur, Ramesh (1998): Stepping Stones to a Nuclear-Weapon Free World, in: R. Thakur (ed.): Nuclear Weapons-Free Zones, MacMillan Press: London, 16.

[69] Michael Hamel-Green, *The South Pacific Nuclear-Free Zone Treaty: A Critical Assessment* (Canberra: Peace Research Centre, Research School of Pacific Studies, Australian National University, 1990), 3.

[70] Security Treaty between Australia, New Zealand and the United States of America (ANZUS).

[71] cf. Christine M. Chinkin, "Suspension of Treaty Relationship: The ANZUS Alliance," *Pacific Basin Law Journal* 7, no. 1-2 (1990): 122. https://doi.org/10.5070/P871-2021952.

[72] Hamel-Green, *The South Pacific*, 57.

[73] In a letter from December 1965 during the NWFZ negotiations to the Chairman of the Preparatory Commissions, Garcia Robles, U.S. Ambassador William C. Foster noted that "w[e] do not wish to have included in the proposed nuclear free zone the Virgin Islands, since it is United States territory, or the Commonwealth of Puerto Rico, because of its integral relationship with the United States. See *Documents on Disarmament 1965* (Washington D.C.: United States Arms Control And Disarmament Agency, 1966), 627. http://unoda-web.s3-accelerate.amazonaws.com/wp-content/uploads/assets/publications/documents_on_disarmament/1965/DoD_1965.pdf. Similarly, the 1975 UN study holds that I

[74] Remarks of the U.S. President Jimmy Carter on Signing Protocol I of the Treaty of Tlatelolco, May 26, 1977. https://www.presidency.ucsb.edu/documents/treaty-tlatelolco-remarks-signing-protocol-I-the-treaty. and https://www.youtube.com/watch?v=3db1uPkb7XU

[75] See Tenth Special Session, Official Records, United Nations General Assembly, May 25, 1978. https://undocs.org/pdf?symbol=en/A/S-10/PV.3.

[76] Note that during the negotiations of the Treaty of Tlatelolco an alternative text had been proposed that would have allowed states with overseas territories to become members of the treaty itself. See Robinson, "The Treaty of Tlatelolco," 295.

[77] "France: Ratification of Additional Protocol I to the Treaty of Tlatelolco," United Nations, Office for Disarmament Affairs, accessed July 20, 2021,

https://treaties.unoda.org/a/tlateloco_p1/france/RAT/mexico_city.
[78] The Protocol to the Treaty of Bangkok contains similar provisions but it has not been signed or ratified by any NWS.
[79] Tamara Patton, Sébastien Philippe & Zia Mian, "Fit for Purpose: An Evolutionary Strategy for the Implementation and Verification of the Treaty on the Prohibition of Nuclear Weapons," *Journal for Peace and Nuclear Disarmament*, Vol. 2:2 (2019): 390.
[80] See Robinson, "The Treaty of Tlatelolco," 293.
[81] Cf. Broadhurst, "Nuclear Weapon-Free," 30.
[82] "Comprehensive Study of the Question of Nuclear-Weapon-Free Zones," 22.
[83] See Donna J. Klick, "A Balkan Nuclear Weapon-Free Zone: Viability of the Regime and Implications for Crisis Management," *Journal of Peace Research*, Vol. 24, no 2 (1987): 113.
[84] "Comprehensive Study of the Question of Nuclear-Weapon-Free Zones," 23 and J. P. Jain, "A Case Study in Non-Conformity," *The Indian Journal of Political Science*, Vol. 36, no. 1 (January-March 1975): 60.
[85] *Common Security: A Blueprint for Survival*. Report of the Independent Commission on Disarmament and Security Issues (Palme Commission) (New York: Simon & Schuster, 1982), 149.
[86] *Common Security*, 147.
[87] Olof Palme in 1983, cited in Broadhurst, "Nuclear Weapon-Free," 31.
[88] Müller et al, "A Nuclear Weapon-Free," 18 and Andrey Sannikov, "Bez"yadernoye postranstvo v tsentre Evropy kak faktor stabil'nosti [A nuclear free zone in the center of Europe as a factor of stability]," *Belorusskiy zhurnal mezhdunarodnogo prava i mezhdunarodnykh otnosheniy*, no.1 (1996), http://elib.bsu.by/bitstream/123456789/31026/1/1996_1_JILIR_sannikov_r.pdf.
[89] Volodymir A. Manzhola, Sergei P. Galaka, "A nuclear weapons free zone in Central and Eastern Europe: A Ukrainian Perspective," in Ukraine and European Security, ed. David E. Albright, Semyen J. Appatov (London: Macmillan Press, 1999),112-122.
[90] 'Statement by the Delegations of Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia to the Preparatory Committee for the 2000 Review Conference of the Parties to the Treaty on the Non- Proliferation of Nuclear Weapons', Geneva, 6 May 1998, NPT/CONF.2000/PC.II/24, cited in David S. Yost, 1999, The US and Nuclear Deterrence, Adelphi Series, 39: 326, Chapter 4, 53.
[91] Treaty on the Final Settlement with respect to Germany, September 1990, Treaty Series No. 88 (1991).
[92] Founding Act on Mutual Relations, Cooperation and Security between NATO and the Russian Federation, May 27, 1997, https://www.nato.int/cps/en/natohq/official_texts_25468.htm.
[93] The United States never deployed nuclear weapons in Iceland, but recently declassified documents by the U.S. State Department suggest that the issue was debated within the U.S. government in the 1950s (See William Burr (ed.) "U.S. Government Debated Secret Nuclear Deployments in Iceland," *National Security Archive*, August 15, 2016. https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2016-08-15/us-government-debated-secret-nuclear-deployments-iceland.) In 2019 hackers forged a press release stating that President Gitanas Nauseda had asked the United States to build a military base in Lithuania and relocate nuclear weapons from Turkey to the country ("Hackers fake press release about Lithuania asking US to move nuclear weapons," *Delfi.en*, October 18, 2019, https://www.delfi.lt/en/politics/hackers-fake-press-release-about-lithuania-asking-us-to-move-nuclear-weapons.d?id=82566327.)
[94] Jozef Goldblat, *Arms Control: the New Guide to Negotiations and Agreements* (London: SAGE Publications. 2002): 218. See also MacDonald, "The Theory and Evolution," 9.
[95] The Treaty on the Prohibition of Nuclear Weapons goes beyond the Federal Constitutional Law as it also prohibits the "use or threaten to use nuclear weapons or other nuclear explosive devices" and to "assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under the Treaty". See Treaty on the Prohibition of Nuclear Weapons, PA/CONF.229/2017/8, United Nations, 2017.
[96] Despite this official policy, Denmark in the past accepted port visits of U.S. nuclear-armed surface ships (until 1992 when the United States ended such deployments) and allowed the United States to transit and deploy nuclear weapons in Greenland. See Lars Van Dassen and Anna Wetter, "Nordic nuclear non-proliferation policies: different traditions and common objectives", in *The Nordic Countries and the European Security and Defence Policy*,

ed. Alyson, J. K. Bailes, Gunilla Herolf, and Bengt Sundelius (Oxford: Oxford University Press, 2006), 255.

[97] The commitment also extends to France, the United Kingdom, the United States and the Soviet Union (Russia) as signatures of the Treaty.

[98] In the early 1990s the Irish Parliament debated the question of Ireland becoming a nuclear free zone by including the prohibition of nuclear weapons transit on air, sea and land in the context of passing a law on radiological protection. See Una Jakob, *Die Abrüstungs- und Nichtverbreitungspolitik Irlands und Kanadas: Eine konstruktivistische Analyse* (Wiesbaden: Springer VS, 2019), 103-4.

[99] The United States reportedly never deployed nuclear weapons on Iceland but declassified State Department records show that U.S. government officials debated this option in the 1950s, including secret deployment. See Burr, "U.S. Government"; William M. Arkin, "Iceland melts," *Bulletin of the Atomic Scientists* 56, no. 1 (January 2000): 80.

[100] The parliamentary resolution states that "Iceland and its economic zone [shall] be declared a nuclear-free zone, taking account of international obligation, with a view to contributing to disarmament and peace", See Parliamentary Resolution on a National Security Policy for Iceland, Althingi, 2016. https://www.government.is/library/01-Ministries/Prime-Ministrers-Office/Parl-Res-Nat-Sec-Council-25-145-2016-tr-br-prot-SKIL-310817-.pdf.

[101] Law on Environmental Protection of the Republic of Lithuania, No. I-2223, January 21, 1992, http://www.asser.nl/upload/eel-webroot/www/documents/Lithuania/Law%20On%20Environmental%20Protection.pdf.

[102] Despite this official policy, Norway has in the past allowed visits by (nuclear powered) submarines and surface ships equipped with nuclear weapons. As Lodgaard and Gleditsch note, since international law grants immunity to military aircraft and naval vessels, it is impossible to verify whether the provision is respected or not. See Sverre Lodgaard and Nils Peter Gleditsch, "Norway - the Not so Reluctant Ally," in *Cooperation and Conflict* 12, no. 4 (1977): 213.

[103] Lodgaard, Gleditsch, "Norway," 210, 216.

[104] Between 1953 to 1979 Spain hosted U.S. nuclear weapons at air bases in Morón, Torrejón de Ardoz and Zaragoza, as well as the naval base of Rota. See Clara Portela, "The rise and fall of Spain's 'nuclear exceptionalism," *European Security* 23, no. 1 (January 2014): 91.

[105] Broadhurst, "Nuclear Weapon-Free," 29.

[106] Especially for small NWS, different societal verification methods that rely on open source intelligence can widen the amount of existing information and thus complement the capabilities of their (often limited) national technical means. Crowd-sourcing provides one possible method, where this form of citizen activity involves societal mobilization and depends upon the motivation and training of participants. In general, the more difficult and complex the task, the greater the requirements in terms of pre-existing knowledge and the more important distinct instructions by administrators. Whatever the form of public engagement – be it the public at large or a group of selected experts – the creative potential of crowds and the quality of problem solving requires a high level of internal diversity, independence and decentralization.

[107] cf. Ivan Safranchuk, "The Russian Position on the Creation of a Nuclear Weapons-Free Zone in Central Asia", *Yaderny Kontrol*, no.9 (Winger 1998/1999): 19.

[108] Pavel Podvig, Ryan Snyder and Wilfred Wan, "Evidence of absence: Verifying the removal of nuclear weapons," *UNIDIR*, 2018: 23.

[109] No inspectors have been allowed inside the storages or even operational depots of non-strategic nuclear weapons. However, the protocols for such possible inspections could be established on the basis of the Type Two inspections' protocols of the New START verification regime.

[110] As a development of the previous provision about elimination of nuclear weapons storage infrastructure this measure is required to prove the absence of SSNW in the storages of conventional weapons on certain bases.

[111] The New START verification regime has a protocol of conversion of nuclear bomber into conventional one. The save procedure could be made with dual-capable weapons systems.

[112] It should be noted though that reversing an already implemented withdrawal process is difficult and would be detectable. For example, the conversion of weapons systems from dual-capable to conventional one would normally be reversible but can still present a significant barrier to the deployment of nuclear weapons as resuming nuclear missions would require

physical modifications of the delivery vehicles and/or launchers. See Podvig et al, "Evidence of absence," 10.
[113] ibid. 10.
[114] Michael R. Gordon, "On Brink of Arms Treaty Exit, U.S. Finds More Offending Russian Missiles," *The Wall Street Journal*, January 31, 2019.
[115] "RS-26 Rubezh," Missile Threat, CSIS Missile Defense Project, accessed July 23, 2021, https://missilethreat.csis.org/missile/ss-x-31-rs-26-rubezh/.
[116] Kingston Reif, Shannon Bugos, "Russia, China Criticize U.S. Missile Test," *Arms Control Today* 49. (October 2019).
[117] Statement by Vladimir Putin on additional steps to de-escalate the situation in Europe after the termination of the Intermediate-Range Nuclear Forces Treaty (INF Treaty). *Kremlin*, October 26, 2020.
[118] "Vladimir Ermakov: my poka ne znayem, chto na ume u komandy Baydena" [Vladimir Ermakov: We don't know yet, what Biden team think]. *RIA Novosti*, December 25, 2020, https://ria.ru/20201225/ermakov-1590913968.html.
[119] "Brifing zamestitelya Ministra inostrannykh del Rossiyskoy Federatsii Sergeya Ryabkova" [Briefing of the Deputy Foreign Minister of Russian Federation Sergei Ryabkov]. *Rossiya Segodnya*, February 11, 2021. http://pressmia.ru/pressclub/20210211/953090432.html.
[120] In June 2021 the Heads of State and Government declared that "Russia's proposal for a moratorium on the deployment of intermediate-range missiles in Europe is inconsistent with Russia's unilateral and ongoing deployment of such systems on the continent and would not prevent Russia from building up such missiles outside of its European territory; this proposal is therefore not credible and not acceptable.", See Brussels Summit Communiqué. Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels, June 14, 2021, https://www.nato.int/cps/en/natohq/news_185000.htm.
[121] United States of America, "Areas of Engagement to Improve Security", non-paper presented to the Russian Federation on January 26, 2022 https://t.co/Eb6Yy46y59
[122] Sutyagin, "Atomic Accounting," 82-83.
[123] Podvig, "Nuclear Weapons in Europe," 8.