

A black and white portrait of Vladimir Gorbunin, an elderly man with a balding head and a serious expression. He is looking directly at the camera with his hands clasped in front of his chin. The lighting is dramatic, highlighting the texture of his skin and the lines on his face.

ВЛАДИМИР  
ГОРБУЛИН

МОЙ ПУТЬ В ЗАЗЕРКАЛЬЕ

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*Не только путевые заметки*

Брандбург

## NUCLEAR DISARMAMENT OF UKRAINE

### VOLODYMYR HORBULIN

Issues related to nuclear disarmament began to be actively discussed again in Ukrainian society after 2014. As before, I consider this discussion completely groundless and I will try to argue my case. Incidentally, a new discussion relating to the renewal of Ukraine's status as a country that has nuclear weapons now objectively works for the interests of Russia as an aggressor-country. Such steps give the Kremlin free rein in the political and ideological, as well as in the military and economic, dimensions of confrontation with us.

But to entirely not talk about this topic would also be wrong. Another matter is that the discussion should be professional, and it should start with our recent history- when Ukraine was the nominal owner of the third largest nuclear arsenal in the world (after the United States and Russia).

In summary, after the collapse of the USSR Ukraine inherited 220 units of strategic delivery weapons, in particular, 176 intercontinental ballistic missiles (ICBM) with 1,249 warheads and 44 heavy bombers equipped with more than one thousand long-range nuclear cruise missiles, not counting several hundred tactical nuclear weapons.

The issue of the further fate of this superpower nuclear arsenal was one of the key issues for the development of young, Ukrainian statehood, since the main world players, particularly the United States and Russia, clearly wanted to see Ukraine as a non-nuclear state and promised to grant proper international security guarantees. The rejection of such a scenario clearly would quickly lead to Ukraine's international isolation. However, not only purely international political factors led to the Ukrainian leadership of that time to the strategic decision to surrender the nuclear weapons. It was also necessary to take into account the military-political aspects of the problem. After all, the main striking power of Ukraine's nuclear potential is 46 solid-fuel intercontinental ballistic SS-24 missiles with ten warheads each that have a flight range of more than 10 thousand kilometers. This meant that the Eurasian continent was not their goal. Were we ready to blackmail, say, the United States, the state, which both then and to the present day, is the main donor of international support for Ukrainian statehood and independence?

Technical-technological and financial-economic factors also made political and strategic decisions difficult. It is worth recalling that in 1999 the warranty periods for 36 of these ICBMs expired, and in 2002 the remaining 10 expired. And if Ukrainian rocket experts could somehow find a solution to the problem of keeping strategic missile carriers in working order (we had the technical-technological base, although such work required adequate funding, which we did not have), in the case of nuclear warheads the situation was much more complicated. The problem lay in the fact that the nuclear warheads were designed and serviced by facilities located in Russia, in a state which demanded the transfer of these warheads to it.

The nuclear warheads themselves have a limited time for their use and after the expiration of the warranty storage period they must be inspected in every manner, after which a decision is made about either the extension of the resource (with the replacement of part of the electric components), or of the regeneration of its nuclear “stuffing.” However, the warranty period for some warheads began to expire in 1993, and some warheads even “began to breathe”- their critical temperature rose. Ukraine did not have the time, the resources, the scientific support, nor the financial support for the organization of full service, service life extension, and the safe storage of warheads that have exhausted their warranty operation time.

The ceremonial reception, with an orchestra, provided in 1992 to the Minister of Defense of Ukraine Konstantin Morozov during his first official visit to the U.S. was largely due not only to the current status of Ukraine as a nuclear power, but also to an explicit lack of understanding by the Americans of the current situation. During one of the receptions hosted by Morozov, I chatted with a CIA station chief in Kiev, who directly stated: “We are at a loss. We don’t know which policy to take in relations with Russia and Ukraine.” It’s curious that not a word was heard about Belarus and Kazakhstan at this time. Then I replied that to develop relations with Ukraine should be as with a state which can bring both tremendous good and tremendous damage to the U.S., since I knew the goals of 176 ICDMs then standing in Ukraine.

I will try to build my logical reconstruction of the disarmament process that Ukraine went through from 1992 to 1996. I think in this context it is necessary to talk about the reduction of strategic nuclear missiles, and not only that Ukraine relinquished nuclear weapons. This is the essence of the decisions of the Budapest Memorandum on security assurances in connection with Ukraine’s accession to the Treaty on the Non-Proliferation of Nuclear Weapons. According to this document, Ukraine not only gave up the nuclear weapons which were located on its territory,

but also removed itself from the use of strategic launch vehicles, although nuclear delivery vehicles were not even mentioned in the Memorandum. The only international document that obliged Ukraine to ensure the simultaneous destruction of nuclear warheads and their means of delivery was the Lisbon Protocol to the Treaty on Strategic Offensive Arms (START-1) of 1992.

It is necessary to clearly separate the two independent, but in 1994 firmly linked, spheres of strategic weapons- nuclear devices and launch vehicles. This is crucial for understanding the reasons for our country's accession to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). It is worth noting: nuclear weapons were not designed, produced, or denuclearized in Ukraine. Whereas the launch vehicles (four generation of missiles from 1959 to 1988) were developed at Yuzhnoye Design Bureau and manufactured at the Yuzhnoye Machine Building Plant in Dnipro [Ukraine].

The process of the transfer of strategic nuclear ordnance from Ukraine to the Russian Federation was concluded on May 31, 1996, and only on October 30, 2001, near the city of Pervomaysk (Mykolaiv Oblast), that the last missile launch facility for intercontinental missiles was destroyed, and the missiles themselves continue to be stored in disassembled condition in Pavlograd.

This is cursory digression made in order to place emphasis in an individual subject matter the rocket and space sphere, associating with it or, alternatively, excluding other branches. Such as, for example, the nuclear potential of Ukraine, development work in the field of ballistic missile defense, and missile armament in combat aviation.

After Ukraine gained independence, Leonid Kravchuk, faced with the problems of the oversaturation of the country with nuclear and conventional weapons, a drop in the production of the military-industrial complex, which in a single moment found itself without the usual system of government orders, came to the conclusion, more with a political instinct than consciously, that Ukraine needed disarmament. He very quickly understood that it was necessary to look for ways out of both the international isolation, caused by the existence of nuclear missile potential in Ukraine, and the worsening economic situation, where heavy engineering businesses and defense contractors were out of work.

In this context, Kravchuk, together with the Ministry of Foreign Affairs, began to form the only correct position at that time: Ukraine as a nuclear-free state. A second president has already finished this process. I have repeatedly said and written that Leonid Kuchma took on

enormous responsibility by signing at the Budapest Summit in 1994 a memorandum on security assurances in connection with the accession of Ukraine to the Treaty on the Non-Proliferation of Nuclear Weapons. It cannot be over-emphasized that it was this memorandum that lifted the political and diplomatic blockade of Ukraine. Today it incurs harsh criticism, but I want to mention those most important advantages that Ukraine received thanks to the signing of the memorandum. These, I insist, extremely significant benefits were not enough for many politicians even then, they remain underappreciated now.

Ukraine became a participant in the START-1 Treaty as one of the four successors of the USSR under this treaty, as well as a full member of the Missile Technology Control Regime (MCTR) without the adoption of discriminatory restrictions, which made it possible to preserve the aerospace industry and the prospects for broad international cooperation. IAEA safeguards apply to Ukraine, which allowed it to both develop nuclear energy and advance scientific research in this area, and to have nuclear facilities on its territory. All of this was made possible thanks to the memorandum.

The only, although very significant, flaw of the memorandum was that it was of a political, and not legal, nature. And this lay the groundwork for countries, that are guarantors of our security, to allow themselves to freely interpret their duties, to the extent of the actual abandonment of their pledged commitments. Nevertheless, regarding strategic nuclear weapons, I insisted and insist on accuracy, the lack of alternatives for the decisions made then, and I attribute the voices being raised today in support of the renewal of the nuclear status to irresponsible populism.

In the mid 1990s, I stood for a total of more than thirty hours before different Verkhovna Rada Commissions, explaining the situation to the deputies and convincing them of the need for disarmament. Opposition was enormous, and at times the reason for it was a banal desire to do harm the president- Kuchma advocated for disarmament, and the composition of parliament and their relations with the guarantors were very complex then. That being said, there were not any serious and reasonable arguments put forward- there were only inflammatory emotions and rampant populism. I was practically nearly driven off the parliamentary speaker's stand several times, but I stubbornly continued to stand my ground.

First and foremost, my argument was as follows: all of our rockets were aimed at the U.S., many of these fitted with systems to overcome the highest-level missile defense. This

brought monumental pressure due to the ocean- in the event of the rejection of disarmament Ukraine would have turned into a rogue state, and found itself in international isolation. And all this in the conditions of a diving economy at the very start of independence. I believe that there were real risks in facing well-consolidated, organized international sanctions- instead of solid and vital political support.

I remember perfectly a poignant situation: I am standing before yet another commission, and one of the populist deputies is on the rampage, rejecting my arguments and demanding to keep the nuclear arsenal. And then Leonid Kuchma, seated in the hall, addresses this deputy: I cannot vouch for it verbatim, but this is a general idea of what he said: “Very well, let’s put one of these rockets in the yard of your house. And along with this, we will not maintain it, because we have neither the resources nor the specialists for maintaining such weapons in proper technological condition. Will you be calm from this? You will feel safe?” The question was, of course, rhetorical, but a few critics were brought down a peg, it forced them to understand the reality in which we found ourselves.

Then it was necessary to constantly explain to people far from the aerospace topic what nuclear weapons are and what terrible risks are involved with their preservation. Most terrible for me personally, as a person from the aerospace industry, was the lack of specialists on work with the nose cones of rockets. Awareness of the threat that such a technique would create in the future without an adequate level of maintenance support became a powerful stimulus for my work on disarmament. The vivid and rather fresh memories of Chernobyl helped convince the doubtful. Incidentally, being at the time the head of the National Space Agency of Ukraine, I often met with the directors of the largest defense companies- and I can say with confidence that among them there was not a single supporter of keeping the nuclear arsenal. And no matter what anyone says about the decision to give up nuclear status, it is precisely because of this decision that Ukraine entered the third millennium as one of leading space nations of the world. And five space rocket complexes for the Ukrainian-designed and manufactured “Cyclone-2,” “Cyclone-3,” “Zenit-2,” “Zenit-3SL,” and “Dnieper” provide launches of spacecraft from spaceports of different countries.

Another thing, we took a hands-off approach to the issue of defense capabilities... This is true, but it has no direct relation to nuclear disarmament. Let’s say, if for instance South Africa gave up its nuclear status practically at the same time as Ukraine, but

began to actively rearm using the latest defense technologies, then we are hopelessly falling behind the times in this sphere. For what we paid a price.... Today, after the start of Russian aggression against Ukraine, we often heard new statements by hardliner politicians about the need for the renewal of nuclear status.

At this time, it is worth dwelling in more detail. In the international nuclear hierarchy Ukraine remains in truth a threshold state. This means that the economic, scientific, and technological capabilities of Ukraine are theoretically sufficient for the development of nuclear weapons. According to its scientific and technological potential, Ukraine, again in theory, could achieve the status of a nuclear status. This is conditional upon the acquisition of the immense resources that would be required in the attainment of such status.

The resources for a nuclear program are generally a separate issue for the state, which in the fifth year of the war only made it to the rearmament of its army with new conventional weapons. Do you feel where I'm getting at? Is it possible to fight with machine guns, but secretly from the world be engaged in a nuclear program? And at the same time being financially dependent on this world. However, even with such a clearly ineffectually reasoned staging of the issue, I still propose to separate resources and technologies, on the one hand, and clean politics, on the other. Although historically nuclear energy has matured from nuclear weapons programs, here, naturally, the reverse is also possible. In the country two facilities for the procurement and processing of uranium, technology for the development of electronics, and even special measurement equipment for determining the isotopic abundance of nuclear materials were retained. In addition, Ukraine occupies one of the first place in the world by reserves of uranium and zirconium.

But some technologies for organizing a closed nuclear cycle are still lacking. No Ukrainian establishments are viable for the initial phase of uranium ore enrichment. It is necessary to take into account both the lack of technology and the manufacturing capacity for building reactors. In Ukraine, there is no full (closed) nuclear fuel cycle. Although, there are some of its individual, key elements: the mining, breaking up, and enrichment of uranium ore to produce triuranium octoxide ( $U_3O_8$ )- known as yellow cake; the use of nuclear fuel (power-producing and research reactors); the storage of spent nuclear fuel; the transportation of fresh and spent fuel and radioactive waste, and the storage and disposal of radioactive waste.

Such elements of the nuclear fuel cycle, such as uranium conversion (the transfer of triuranium octoxide  $U_3O_8$  into uranium hexafluoride  $UF_6$  - a gaseous compound that is technologically necessary for further enrichment), isotope enrichment of uranium and its reconversion (the conversion of enriched uranium hexafluoride to uranium oxide), the manufacturing of reactor fuel pellets from uranium oxide and the production of ready-made reactor fuel assembly are absent in Ukraine today.

And, in general, the existing scientific potential and its own experimental base is insufficient for scientific and technical support for the creation of a nuclear cycle in Ukraine. But the colossal financial problems are a much more noticeable obstacle for the realization of such ambitions. After all, the real financing for the majority of current programs for the creation of the nuclear cycle in the years of independence did not surpass 10 percent of the required or declared level. On top of that, we have not delved into the problems of the country's energy security.

Onwards. As for the direct creation of nuclear weapons, weighing all the pros and cons, I take it upon myself the responsibility to declare: we currently are not able to create a nuclear warhead. We have practically no industrial base for this, in order to seriously take the recreation of nuclear warheads. In Ukraine, the radiochemical industry is absent as such. We do not have and never have had specialists, who would design, develop, build, and, most importantly, test the nuclear units in semi-combat or combat conditions. For this it is necessary to obtain equipment and master a number of elements of the nuclear fuel cycle which are currently not available in Ukraine, such as uranium conversion, its isotopic enrichment and reconversion. Most critical is the isotope enrichment of uranium, the purchase of technologies and equipment, which is practically impossible since all of this falls under the prohibitive regime of export control. The emission of plutonium from depleted nuclear fuel also does not solve the 'weapon-grade' issue, since reactor-grade plutonium, unlike 'weapon-grade,' is not suitable for the creation of an effective nuclear weapon.

From a technological point of view, the most complex of all problem to solve is the nuclear 'stuffing,' for the manufacture of which needs either uranium enriched by  $^{235}U$  no less than 80% (but for an effective charge no less than 90-95%), or 'weapon-grade' plutonium, in which a part of  $^{239}Pu$  makes up no less than 90%. Ukraine does not have such materials. We have used nuclear fuel enriched by  $^{235}U$  less than 5%, and for scientific research no more than 20. There are also no technologies, equipment, or specialists in the isotopic enrichment of uranium.



The purchase of technologies and equipment is practically impossible, since they fall under export control and ban.

Regarding 'weapon-grade' plutonium, it was developed only in special 'commercial' reactors. 'Energy-grade' plutonium, contained in the spent nuclear fuel of a nuclear power plant, due to the high level of contamination by other isotopes of plutonium (most significantly  $^{238,240}\text{Pu}$ ) is unfit for the manufacture of a classic nuclear charge, since it is supersaturated with primary neutrons. This leads to a far too high speed for the chain reaction, which does not allow it to attract such a volume of nuclear materials to the reaction, which is necessary for a full detonation. The excessive speed of the reaction turns into a small-scale explosion, dubbed a 'pop,' or more poetically, a 'splash of champagne.' This effect was explained as far back as the second half of the 1940s by American scientists- the forefathers of the atom bomb. Although it is theoretically possible to 'neutralize' such excess neutrons.

As we can see, an attempt to acquire all of the necessary components takes many years and incredible financial resources, measured in tens if not hundreds of billions of dollars, which Ukraine does not have- and especially would not have in the status of a rogue state, which would be the inevitable results of the renewal of nuclear status.

Let's look at the historical experiences of other countries that had genuine nuclear ambitions. What are they facing and what lengths are they prepared to go to for the sake of creating a full nuclear cycle?

Pakistan found itself in a situation, very similar to Ukraine's, in which at the time of gaining independence was in conflict (due to the territorial conflict around Kashmir) with the largest country in the region- India. After several armed conflicts with India, which set about to implement its own nuclear program, Pakistan appealed to the international community about the reconciliation of the conflict and security guarantees. Zulfikar Bhutto, the then Minister of Energy, and then President and Prime Minister of Pakistan, taking into consideration the inadequate efficiency of international guarantees and the danger of the development of India's nuclear weapons, supported the creation of Pakistan's nuclear program, despite the colossal costs and sanctions. His famous observation, "If India makes a bomb, we are ready to eat grass, but we will make our own nuclear bomb," aphoristically accentuates the key difficulties that faced the state in having nuclear ambitions. Pakistan stated the fact of their possession of a nuclear weapon in 1997.

Another example is Iran and the situation which during the last ten years has developed around its nuclear program and attempts to create its own facility for uranium enrichment. In response to the refusal of Iran to desist uranium enrichment the Security Council of the UN, starting from the end of 2006, took adopted a number of resolutions banning exports to Iran of nuclear, missile, and a large proportion of military-technical products. The US and EU imposed even more harsh sanctions banning direct foreign investments in gas, oil, and the oil-refining industry of Iran, contacts with their banks and insurance companies, financial transactions, and things like that. Despite public statements by high-ranking Iranian officials about the peaceful nature of the program, starting from 2011 the IAEA expressed concerns about the possible military dimension of Iran's nuclear program.

But are we prepared to take the same path now? And if we are ready, do we understand that discussion about the restoration of Ukraine's status as a nation that has nuclear weapons now objectively works in the interests of Russia as an aggressor state?

Firstly, Ukraine's exit from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) explicitly would cause massive negative international repercussions, resulting in Ukraine's international isolation, the loss of the backing of our partners in this difficult time for us, the withdrawal of investments and credit, and the introduction of a sanctions regime against us.

Secondly, not even taking into account the technological difficulties of producing nuclear weapons, making a similar production requires a significant amount of time (more than 5 years, which we do not have), and also an enormous monetary and financial resources (by various estimates, from several billion dollars to hundreds of billions of U.S. dollars), which Ukraine does not have, and especially would not have under the condition of international isolation and sanctions.

The example of Iran once again confirms the best of the outlined conclusions. This is because even with full internal support for their nuclear program under the conditions of internal sanctions, they needed nearly 10 years (!) for access to the ability to obtain full highly enriched uranium in the required quantities.

But even this is not important. It is more important to recognize that the decision to bring Ukraine's nuclear status back to life and leave the NPT now would not give us any advantages in the military confrontation with the Russian aggressor. Instead it would untie the Kremlin's hands

in the political and ideological, and in the military and economic dimensions of the conflict with us. In addition, it should be understood, that precisely those dangers against which nuclear weapons are powerless have come to the forefront today. And a colossal sum spent on restoring nuclear potential, will impoverish the country in the end, not solve problems security challenges. Meanwhile, by counting on nuclear weapons, Ukraine will fail to adequately finance the creation of conventional weapons, which are necessary for assuring full protection from terrorist threats, from being drawn into regional and border conflicts.

I am not talking about the opposition already, which would have to overcome the desire that Ukraine renew nuclear status. To make such a decision Ukraine would have to go against the Lisbon Protocol of 1992. As a result of the strident rhetoric of the international community, sanctions would follow, and substantial economic pressure. This pressure would not only strip Ukraine of such essential allies in the international arena, but also in the long run it would be forced to abandon such a decision. I therefore reiterate: the reincarnation of Ukraine as a country with nuclear weapons would be the wrong decision from an economic and political point of view, as well as militarily, because it would distract from the creation of new modern pieces of weaponry, which can provide a deterrent effect on opponents.

And one more thing: it is necessary to remember that Ukraine is a space power. The fact that we ceased to produce strategic rocket systems does not mean that, working within the boundaries of international agreements, we are not able to produce short-range ballistic missiles systems. These systems cannot be designated in a direct sense as a means of deterrence, but the Ukrainian army would feel more confident, and the development laboratory and factories not only would have preserved their potential, but also would have increased it.

Many are inclined to devote closer attention to the Russian factor in the issue of disarmament. Of course, this existed, but not in the form of some political pressure, but in a purely economic form. In the early 90s, we had accrued around 2.5 billion dollars of debt for Russian gas. Nuclear fuel for our atomic energy was effectively supplied to us from 1992 by the Russian Federation without payment, in credit. We managed to eliminate the debt for the nuclear fuel only in 1997. All of this, again, is under the conditions of the most difficult economic situation. Of course, the possibility to abate the debt load in return for disarmament was one of the most important factors in the decision making.

In the whole set of issues for nuclear disarmament, I consider only one debatable- the compensation that Ukraine received as a result. Yes, we, in all probability, were able to get far more. Unfortunately, Ukraine in reality repeatedly demonstrated an ineptitude to bargain. And our weakness influenced the resulting agreements for nuclear disarmament.

What next, does the capability exist for Ukraine to produce a deterrent weapon for external aggression? And are there any grounds for this?

I believe there are both the grounds and the capabilities. The Ukrainian-Russian conflict around the island of Tuzla in 2003, the seizure and annexation of Crimea in the spring of 2014 and the military aggression in the Donbas conclusively and definitively proved that the Russian Federation in general does not consider itself bound in respect to Ukraine's security guarantees that are determined by the Budapest Memorandum. About which, by the way, the Prime Minister of the Russian Federation Dmitry Medvedev and the Minister of Foreign Affairs Sergey Lavrov publically made statements.

Under the conditions of the new long-term challenges of the hybrid war with Russia, it is extremely important to Ukraine to secure support from the U.S. on the issue of revising the fixed member conditions of the Missile Technology Control Regime (MTCR) of 1998 for range limitations, set up in the interests of its own defense capabilities for medium-range strategic missiles. Ukrainian rocketry engineers are certain that the technological capacity available in the sector makes it possible to produce, with the use of components of previously mass-produced rockets, Ukrainian cruise missiles with a range capacity of 1500 km, which is three times larger than the current MCTR limits. It is extremely important that such work would be allowed within the framework of defense industry cooperation inside of Ukraine.

Currently, political determinants stand out as the highest-priority restrictive factor in authorization of the referred to situation, in particular for Ukraine restrictions established on the range for the development of cruise missiles in the interests of their own defense capabilities of 500 and 280 km - for the production of such rockets for export. But then Ukraine consented to these terms for membership in the MTCR, keeping in mind the mentioned guarantees which, as it became clear, do not function.

And today, when we found ourselves in new conditions, our Western partners are blocking Kiev's purchases for both strike weapons and components for the Ukrainian strike

systems. So, getting Kiev approval from Washington to review active restrictions of the MCTR is now the main task for our political and military diplomatic establishment: its decision will mean that the U.S. is positioning Ukraine as an ally. And the presence of such a rocket in Ukraine would be a serious factor for containment and countering the military component of the Russian hybrid war, and the rhetoric of the aggressor towards Ukraine would change.

There are other important operative directions for Ukraine. For instance, the appearance of new dangers, particularly in connection with the development of medium-range rockets in a range of countries, will inevitably prompt Europe to implement some projects in security domain. In my view, Ukraine is already now ready to take part in the creation of the anti-missile architecture of Europe. Our country has all the legal right for this, since we remain one of the legal successors of the disintegration of the USSR in the ABM Treaty of 1972. Therefore, if you take the European context, in practical terms a joint project for the creation of a ballistic missile defense system on the European continent could be interesting and cost effective.

We could also propose to the American side feasible participation in the creation of their national missile defense (NMD) in Europe. Such a project would allow us to secure orders for the production of several elements for testing the American NMD, for example, missile targets. But at the time of the certain development of events it would be possible to raise the question about the placement of the object of this NMD on the territory of Ukraine, taking into account its cover by American air defense systems and a contingent of American troops. This approach is reasonable, because it automatically makes Ukraine an ally of the U.S. And simultaneously, the territory is inviolable from Russia, which has become hostile.

These are just some of the theories which should be worked through in detail. Under the existing circumstances, when a nuclear-armed power, that has in addition an army force of nearly a million for conventional warfare, intends to destroy our state and is neglecting previously given guarantees, we must consider any, including asymmetric, theories assuring our security.