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THE TEN APORIAS OF OUR TIME. THE THEORY AND PRACTICE OF NUCLEAR DETERRENCE

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Abstract. Rising international tensions and the risks of sliding towards a nuclear conflict against the background of the erosion of the arms control system between Russia and the West is becoming the central subject of modern political discourse. In particular, the author investigates the psychological aspects of deterrence, the dichotomy of its functions of preventing and conducting nuclear war, the concepts of first and retaliatory strike, the dialectics of defense and offence, plans for limited nuclear war, and the effect of entanglement of nuclear and conventional weapons.

Keywords: limited nuclear war, launch-on-warning, escalation, ballistic missiles, hypersonic systems, space weapons, cyberwarfare, missile defense, arms control.

What a pity it is that the ancient Greek philosopher Zeno died 2500 years ago. He would certainly have found many more examples for his aporias, or logical paradoxes that are unsolvable within the set parameters of a given situation.[1] In our time, searching for answers to aporias is oftentimes not an intellectual game, but a question of life and death for our civilization. As, for instance, when the discussion is addressed to "nuclear deterrence" and its material foundation: arsenals of nuclear weapons of mass destruction. The problems of nuclear deterrence are in general, a singularly fruitful field of paradoxes and logical riddles. Professionals working on the subject find them a regular pain in the neck, while those concerned with the fates of the world for moral reasons find them highly alarming.

In the early 2000s, a group of State Duma deputies (including myself in my capacity as the deputy chair of the Defence Committee) visited a strategic missile base. In response to distinguished service recognition, a young officer said, "We are simply doing out duty because we understand what can happen if our

[1] Zeno's most famous aporia is that of Achilles and the tortoise. The idea is that, despite his superior speed, Achilles will never be able to overtake a tortoise that is some distance ahead of him. According to Zeno, when Achilles reaches the tortoise's starting point, it will have moved forward at least a little bit. It will then take Achilles some time to run that distance, by which time the tortoise will have moved further, and so on ad *infinitum*. The logical "trap" is that time is counted discretely up to the tortoise's next spatial position, while time is a continuum and, if counted for a little while longer, Achilles will overtake the tortoise.

missiles are not launched". Later, I privately asked him, "What would happen if the missiles are not launched?" He said, "Then their assigned targets will not be destroyed". I continued, "But do you realize that the launch of your missiles would mean you have failed in your primary duty – to deter aggression? Your missile strike will punish the aggressor, but it will not save Russia from the catastrophic consequences of a nuclear war?" The officer faltered for a moment, but then quickly found the right words, "Such matters are a task for politicians, we do what we have been trained to". He gave an absolutely correct response, yet, without being aware of it, he touched upon the main paradox of the entire theory and practice of nuclear deterrence.

At the Valdai Forum in October 2016, President Putin said, "Nuclear weapons are a deterrent and a factor of ensuring peace and security worldwide. It is impossible to consider them as a factor in any potential aggression"[2]. Indeed, in the absence of an effective defence from nuclear missiles, the security of great powers rests on their potential to launch a nuclear response to a possible attack. This potential requires tremendous financial, material and human resources. Nuclear forces, however, are not the bearer of nuclear deterrence as such, they are merely its pre-requisite. Deterrence itself should rest in the heads of the leaders of those states to whom deterrence is "addressed". And if they do not properly understand which actions could prompt another power to launch a nuclear strike, deterrence will collapse, and theory will instantly turn into practice –that is, an exchange of nuclear strikes with irreversible consequences for both sides. It will turn out then that all previous spending and efforts had failed to protect national security simply because they were not adequately reflected in the mind of the potential adversary. This may be considered the first *"nuclear deterrence aporia"*. Zeno, Achilles, and the tortoise can take a hike!

When it comes to military and strategic relations between states, nuclear deterrence is a particular area in the mentality of leaders and political elites. Yet this is not abstract philosophy à la Zeno. Through the use of economic resources and products of scientific and technological progress, this mindset materializes in the form of physical objects – nuclear arsenals and plans for their combat employment. This article analyses several principal paradoxes in this singularly contradictory area of today's international relations. The conclusion is that within the set framework of nuclear deterrence, its theory and practice its paradoxes (aporias), no matter how dangerous, do not have a logical solution. The only way to defuse the perils of nuclear deterrence relations and transform revised logical constructs into a material reality of fortifying the foundations of mutual security is by going beyond this framework into the logic of arms control.

[2] Meeting of the Valdai International Discussion Club. – *President of Russia. Official site.* October 27, 2016. URL: http://en.kremlin.ru/events/president/news/53151 (accessed May 29, 2021).

THE GENESIS OF NUCLEAR DETERRENCE

The nuclear deterrence doctrine emerged as a symbiosis of two elements: the idea of using military force to put political pressure on an adversary, and the revolution in nuclear physics that had created a weapon of boundless destructive power. The first element is thousands of years old; the second did not generate the nuclear deterrence doctrine immediately.

President Harry Truman recalled after the first nuclear bomb test of July 16, 1945 that he "regarded the bomb as a military weapon and never had any doubt that it should be used" [Newhouse 1989: 41]. And it was used, twice – on August 6 and 9 of that same year in Hiroshima and Nagasaki. However, on August 29, 1949, the USSR also tested a nuclear bomb, and did it far sooner than the United States had expected. Subsequently, the two powers started to build up their nuclear arsenals at breakneck pace, not in the interests of deterrence, but for the sake of victory in a war that appeared inevitable. The idea of nuclear deterrence was mostly confined to the works of American theorists such as Thomas Schelling, Henry Kissinger and Bernard Brodie [Brodie 1955].

In the event of a military conflict with the Soviet Union, the official U.S. doctrine of "massive retaliation" in the 1950s envisioned a massive air raid with the goal of dropping 4 700 nuclear bombs on the USSR, China and their allies [Kaplan 1983: 269]. Human casualties in these and neighbouring (neutral) states would total approximately 800 million dead [Ellsberg 2017: 100-104]. The idea was that there would be no retaliatory Soviet strike against the United States, and the only cost of victory would be the losses in the allied states in Europe and Asia.

It was only when the Soviet Union developed intercontinental airplanes and nuclear missiles that the United States started to seriously revise its views of a global war since it had now lost its traditional advantage of being unreachable beyond two oceans. The idea of nuclear deterrence moved to the forefront of U.S. military policy and it was formulated by Secretary of Defense Robert McNamara, whom President John F. Kennedy brought to the Pentagon in 1961. McNamara immediately ordered a revision of the "massive retaliation" doctrine and abandoned the plan for simultaneous strikes against the adversary's cities, yet he tried to experiment with the concept of strikes against military targets (the 1962 "Counterforce" strategic concept and the 1964 "Damage Limitation" concept).

At the same time, the nuclear arms race reached an unprecedented level. By the end of 1967, just six years after McNamara's appointment, the number of strategic ballistic missiles in the arsenal of the United States had grown 40 times[3]. And in 1963-1965, the country produced an average of one ground-based intercontinental

[3] In the early 1961, the U.S. strategic forces had 12 primitive Atlas ICBMs and two nuclear-powered submarines carrying 16 Polaris A-1 SLBMs each. In 1967, they had 1000 Minuteman-I and Minuteman-II ICBMs, 54 Titan II ICBMs, and 41 submarines with 656 Polaris A-3 and Polaris A-2 SLBMs. In fact, the strategic force build-up was even greater since up to 500 Atlas, Titan-I Minuteman-I and Polaris A-1 missiles were decommissioned and withdrawn. At the same time, approximately 200 B-52 and B-58 bombers were accepted in service. The number of strategic nuclear delivery vehicles (SNDV) grew from 1850 to 2500, and the number of warheads increased to 5000, with 75 per cent of this potential being virtually invulnerable since they were deployed in hardened launch silos and on submarines.

ballistic missile (ICBM) a day and one nuclear-powered submarine with 16 submarine-launched ballistic missiles (SLBM) a month. However, given the unbelievable destructive power of nuclear weapons, the possibilities of their real military and political use were shrinking relentlessly just as the arsenals were built up.

This can be considered the *second "nuclear aporia",* which is unresolvable without a revolutionary scientific and technological breakthrough in either offensive or defensive weapons. This aporia stems from the absolute destructive power of nuclear weapons: even a few missiles can transform dozens of major cities of any superpower into "hiroshimas" and thus cause unacceptable damage. Additionally, the Soviet Union was building up its nuclear missile potential in response, and even though the costs were huge and the country was several years behind, it was inexorably moving towards strategic parity[4].

In 1967, McNamara delivered a high-profile speech in San Francisco, his strategic will and testament, as it were, and he publicly drew conclusions from the situation at the time, "The cornerstone of our strategic policy continues to be to deter deliberate nuclear attack on the United States or it allies. We do this by maintaining a highly reliable ability to inflict unacceptable damage upon any aggressor [...] even after absorbing a surprise first strike" [McNamara 1968: 51-67]. Stranger still, the Secretary of Defense acknowledged that a retaliatory Soviet strike could cause the United States unacceptable damage even after an initial U.S. attack. His analysis of the arms race mechanism was pointedly objective, "Whatever be their intentions, whatever be our intentions, actions [...] on either side relating to the build-up of nuclear forces [...] necessarily trigger reactions on the other side. It is precisely this action-reaction phenomenon that fuels the arms race" [ibid.: 57]. McNamara went on to propose a way out of the vicious circle, "We do not want an arms race with the Soviet Union – primarily because the action-reaction phenomenon makes it foolish and futile [...] [B]oth our nations would benefit from a[n] [...] agreement first to limit and later to reduce our offensive and defensive strategic nuclear forces" [ibid.: 57].

Thus the idea of mutual nuclear deterrence was proclaimed at the official level. Five short years later, the idea would be enshrined in the Anti-Ballistic Missile Treaty and the Interim Agreement on Strategic Arms Limitation (SALT I) between the United States and the Soviet Union signed at the Moscow Summit in May 1972. True, these treaties were followed by two more rounds of the arms race that proved extremely expensive and politically dangerous, and a deep reduction in nuclear arms started only two decades later. Yet it was in the early 1970s that nuclear deterrence, with all its paradoxes and contradictions, became part and parcel of the theory and practice of relations between the great powers.

[4] In 1967, the Soviet Union had about 800 silo-launched ICBMs and was putting into service a large number of nuclear-powered submarines with SLBMs, which allowed for permanent combat patrol throughout the World Ocean [Strategic... 1998: 113-118, 227-230, 248-259].

PREVENTING OR WAGING WAR?

Even though nuclear arsenals have been reduced almost ten-fold, thanks in most part to U.S.–Russia treaties and unilateral steps of the last three decades, total and complete nuclear disarmament remains beyond the horizon of global politics. Politically, great powers do recognize that for as long as nuclear arms exist, they should serve solely the purposes of preventing war, and not waging war in order to defeat the enemy. The problem, however, is that the line between nuclear deterrence and nuclear warfighting is quite artificial. All nine of today's nuclear states claim that deterrence is the *raison d'être* of their nuclear arsenals (in case of Israel, this is implied but not officially declared). For instance, Russia's Nuclear Doctrine first published in June 2020 states, "The Russian Federation views nuclear weapons solely as a means of deterrence with its use being an extreme and forced measure and the Russian Federation makes every necessary effort to reduce nuclear threat and prevent such an exacerbation of international relations that could provoke military conflicts, including nuclear ones"[5].

The Trump administration's Nuclear Posture Review of 2018 noted, "The United States would only consider the employment of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners"[6]. The new Biden administration in its Interim National Security Strategic Guidance of March 2021 stresses, "We will take steps to reduce the role of nuclear weapons in our national security strategy, while ensuring that our strategic deterrent remains safe, secure, and effective and that our extended deterrence commitments to our allies remain strong and credible"[7].

At the same time, any kind of nuclear deterrence is only credible provided there is a material basis, i.e. nuclear weapons, and a readiness to use such weapons in accordance with the military doctrines, operational plans and lists of a potential adversary's targets. Russia's Nuclear Doctrine unequivocally states, "Nuclear deterrence is ensured by the Armed Forces of the Russian Federation having combat-ready forces and means capable, through the use of nuclear weapons, of causing guaranteed unacceptable damage to the potential adversary under any circumstances; deterrence is also ensured by the Russian Federation being ready and willing to employ such weapons"[8]. Trump's Nuclear Posture Review declared, "U.S. nuclear capabilities ... achieve our objectives if deterrence fails"[9].

[5] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons. Decree of the President of the Russian Federation.* Moscow, the Kremlin, June 2, 2020. No. 355. Para. 5. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed March 1, 2021).

[6] *Nuclear Posture Review.* Office of the Secretary of Defense. February 2018, Washington, DC. URL: https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINALREPORT.PDF (accessed March 1, 2021).

[7] *President Joseph Biden, Jr. Interim National Security Guidance.* The White House, Washington, March 2021, p. 14. URL: https://www.whitehouse.gov/wp-content/uploads/2021/03/NSC-1v2.pdf (accessed March 1, 2021).

[8] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons. Decree of the President of the Russian Federation.* Moscow, the Kremlin, June 2, 2020. No. 355. Para. 10. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed March 1, 2021).

[9] *Nuclear Posture Review.* Office of the Secretary of Defense. February 2018. Washington, DC. URL: https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINALREPORT.PDF (accessed March 1, 2021).

One could suppose that preventing a nuclear war entails a retaliatory (second) strike, while waging a war entails a first strike, and there is a certain rational sense to that notion. Yet, out of nine states practicing nuclear deterrence today, seven openly allow for a first strike (assuming that Israel is one of these states). Two states (China and India) have commitment to no-first-use of nuclear weapons, although this pledge is accompanied by various exemptions or treated by foreign "addressees" as no more than "propaganda".

The Trump doctrine (as before) quite openly stated that "to help preserve deterrence and the assurance of allies and partners, the United States has never adopted a 'no first use' policy and, given the contemporary threat environment, such a policy is not justified today"[10]. Russia's Military Doctrine, in addition to using nuclear weapons "in response to the use of nuclear weapons and other weapons of mass destruction against Russia and (or) its allies" envisions the possibility of a first (preventive) use of nuclear weapons "in case of an aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in danger"[11].

Russia's 2020 Nuclear Doctrine details and supplements this condition with non-nuclear military threats which may be neutralized through nuclear deterrence (i.e. aiming nuclear weapons and being ready to use them): "...states that consider the Russian Federation as a potential adversary deploying systems and means of missile defence, intermediate- and shorter range cruise and ballistic missiles, precision non-nuclear and hypersonic weapons, unmanned combat air vehicles, directed-energy weapons" and also "nuclear missile strike early warning systems". Similar to the United States' 2019 Review, Russia's doctrine also indicates that it can deliver a nuclear strike if "an adversary affects critically important government or military facilities of the Russian Federation, the disabling of which would result in the disruption of a nuclear response actions"[12]. This list entails a significantly broader range of scenarios and targets for a first nuclear strike.

The nuclear deterrence dichotomy in its functions of preventing and waging a nuclear war can be considered the *third "nuclear deterrence aporia"*. Theoretically, deterrence is intended to prevent war, but it is based on real, mostly secret plans for waging war[13]. These plans include first strike concepts that would, strictly speaking, launch a nuclear war. This contradiction is exacerbated by the blurred line between plans and means of delivering a first and a second (retaliatory) nuclear strike.

[10] Ibidem.

[11] *The Military Doctrine of the Russian Federation*. URL: http://news.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf (accessed February 1, 2021).

[12] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons.* Decree of the President of the Russian Federation. Moscow, the Kremlin, June 2, 2020. No. 355. Para. 9, 14, 19. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed March 1, 2021).

[13] The dissonance between the two deterrence functions reached the point of absurdity when the Soviet Union developed the so-called Dead Hand system intended to guarantee a counterstrike even if the Soviet military and political leadership is destroyed. The system included an automated command to launch a nuclear counter strike detected by shock-wave, heat, radiation, etc. sensors. Theoretically, it was supposed to be an absolute guarantee of retaliation and a reliable means of nuclear deterrence. However, given the paranoid Soviet secrecy, the system was kept secret from the adversary and it would therefore have zero deterrence effect and could only guarantee retaliation in case of war.

FIRST AND SECOND STRIKE

Speaking in Sochi in October 2018, President Putin eloquently expounded the main concept of Russia's nuclear doctrine, "Our concept is based on a launch on warning principle. This means that we are prepared and will use nuclear weapons only when we know for certain that some potential aggressor is attacking Russia, our territory. I am not revealing a secret if I say that we have created a system which is being upgraded all the time as needed – an MEWS – missile early warning system. This system monitors the globe, detecting the launch of any strategic missile from sea or any other territory from which it was launched. Second, the system tracks the trajectory. Third, it locates nuclear warheads' impact zone. Only when we know for certain – and this takes a few seconds to understand – that Russia is being attacked we will deliver a retaliatory strike"[14].

Out of the nine nuclear powers, only Russia and the United States have the capability to implement a launch-on-warning strike since they have the required operational and technological means. It should be noted parenthetically that the launch-on-warning strike described above clearly does not apply to the use of the tactical nuclear weapons of the ground forces, the Navy or the Aerospace Forces, where Russia probably is ahead of all the other eight states together and that are not suited for such use[15].

The military mindset is irresistibly attracted to the idea of an immediate and maximally powerful nuclear counterstrike and maintaining the highest degree of combat-readiness of the arms and armed forces. The rationale behind this concept is, first, the need to escape from the strike by the enemy's strategic nuclear forces in order to carry out a retaliation against the aggressor. As a matter of fact, whatever first strike the adversary launches, there will be enough surviving weapons for a devastating response (missile-carrying submarines at sea, ground-mobile ICBMs, airborne bombers). The military, however, is not ready to accept the possible loss a significant part of their weapons to an attack.

They would want to use all their available weapons to strike all the planned targets (remember the dialogue at the missile base cited at the beginning of this article).

The second argument is the possibility that a nuclear strike destroys the state leadership and other links in the chain of command, which would make it difficult (or utterly impossible) to authorize retaliation. The launch-on-warning strike concept was first officially made public in the 2020 Nuclear Doctrine of the Russian Federation, where "receiving reliable information on the launch of ballistic missiles against the Russian Federation and (or) its allies" was listed

[14] Meeting of the Valdai International Discussion Club. October 18, 2018. – *President of Russia. Official site.* URL: http://en.kremlin.ru/events/president/news/58848 (accessed May 30, 2021).

[15] Independent assessments estimate Russia's stock of such nuclear weapons at approximately 1830 warheads, while eight other states have about 850 warheads [SIPRI Yearbook... 2019: 286-348].

among the primary conditions determining the possibility of using nuclear weapons[16].

Nevertheless, the expediency of such a response should be weighed against the risk of starting a nuclear war because of a technological malfunction or a political miscalculation. In addition to quite probable and not infrequent technical early warning systems' glitches (false alarms[17]) both in the Soviet Union and the United States [Perry 2015: 52-53], the main danger lies in the extremely short time, the minutes (Putin even said seconds!) during which the leadership has to make a decision on whether humanity lives or dies. This is not difficult in times of peace, for instance, during strategic command exercises imitating a massive missile launch. Under those circumstances, all warning and communications systems function perfectly, commanders one by one snappily report successful launches of their missiles strictly at the planned time, and this instils in the leadership a feeling of satisfaction and confidence in the country's defence capabilities.

In real life though, things may go differently – under psychological stress, with contradictory or unreliable information coming in regarding the enemy's intentions, in a state of fear of dying any second in the nuclear annihilation. Additionally, in a crisis, many actions of the other side designed to increase the survivability of its forces for a second strike are indistinguishable from the preparations for a first strike: all combat ready missile submarines go out to sea, bombers get air-borne (after that, they are very hard to locate and the launch of cruise missiles is very difficult to track), aviation and space intelligence activities are expanded , and tactical nuclear weapons are deployed at forward bases and mounted on delivery vehicles. As if this is not enough, such conditions are conducive to a sharp rise of the probability of accidents, inadvertent skirmishes and other incidents between the opposing armed forces along the contact line. The information will go to state leaders via their military subordinates instead of directly, and those subordinates, careful not to underestimate the enemy, will provide the worst-case interpretation of events. All such circumstances characterized the Cuban Missile Crisis in 1962. Today, memoirs and declassified documents show that a disaster was avoided largely due to a lucky coincidence of events. But there is no reason to hope for such luck in the future, especially given the complexity, speed and automation of today's weapons and their information management and command-control systems.

The military always places the responsibility for the final decision to launch a nuclear strike on the political leadership, yet the latter is far from free in its choice of action. On the contrary, it is bound hand and foot, "hostage" to operational

[16] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons. Decree of the President of the Russian Federation.* Moscow, the Kremlin, June 2, 2020. No. 355. Para. 19. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed March 1, 2021).

[17] See: Lieutenant Colonel Who Saved the World did not Think Himself a Hero. 2018. – *Independent Military Review.* No. 8 (March 2–8). P. 12-18. (In Russ.)

plans and the technical characteristics of weapons developed by military agencies and defence industries in times of peace far before an emergency situation all turns of which no computer algorithm can possibly predict.

Centuries of history have demonstrated that the most thorough war plans frequently collapse once the firing starts. Russia had this experience in the Winter War with Finland, Great Patriotic War, and the wars in Afghanistan and Chechnya. The only difference is that both in the past and in the current local conflicts, a failure of military plans brought additional setbacks and losses, but did not spell an irreparable disaster. But this is exactly what nuclear weapons bring. These circumstances entail another paradox.

Parliaments and governments hold protracted debates and votes on taxation, welfare and even beekeeping. But the decision to employ nuclear weapons is, by law, entrusted to a single person, even if that person can allegedly take advice from subordinates. To ensure this capability, Russia and the United States have the so-called "nuclear briefcases": carry-on radio terminals that accompany presidents everywhere together with officers on duty and allow them to give a remote coded sanction to launch a nuclear strike[18].

In the case of the two superpowers, this is not only the decision on the life or death of their nations, but also on the survival of humanity. A massive nuclear strike exchange between the United States and Russia would wipe out hundreds of millions of people in the northern hemisphere in a matter of several hours. It would destroy everything that had ever been built there during the last thousand years and plunge the rest of the world into the Neanderthal state. That is the kind of power that the Egyptian pharaohs, Chinese emperors and European kings of the past could not even dream about. However, every person has their weaknesses and can make spontaneous steps – everyday the life gives many proofs of that. Yet this banal statement takes on a fateful significance when a decision to bring about a "global catastrophe" (as Putin called it)[19] has to be made under stress in

[18] In the United States, such a device (nicknamed the "nuclear football") is entrusted to the president and the vice president, followed by a legally established chain of about a dozen official persons, starting with the speakers of both houses of Congress, the Secretary of the Treasury, etc., with the Secretary of Defence being way down in that chain and with no military personnel on the list at all. According to published data, the Russian equivalent is called "Kazbek," the president's is one of three "briefcases" containinga "nuclear button," the others being held by the Minister of Defence and the Chief of the General Staff of the Armed Forces. The great secret is whether the order to launch missiles needs to be given together (as with the three components of a code) or whether each of them can do it individually. It would be apt here to recall the 1991 putsch when the "nuclear briefcase" was taken away from Mikhail Gorbachev, and then, amid the general confusion, Minister of Defence Dmitry Yazov just lost his "briefcase," although control over the nuclear forces appeared not to have been interrupted. In the United States, given President Trump's eccentricity and ignorance, Congress earnestly campaigned to strip the president of his monopoly on "the end of the world" decision. See: De Luce D. *Congress Questions Trump's Exclusive Hold on the Nuclear Football*. URL: https://foreignpolicy.com/2017/11/14/congress-questions-trumps-exclusive-hold-on-the-nuclear-football/; Safranchuk I. The Future of Russia's Nuclear Forces. PIR Center Report. Ed. by D. Evstafiev. Pt. 3. URL: http://www.pircenter.org/pages/34-no-10-1999-the-future-of-russia-s-nuclear-forces-in-russian (accessed May 31, 2021).

[19] Meeting of the Valdai International Discussion Club. October 18, 2018. – *President of Russia. Official site*. URL: http://en.kremlin.ru/events/president/news/58848 (accessed May 31, 2021).

the matter of minutes or even seconds. This is the truly crucial aspect of nuclear deterrence that its proponents prefer to overlook.

A mistaken decision to launch a nuclear strike and consequently eliminate civilization is so dangerous and irreversible that a nuclear attack warning with even 99 percent reliability cannot be considered "reliable information." The only acceptable reliability is when real nuclear explosions in one's own territory are detected and complete certainty exists regarding the initiator of the attack. This is the only thing that justifies the use of nuclear weapons in a so-called "deep second strike" on a calculated and adequate scale.

The fourth "nuclear aporia" consists in the dependence of nuclear deterrence on the rash decision of a single person made under stress and in an uncertain situation when a technical glitch or a human error could entail a global catastrophe – the kind that deterrence should theoretically prevent. This paradox is impossible to resolve in the modern version of nuclear deterrence, but it can be made less threatening. For example by orienting strategic forces on the "deep second strike concept" that gives a country's leadership sufficient time to make a carefully considered decision, preferably a collective one (for instance, at the Security Council)[20].

The reliability of deterrence can be further increased not through the means and procedures of an instant retaliation, but through highly survivable weapons systems (sea-based and ground-mobile) and invulnerable redundant information management and command-control systems that includes state leadership and armed forces command chain. What is also required is a legitimate and technically insured succession plan in the event that the top leadership is put out of action. This is where resources should be channelled as a matter of priority, rather than to impressive, but strategically dubious weapons systems.

More substantial measures go beyond nuclear deterrence and presuppose agreements with other powers on measures for preventing an unintended war, and joint centres for controlling the military situation. More broadly, they could include agreements on the limitation of certain weapons and types of military forces and activities, the mutual lowering of combat readiness of certain weapons systems, and steps to settle conflicts and prevent their escalation.

MILITARY TECHNOLOGIES AND POLITICAL MOTIVES

The launch-on-warning concept vividly illustrates the pressure that the technical aspects of nuclear weapons put on the concepts of their use, and thus on nuclear deterrence. Ground-mobile missiles in operational deployment areas, submarines at sea and air-borne aviation can survive a nuclear attack and deliver retaliation comparable to hundreds of "hiroshimas". Yet, apparently, in order to cause the maximum "unacceptable damage" to an aggressor as mentioned in the Military Doctrine,

[20] In the 1962 Cuban MissileCrisis, it was collective decision-making in the Soviet Union and the United States that largely allowed the parties to prevent a war, but back then, there were no concepts of a reciprocal counterstrike, no means of delivering one, and no "nuclear briefcases".

a launch-on-warning of silo-based missiles is deemed necessary, particularly by the most powerful heavy ICBMs (such as today's SS-18 "Voyevoda", known as "Satan" by NATO, and the future SS-X-29 "Sarmat")[21].

But in fact this means that the technical characteristics of weapons dictate decisions that a state's top leadership makes on the "end of the world." These parameters include the impossibility of making liquid-fuelled heavy ICBMs mobile, the insufficient hardness of their silo launchers[22], and the appeal of their high launch-readiness. And the threat is determined by the number, accuracy and yield of warheads and the flight-time of the enemy's missiles (15-20 minutes).

Under the Trump administration, the United States placed greater emphasis on the launch-on-warning concept of their own using silo-based ICBMs. The 2018 Nuclear Review stated, "[T]he United States will maintain a portion of its nuclear forces on alert day-to-day, and retain the option of launching those forces promptly [...] It also makes clear to potential adversaries that they can have no confidence in strategies intended to destroy our nuclear deterrent forces in a surprise first strike"[23]. The fact that both parties are geared towards this concept means that the danger of an unintended nuclear war is growing exponentially.

In addition to the risk factors already listed, the danger may increase in the future because space-based weapons and cyber warfare systems will be capable of destroying or disabling missile attack early warning systems. The proliferation of missiles, particularly sea-launched missile, creates the danger of provocative "anonymous" third-party strikes from underwater. The development of hypersonic boost-glide systems will make land-based missiles tracking radars incapable of monitoring the trajectory of the enemy's missiles and predict their targets in a timely manner. This means that a launch-on-warning strike will have to be authorised based solely on the signals from satellites that are known to periodically give false alarms[24].

Another example of the influence that technology has on nuclear deterrence is connected with the abrogation of the INF Treaty in 2019 and the possible deployment of new American intermediate-range missiles at in Europe and Asia.

[21] The Military Doctrine of the Russian Federation. – *President of Russia. Official website.* URL: http://news.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf (accessed February 1, 2021).

[22] Russia strives to increase the blast resistance of its ICBM launch silos in every possible way, but that cannot save a missile from a precision strike, since a deviation of 90-120 metres and an explosion yield equivalent to 300,000-500,000 tonnes of TNT mean that the silo would be in the crater of a nuclear explosion.

[23] *Nuclear Posture Review.* Office of the Secretary of Defense. Washington, DC, February 2018,p. 22. URL: https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF (accessed March 1, 2021).

[24] Space tracking systems for hypersonic glide missiles will be actively developed, but, like early warning satellites, they will use infrared sensors, since hypersonic glide systems flying through the stratosphere heat to very high temperatures (Vladimir Putin compared them to "flying fireballs"). At the same time, the early warning systems will not receive timely confirmation by systems based on a different physical principle, i.e. radar data, since the radars will be able to provide warning time of only three to four minutes. This will decrease the reliability of the warning systems because identical physical interference may affect space infra-red launch detection and missile tracking sensors.

The short flight time of future ballistic and hypersonic gliding missiles could undermine the Russian launch-on-warning concept, leaving the political leadership no time to make an appropriate decision. Chief of the General Staff of the Russian Armed Forces Valery Gerasimov said, "The policy conducted by our western 'partners' forces us to respond to a threat by creating a our own threat, to plan future strikes against decision-making centres and launchers designed to use cruise missiles against Russia"[25]. This wording clearly implies pre-emptive strikes, which other influential military leaders confirm[26]. Such a logic is intended to escape the hit from intermediate-range missiles. However, a subsequent US missile strike from across the ocean would nevertheless be deadly for Russia. And if the United States follows Russia in adopting the pre-emptive strike concept (as it has recently adopted the launch-on-warning concept), then a possible crisis may force both sides towards pre-emptive actions. And all this not for any significant political reasons, but because of the insufficient survivability of missile launchers and command-control systems in case of a hypothetical first strike of intermediate-range missiles deployed in Europe and Asia.

It thus follows that Carl von Clausewitz's famous adage that "war is a continuation of politics by other means" [Clausewitz 1934: 28] needs to be adjusted to fit our times. Theoretically, the interests of security policy determine reliance on nuclear deterrence. Practically, the increasingly effective and complex military technologies increasingly dictate operational and strategic concepts that sometimes threaten to provoke a military conflict and cause the kind of disaster that deterrence was ideally intended to prevent. Today, Clausewitz would have to expand his adage: war could become a continuation of military doctrines, operational plans and weapons technologies that exist separately from political interests. This is the *fifth "nuclear deterrence aporia"*. It could be partially resolved through technological measures,[27] but only under the condition that operational nuclear deterrence plans undergo a massive adjustment, which presupposes political decisions going far beyond deterrence[28].

LIMITED NUCLEAR WAR

The sacramental question that has puzzled generations of theoreticians and practicians of military strategy is: What should be done if nuclear deterrence "fails"?

[25] Gerasimov V. 2019. General Staff Is Planning Strikes. – *Military-Industrial Courier.* No. 9. March 12-18. P. 6.

[26] See interview: Col. Gen. Viktor Esin: "If the Americans Do Start Deploying Their Missiles in Europe, We Will Have no Other Course Open to us but to Abandon the Reciprocal Counterstrike Doctrine and Switch to the Pre-Emptive Strike Doctrine." Zvezda, November 9. 2018. URL: https://zvezdaweekly.ru/news/t/20181117102-0iaAI.html (accessed November 30, 2021).

[27] For example such measures might include transitioning to single-warhead silo-launched ICBMs, a strike against which would require a double warhead expenditure for each destroyed warhead, and ground-mobile multiple-warhead ICBMs that cannot be hit with a pre-programmed missiles while they are on the move.

[28] That is, abandoning plans for any kind of a first nuclear strike, gearing towards a "deep second strike" by strategic forces, reducing the criteria for "unacceptable damage" to the adversary.

For example, if a conventional attack creates a threat of inevitable military defeat? If the other party uses nuclear weapons selectively? If it uses other types of weapons of mass destruction or mounts a cyberattack on information and command-control systems?

As a response to these dilemmas limited nuclear war concept is being promoted. At that it is highly controversial, and presently the most dangerous element of nuclear deterrence relations. The United States and NATO initially advanced this strategy, as well as the relevant weapons, in the 1960s and early 1970s with regards to both the European and Asian theatres of war, and at the strategic level as well[29]. These plans, however, crashed against the probability of a massive nuclear response from the Soviet Union which categorically rejected such ideas and did not draw any distinctions between strategic and tactical nuclear weapons, or between global and regional nuclear war, yet bolstered its "crushing retaliation" potential for every contingency.

However, following the collapse of the Soviet Union and democratic Russia adopting a course for comprehensive integration with the West, new and quite paradoxical trends emerged in Russia's nuclear deterrence policy. First, in 1993, Russia disavowed the Soviet Union's 1982 solemn nuclear no-first-use pledge. Ten years later, the 2003 White Paper of the Ministry of Defence contained a provision on the possibility of: "de-escalation of aggression [...] by a threat of launching or by directly launching strikes of different scale using conventional and/or nuclear weapons". There was even an option of "dosed use of individual elements of The Strategic deterrence forces"[30].

These provisions caused quite an uproar abroad, and subsequent versions of Russia's Military Doctrine and other official strategic documents have not directly mentioned such ideas. At the same time, the wordings adopted in the doctrine do not rule out such actions, since they do not specify how Moscow can "use nuclear weapons [...] in the event of an act of aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in danger"[31]. Logically, eliminating a threat to the "existence of the state" should not result in its destruction as the result of an exchange of massive nuclear strikes. (Fearing death one does not commit suicide.) If the goal is to stop a non-nuclear aggression with nuclear arms, this entails limited use of nuclear weapons in order to end a war without bringing it to the point of total mutual destruction. It is also unclear what can be considered a danger to the "very existence of the state".

Some recent policy papers can be interpreted in the spirit of the limited nuclear war strategy.

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[29] *Secretary of Defense James R. Schlesinger. Annual Defense Department Report, FY 1975.* Government Printing Office, Washington, D.C. March 4, 1974. URL: http://history.defense.gov/Portals/70/Documents/annual_reports/1975_DoD_AR.pdf?ver=2014-06-24-150705-323 (accessed February 2, 2021).

[30] Current Developing Objectives of the Armed Forces of the Russian Federation. – *Krasnaya Zvezda*. October 11, 2003. URL: http://old.redstar.ru/2003/10/11_10/3_01.html (accessed February 2, 2021).

[31] *The Military Doctrine of the Russian Federation*. URL: http://news.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf (accessed February 1, 2021).

For example, the 2020 Nuclear Doctrine states that, "in the event that a military conflict breaks out," the deterrence policy "guarantees the prevention of any escalation and the termination of hostilities on conditions that are acceptable to the Russian Federation and (or) its allies."[32]This can theoretically be done without crossing the "nuclear threshold," but then the policy documents should be focused on general purpose forces, while the entire document speaks of nuclear weapons. Another official publication is on naval policy and notes, "Amid an escalating military conflict, demonstrating a readiness and willingness to use force through employment of non-strategic nuclear weapons is an effective deterrent factor"[33]. However, no explanation is given as to how to demonstrate "readiness and willingness" without using nuclear weapons. In both cases, the idea of the limited use of nuclear weapons is not stated directly, but several publications by Russian military professionals (on active duty) unequivocally promote the "limited nature of a first nuclear impact intended not to harden, but to sober the aggressor and force it to cease the attack and switch to talks"[34].

One way or another, the time has come for Moscow to officially unequivocally clarify this question, which has become the central subject of U.S.–Russia nuclear deterrence relations. True, there is another opinion on that matter. All nuclear states without exception maintain some measure of vagueness in their doctrines, believing it to be conducive to deterrence. This is also Russia's policy, and its Nuclear Doctrine directly states that "uncertainty concerning the scale, time and location of the possible use of nuclear deterrence weapons" is a nuclear deterrence principle.[35]

Uncertainly, however, could push things in the opposite direction, towards nuclear war – especially in the context of worsening international conflicts, the rising levels of armed confrontation between great powers, and the increasing speed of decision-making in a crisis. (Remember the first nuclear aporia). In addition to the possibility of a fatal miscalculation, uncertainty concerning the other side's policies is used to crank up tensions and justify one's own strategic concepts and armament programmes, which was clearly manifested in the policy of the United States.

This was vividly manifested in Trump's 2018 nuclear doctrine: "Recent Russian statements on the development of nuclear doctrine appear to lower the threshold for Moscow's first-use of nuclear weapons.

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[32] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons. Decree of the President of the Russian Federation*. Moscow, the Kremlin. June 2, 2020, No. 355, Para. 4. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed February 1, 2021).

[33] *Decree No. 327 of the President of the Russian Federation "On Approving the Framework of the Russian Federation's State Policy in Naval Activities up to 2030" dated July 20, 2017.* URL: https://www.garant.ru/products/ipo/prime/doc/71625734/ (accessed February 2, 2021).

[34] Akhmerov D., Akhmerov Ye., Valeyev M. 2016. Aerostat is a Friend of Sarmat. – *Military-Industrial Courier.* October 12. URL: https://vpk.name/news/165525_aerostat__drug_sarmata.html (accessed February 2, 2021).

[35] *On the Framework of the Russian Federation's State Policy on Nuclear Weapons. Decree of the President of the Russian Federation*. Moscow, the Kremlin. June 2, 2020. No. 355, Para. 15. URL: http://publication.pravo.gov.ru/Document/View/0001202006020040?index=2&rangeSize=1 (accessed February 2, 2021).

Russia demonstrates its perception of the advantage these systems provide through numerous exercises and statements. Correcting this mistaken Russian perception is a strategic imperative"[36]. This is not a mere declaration, since this concept rests on the material foundations of an entire "package" of nuclear weapons[37].

The main paradox of a limited nuclear war concept is that the characteristics of the most effective deterrence are largely contrary to the methods of practical warfare, should a war break out despite deterrence. The former entails immediate massive strikes using all available capabilities with a view to causing maximum losses to the adversary's population, industry, state leadership and armed forces. The latter entails avoiding the deliberate extermination of civilians or cause an environmental disaster, as well as controlling escalation and preserving the possibility of agreeing to end the war (which means avoiding elimination of at least some elements of the adversary's state governance). The second approach is also dictated by the principles of morality and international humanitarian law. At the same time, this principle makes a nuclear war less unthinkable leaving hope for national survival and damage limitation.

Herein lies the *sixth "nuclear aporia"*: deterrence provides options for the limited use of nuclear weapons, which weaken deterrence and increase the likelihood of war, which nonetheless would be impossible to wage in accordance with any kind of rules.

Offence and defence

The era of nuclear deterrence has turned another traditional truth on its head – that defence is good and ensures peace. By the late 1960s, security was based on deterring an aggression by threatening a crushing counterstrike. From that point on, anti-ballistic missile (ABM) defence systems started to look completely different. Robert McNamara concluded that such systems created a powerful additional stimulus for the arms race. In his San Francisco speech (1967), he explained, "If we [...] opt for heavy ABM deployment – at whatever price – we can be certain that the Soviets will react to offset the advantage we would hope to gain" [McNamara 1968: 51-67].

At that time, it was a truly revolutionary idea and, unsurprisingly, at the meeting between President Lyndon Johnson and Soviet Premier Alexei Kosygin in Glassboro, New Jersey in June 1967, the Soviet side rejected McNamara's proposal to mutually limit the anti-missile defence systems of both countries. Shortly,

[36] *Nuclear Posture Review.* Office of the Secretary of Defense. February 2018, Washington, DC. URL: https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF (accessed March 1, 2021).

[37] Some Trident II SLBMs were equipped with low-yield warheads (W76-2), there are plans of bringing back sea-launched nuclear cruise missiles that the Navy decommissioned in 2011, and there are plans to develop guided bombs with varying payloads (B61-12) for tactical and strategic aviation, and new long-range air-launched cruise missiles (LRSO – long-range stand-off weapon).

however, Moscow accepted McNamara's logic, especially since in 1969, the United States started to deploy its own ABM system, named Safeguard. The Anti-Ballistic Missile Treaty was subsequently concluded in 1972.

Years went by, and the sides reversed their positions on the matter. Having withdrawn from the ABM Treaty in 2002, the United States is now initiating the development of missile defence, explaining that the United States needs to protect itself against missiles from third states (namely North Korea and Iran, but likely China and Pakistan as well). Russia sees this as a threat and insists that such systems must be strictly limited. In his much talked-about Address to the Federal Assembly on March 1, 2018, Vladimir Putin once again explained the importance of the former Anti-Ballistic Missile Treaty, saying that this "Treaty [...] prevented either party from recklessly using nuclear weapons, which would have endangered humankind, because the limited number of ballistic missile defence systems made the potential aggressor vulnerable to a retaliatory strike"[38]. Exactly in McNamara's logic, he announced a broad programme of developing offensive weapons for penetrating the U.S. missile defence systems[39].

In terms of the theory of deterrence, however, missile defence is not necessary a destabilizing element. For example, if such a system is designed to protect strategic forces from a disarming strike by an enemy's nuclear or non-nuclear offensive weapons, then it bolsters a second strike potential and boosts deterrence. The same applies to the missile defence of territories (cities and critical civilian facilities) from the limited use of nuclear weapons, missile strikes by third states, strikes by extremist regimes or terrorists, and accidental missile launches. These are presently becoming serious threats as nuclear weapons and technologies proliferate.

Theoretically, this could be the subject of an agreement between Russia and the United States: restricting the destabilizing missile defence systems that are designed to protect cities against a retaliatory strike from other party, but allowing defence to parry a disarming strike by either of the two powers or a limited attack by third states and terrorists. In 2002-2011, the two powers held official talks and conducted research on cooperation in developing missile defence systems. However, no results were achieved. Demarcating stabilizing and destabilizing anti-missile systems is far harder in practice then in theory due to strategic, technological and political differences between the parties.

[38] Presidential Address to the Federal Assembly. The President of Russia delivered the Address to the Federal Assembly. March 1, 2018. – *President of Russia. Official site.* March 1, 2018. URL: http://en.kremlin.ru/events/president/news/56957 (accessed March 15, 2021).

[39] This programme includes developing the heavy Sarmat RS-28 ICBMs (SS-X-29 by NATO definition); equipping the RS-18 ICBM (SS-19 in NATO classification) with the Avangard hypersonic gliding vehicle; developing the nuclear powered land-based intercontinental cruise missile Burevestnik and an intercontinental autonomous underwater nuclear powered and nuclear armed drone Poseidon; and Kinzhal – an intermediate-range hypersonic aero-ballistic missile.

In the foreseeable future, no anti-missile defence system will be able to counter a second strike, much less a first strike, launched by a superpower. However, the concept and means of a limited nuclear war give defence a new "lease on life," as they give rise to scenarios where limited strikes can be exchanged. Missile defence systems and new systems for penetrating such defences (such as nuclear and conventional hypersonic missiles) could play much more important role. It also creates room for an endless race of defensive and offensive arms that the ABM Treaty stopped for 30 years after 1972.

This problem remains a stumbling block in the U.S.–Russia dialogue on strategic stability, including the follow-on to the New START Treaty. These talks were made possible by the prolongation of New START in February 2021 and the Geneva summit in June.

Theoretically the parties may at some distant future agree to transition to mutual deterrence based on effective defence systems coupled with deep reduction of offensive weapons. However, as Putin noted, the parties need to avoid harbouring any illusions that a nuclear attack can be launched with impunity.

From the point of view of universal human values, the threat of eliminating peaceful population is immoral, and protecting the population is highly moral. However, the opposite is true for the current nuclear deterrence relations between Russia and the United States: the desire to protect the population and industrial facilities increases the danger of nuclear war, with the subsequent extermination of the civilian population despite the missile defence systems that are in place. This is the *seventh, "nuclear aporia"* of today.

Malignant symbiosis

Currently, strategic relations between the great powers go beyond the nuclear weapons balance. Military-technical progress is mostly moving towards the development of conventional (non-nuclear) long-range (over 500-600 kilometres) precision offensive systems capable of using conventional munitions to hit those targets that could previously only be destroyed by nuclear weapons[40]. Long-range non-nuclear systems are intruding into the strategic balance through the concept of "conventional deterrence" proclaimed in the official documents of the United States, as well as in Russia's Military Doctrine, which states that, "as part of carrying out strategic forceful deterrence measures, the Russian Federation envisions the use of precision-guided weapons"[41]. It was initially believed that this concept would raise

[40] These are U.S. sea-launched Tomahawk cruise missiles (BGM-109) and air-launched cruise missiles (AGM-84, AGM-158B JASSM-ER, AGM-183A, X-51). Russia is also developing its non-nuclear cruise missile arsenal: sea-launched 3M-14 Kalibr and 3M-14 Zirkon missiles, air-launched Kh-555, Kh-101, and Kh-47M2 Kinzhal missiles. By 2018, the number of Russia's precision-guided conventional cruise missiles had grown more than 30 times. See: *Presidential Address to the Federal Assembly.* March 1, 2018, Moscow. URL: http://en.kremlin.ru/events/president/news/56957 (accessed March 10, 2021).

[41] *The Military Doctrine of the Russian Federation.* URL: http://en.kremlin.ru/events/president/news/56957 (accessed February 1, 2021).

the "nuclear threshold," but it ended up doing the exact opposite. Politically, such systems are easier to use than nuclear weapons, but they can provoke an uncontrolled conflict escalation, which can be treated as the *eighth "deterrence aporia"*.

These weapons pose the threat of non-nuclear attacks on each other's nuclear forces. It is thus far unclear whether their accuracy will be enough to strike hardened sites (ICBM silos and command bunkers) and whether they will be able to hit ground-mobile missiles. However, there is no doubt that a broad range of fixed soft targets of the strategic forces is vulnerable even to old subsonic cruise missiles[42]. Especially since air-, surface-, and sea-launched subsonic cruise missiles in future will be replaced with hypersonic boost-glide, ram-jet and aero-ballistic weapons[43].

The effect of the entanglement of nuclear weapons and precision-guided conventional weapons is the crucial destabilizing factor in today's strategic situation. The deployment of dual-purpose vehicles that can carry both: conventional and nuclear warheads is expanding[44]. After their launch, the nature of the strike can only be determined when the warheads actually detonate. As a result, traditional nuclear deterrence categories ("nuclear threshold", parity, the survivability and vulnerability of weapons systems, second and first strike attributes, unacceptable damage, escalation prevention, etc.) are "blurring". Recently, the concepts have emerged of ŧ coordinated and integrated use of nuclear and conventional weapons.

In June 2019, a report of the U.S. Joint Chief of Staffs was leaked to the press. Of particular note was the part that said, "Using nuclear weapons could create conditions for decisive results and the restoration of strategic stability [...] A nuclear weapon could be brought into the campaign [...] to escalate the conflict to sue for peace on more favourable terms [...] Integration of nuclear weapons employment with conventional and special operations forces is essential to the success of any [military] mission or operation"[45]. Accordingly, the United States is developing a "multi-domain" war strategy: closely integrated military operations on the ground, at sea, in the air, outer space and in cyberspace [Feickert 2019].

Russia has no such leaks, but it is preparing its own response to the "multi-domain" strategy of the United States. The line of thinking among the military is evident from the ideas of the intellectual elite of the Russian Aerospace Forces:

[42] These are radars, anti-missile and anti-aircraft defence systems, light ground shelters for ICBM mobile launchers, missile-carrying submarines at naval bases, heavy bombers at airfields, nuclear warhead storage facilities at military bases, space vehicle and long-range aviation communication and command posts.

[43] These are U.S. air-launched missiles (AGM-183A, X-51) and possible surface-launched intermediate-range missiles following the country's withdrawal from the INF Treaty: Precision Strike Missile (PrSM), Ballistic missile with trajectory shaping vehicles (BMTSVs) and Long Range Hypersonic Weapons (LRHW) [see Pifer 2019: 1-7]. Russia is developing Zirkon class hypersonic sea-launched 3M22 missiles and Kinzhal class air-launched Kh47M2 missiles.

[44] This applies to Russia's SCLM Kalibr and the U.S. Tomahawk, as well as to Russia's X-101/102 class air-launched cruise missiles and the future LRSO (Long range stand-off) weapons of the United States.

[45] *Joint Publication 3–72. Nuclear Operations. Joint Chiefs of Staff.* 11.06.2019. P. III-3, V-3. URL: https://fas.org/irp/doddir/dod/jp3_72.pdf (accessed March 10, 2021).

"The Russian Federation is capable of switching from deterring potential adversary through nuclear weapons to the policy of intimidation, threatening unacceptable comprehensive defeat through the use of all types of weapons as part of pre-emptive actions amid the danger of a local war against the Russian Federation"[46].

The doctrines of Russia, the United States and some other nuclear states view one of the tasks of nuclear deterrence as preventing conventional aggression by the possibility of the use of nuclear weapons. The trend for integrating weapons into dual nuclear/conventional arms and operations is shaping the view of nuclear weapons as a quite practicable means for achieving success: if not a decisive victory over the enemy, then at least "peace on more favourable terms." Nuclear deterrence initially designed for preventing a conventional war, presently transforms into a strategy of waging a hybrid nuclear-conventional war, thereby denying itself as in Hegel's dialectics, which constitutes yet another (the ninth) *"deterrence aporia"*.

These factors vividly show that nuclear deterrence tends to self-destruct both from within (via the concept of a limited nuclear war) and from without (in the course of the technical and operational entanglement of nuclear and conventional weapons, and through automatization of command-control systems). As third nuclear states build up their "deterrence" potentials, and as the likelihood of the proliferation of nuclear arms and their delivery vehicles increases (together with boost-glide, anti-missile and space weapons), the above dangers will grow exponentially. The problems of nuclear multi-polarity deserve separate consideration. It is enough here to stress that nuclear deterrence does not provide an adequate response to these challenges, but only exacerbates the dangers of nuclear proliferation.

Controlling nuclear deterrence

The nuclear deterrence, as opposed to warfighting, has long been considered the "lesser" of two "evils". However it has a propensity of becoming the greater of those evils if not restrained by arms control treaties. Since 1969, the dialogue in this area had been based on the parity principle, which was called "equality and equal security". After 1990, it was based on the concept of "strategic stability", which implied using arms control to forge a state of strategic relationship between parties (i.e. mutual nuclear deterrence) which removes the "incentives for launching the first nuclear strike". To achieve this, the parties agreed on several specific principles for limiting and reducing strategic arms[47]. These principles formed the foundations of six treaties and agreements, from START I up to the current New START.

[46] Khodarenok M. 2021. Slogans of a Pre-Emptive Strike. – *Independent Military Review*. February 19-25. No. 6. P. 1-3.

[47] These are: taking into account the interrelation between offensive and defensive strategic arms (so that defence cannot weaken the other party's second strike); reducing the concentration of warheads on strategic vehicles (so that one vehicle carrying several warheads cannot hit several enemy vehicles with an even greater number of warheads); and giving preference to highly survivable systems (so that they cannot be destroyed with a pre-emptive strike before they are launched). See: *Soviet–United States Joint Statement on Future Negotiations on Nuclear and Space Arms and Further Enhancing Strategic Stability.* June 1, 1990. URL: https://bush41library.tamu.edu/archives/public-papers/1938 (accessed March 15, 2021).

Today the strategic balance appears far more stable due to these treaties than in the early 1990s. The ratio of warheads to delivery vehicles has fallen seven times, the number of delivery vehicles - three times, and the survivability of strategic forces of Russia and the United States has substantially increased. That said, arms control has stagnated over the last decade, and has now been plunged into a crisis culmination in the abrogation of the U.S.–Russia INF Treaty in 2019 (which was signed in 1987 and served as an important precondition for the follow-on strategic arms control). Under such circumstances, politicians, experts and the general public are once again sensing the growing threat of nuclear war. This is the feeling Putin expressed in October 2020 at a meeting of the Valdai Discussion Club, "[T]he world will have no future unless limits are put on the arms race"[48].

However, another view of the crisis is that it was made inevitable by the radical changes in the world order and the development of revolutionary military technologies that made the previous methods of nuclear arms control outdated. Such views were first proposed abroad, and then appeared in Russia[49]. Proponents of this philosophy claim that "the previous understanding of stability as the lack of incentives on the part of Russia and the United States to launch a first nuclear strike against each other is no longer reflective of the state of affairs" [see Karaganov, Suslov 2019].

Indeed, the superpowers can no longer launch a successful disarming nuclear strike against each other. But this state of strategic relations did not emerge all by itself, it grew out of ten crucial treaties and agreements on arms control concluded after 1972. If the parties leave this path, the old danger of a first massive nuclear strike will once again become part of U.S.–Russia nuclear deterrence relations. The groundwork laid by these treaties and agreements must be preserved at all costs as the foundation of stability. It is another matter that the cutting-edge technologies considered above must be taken into account by the stability concept since they may provide additional incentives to launch a first nuclear strike (hence, at the Geneva summit in June 2021, Russia and the United States agreed to start a bilateral Strategic Stability Dialogue).

The only way to do this is to continue and expand arms control. Since third parties are not going to join the process in the near future and since no one has thus far calculated how far strategic arms can be reduced before stability becomes compromised, the agenda of the next START should include broader and stricter measures for arms restrictions instead of another direct deep reduction of nuclear weapons. In addition to traditional ICBMs, SLBMs and heavy bombers, this means limiting all long-range nuclear air- and sea-launched cruise missiles, aero-ballistic missiles and

[48] Meeting of the Valdai International Discussion Club. – *President of Russia. Official site.* October 22, 2020. URL: http://en.kremlin.ru/events/president/news/64261 (accessed May 31, 2021).

[49] *Creating the Conditions for Nuclear Disarmament (CCND).* Working Paper Submitted by the United States of America. URL: https://undocs.org/NPT/CONF.2020/PC.II/WP.30 (accessed May 25, 2021); *Speech by Ms. Alice Guitton, Permanent Representative of France to the Conference on Disarmament, Head of the French Delegation.* Geneva, April 23, 2018. URL: http://statements.unmeetings.org/media2/18559222/france-newl.pdf (accessed May 31, 2021).

nuclear gravity bombs of strategic aviation[50]. The same applies to the cutting-edge surface-, air- and sea-launched hypersonic long-range glide systems (both nuclear and conventional), intercontinental cruise missiles and long-range underwater unmanned vehicles, and orbital and fractionally orbital missiles. Agreements should also be achieved on stabilizing reglamentation of ballistic missile defence systems, restricting the development of space strike weapons, confidence-building measures in the cyber area, and specific measures to address non-deployed (including tactical) nuclear munitions in storages of different types.

In light of such difficult tasks ahead, some experts who are highly respected both in Russia and abroad make rather odd conciliatory statements, "We should not mourn the passing of arms control that, over a half-century, gave the world some sense of security, more psychological than real. It is nuclear deterrence that has been and remains key to strategic stability, and making it more effective is top priority. This, rather than arms control, is the only basis of strategic stability. In a polycentric and deregulated nuclear world, strategic stability can and should be complemented by reliable communication, contacts, a measure of transparency and restraint among the relevant parties. Investing in these measures makes more sense than trying to salvage arms control or seeking to impose it on unwilling parties" [Trenin 2020].

In contrast to that it was nuclear deterrence that had a far greater psychological effect than arms control in recent years, since the effectiveness of nuclear deterrence depended on how the leaders of confronting powers perceived their own nuclear potential and that of other nations. As for arms control, it has affected directly the material basis of nuclear deterrence, reducing and limiting nuclear arms and their development programs. Additionally, arms control marked a sense of dividing line between the two linked functions of nuclear deterrence: war prevention and warfighting. Weapons systems and their specific characteristics covered by treaties fall into the first category, while those not covered by such agreements fall into the second.

Clearly, this demarcation is relative: all the weapons restricted under treaties (with the exception of prohibited or eliminated arms) retain their nuclear warheads, targets and on-board flight programmes. However, as the subject of treaties, such weapons systems remain in the hands of each party as if "by permission" of the other, as a means of acceptable deterrence rather than a means of first strike and gaining victory. Therefore, changing the logical framework of nuclear deterrence breaks through its impasses with the aid of treaties.

It is also obvious that "reliable communication", "contacts" and "restraint" are impossible without arms control. Without substantive talks, contacts turn into abstract disputes. They are fascinating and useful at expert forums, but unproductive at the state level (as proved by U.S.-Russian and U.S.-Chinese consultations on strategic stability during several recent years). The first and, sadly, last state-to-state "strategic stability"

[50] Under START III, bombers carrying cruise missiles and air bombs count as a single delivery vehicle and single warhead even though in fact each can carry between six and twelve nuclear warheads. Sea-launched cruise missiles were not limited at all.

concept was developed not at academic conferences, but at the talks on START I, and this stability was enshrined in its articles and the provisions of the five subsequent treaties. In the absence of control and restriction measures, there will be no "transparency" either, since different political systems entail different degree of openness of military information in the United States and Russia (to say nothing of China). Due to a long break in the talks (2010-2021), Russia is going back to the Soviet traditions, when some information provided to the sarcastically termed "potential partners" under the New START terms is kept secret even from the Russian public.

Naturally, arms control should not be idealized; it is not free of its own contradictions. This process is regularly thrown off course by political conflicts between superpowers (around Afghanistan in 1979, Yugoslavia in 1999, and Crimea and Donbass in 2014) and sometimes even by irresponsible statements of the leaders. Following deep reductions of strategic weapons after the early 1990s, it is unclear how far can the parties go down this road for the survivability of second strike potentials, and their ability to penetrate missile defences not diminishing and for the nuclear war not becoming less unthinkable in its consequences. It is also uncertain how far should the bilateral format go on, what principles should serve for transitioning to multilateral format, and in which sequence the states should participate in this process.

The terms and conditions of treaties determine verification regimes for agreements, but for their turn these agreements depend on the possibility of reliable verification that frequently runs into the "top secret" obstacle. Additionally, the parties repeatedly swap their stances on the same issues making compromises hard to reach (restricting missile defence systems, intermediate-range missiles, MIRVed ICBMs, air- and sea-launched cruise missiles, etc.).

When relations are good, the need for arms control is questioned: allegedly such treaties are needed between adversaries, not between partners (this was the mantra of the late 1990s and the early 2000s, which brought the process to stagnation). And when relations are bad (as they are now), treaties are said to be impossible since for the lack of trust between the parties. However, trust is not born out of mutual compliments of the leaders. Rather, it stems from the coordination of interests and out of treaties that are strictly observed and expand openness of the parties.

Still, the above contradictions cannot be classified as aporias in Zeno's understanding – paradoxes that cannot be resolved within the set logical system. When the parties had the requisite political will, the contradictions of arms control were sooner or later resolved within its own context, which is confirmed by the six decades of the history of this process (starting with the 1963 Partial Nuclear Test Ban Treaty). Unlike this process, "nuclear aporias" are unsolvable in the context of nuclear deterrence, which is also evidenced by the seven decades of its evolution.

And by the way about history. The main historical argument of the proponents of nuclear deterrence is that thanks to deterrence the world has avoided a global war for seven decades, with concurrent conflicts being local in nature. This argument can

be neither confirmed nor refuted since history does not know a subjunctive tense (in this case luckily). Nonetheless, the world has known similar periods in the past when nuclear weapons could not be imagined. There was no big war during the century between the Napoleonic Wars and World War I. Before that, there was no big war in the century and a half between the Thirty Years War and Bonaparte's conquests. So, as far as duration goes, the nuclear age has yet to prove its historical endurance.

* * *

This overview of nuclear deterrence paradoxes, today's version of Zeno's aporias, is certainly not exhaustive. Yet it demonstrates convincingly that this system of relations is far from ideal and that it is evolving in a dangerous direction. The security of states based on their ability to kill hundreds of millions of each other's citizens in the course of a few hours is not a reliable basis of military relations (not to mention the moral aspect of such an arrangement). It is time for the fans of nuclear deterrence to understand that arms control is the only way to resolve the contradictions that are inherent in deterrence, that the "Zeno" effect transforms nuclear deterrence into its opposite and, amid growing tensions and the rapid development of military technologies, threatens to collapse into a global disaster.

At the same time, it is obvious that it is impossible to just "abolish" nuclear deterrence. It has become an integral element of today's world order and a field of scientific and technological progress and it will therefore remain with us in the foreseeable future. Nuclear deterrence cannot be abandoned without radically changing the world order, and the world order cannot be fundamentally improved due to stern restrictions of self-generating nuclear deterrence. This is probably yet another *(tenth) "nuclear aporia"* of today. It can be addresses only through learning to live with nuclear deterrence without considering it a panacea, but actively managing and "defusing" it through bilateral and multilateral treaties, norms and mechanisms. This is the only path of survival for the current civilization until it figures out a way to replace the potentials of mutual mass murder with a different foundation of security that would better suit the glorious title of "civilization".

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ДЕСЯТЬ АПОРИЙ НАШЕГО ВРЕМЕНИ. ТЕОРИЯ И ПРАКТИКА ЯДЕРНОГО СДЕРЖИВАНИЯ

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Аннотация. Нарастание международной напряженности и рисков сползания к ядерному конфликту на фоне эрозии системы договоров по контролю над вооружениями между

Россией и Западом становится центральной темой современного политического дискурса. Автор анализирует противоречия теории и практики ядерного сдерживания. В частности, в статье рассматриваются психологические аспекты сдерживания, дихотомия его функций предотвращения и ведения ядерной войны, концепций первого и ответного удара, диалектика обороны и нападения, планы ограниченной ядерной войны, эффект смешивания ядерных и обычных вооружений. Автор доказывает, что, подобно апориям древнегреческого философа Зенона, эти парадоксы неразрешимы в рамках заданной логики – в данном случае логики ядерного сдерживания. Решение видится автору в выходе за эти рамки – на пространство договорно-правовых мер контроля над вооружениями.

Ключевые слова: ограниченная ядерная война, ответно-встречный удар, эскалация, баллистические ракеты, гиперзвуковые системы, космическое оружие, кибервойна, противоракетная оборона, контроль над вооружениями

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