**INSTITUTE OF WORLD ECONOMY
AND INTERNATIONAL RELATIONS
RUSSIAN ACADEMY OF SCIENCES**

NUCLEAR THREAT INITIATIVE

This publication is dedicated to the memory of Alexander Pikaev, our colleague and friend

NON-NUCLEAR FACTORS OF NUCLEAR DISARMAMENT

(Ballistic Missile Defense, High-Precision Conventional Weapons, Space Arms)

Foreword by Academician Alexander A. Dynkin at the Conference "Missile Defense, Non-Proliferation and Deep Reduction of Nuclear Weapons"

Alexei Arbatov, Vladimir Dvorkin and Sergey Oznobishchev

**Moscow
IMEMO RAN
2010**

УДК 327
ББК 66.2 (0)
Non 76

Foreword by Academician Alexander A. Dynkin at the Conference "Missile Defense, Non-Proliferation and Deep Reduction of Nuclear Weapons"

Alexei Arbatov, Vladimir Dvorkin
and Sergey Oznobishchev

Non 76
Non-Nuclear Factors of Nuclear Disarmament (Ballistic Missile Defense, High-Precision Conventional Weapons, Space Arms).
Alexei Arbatov, Vladimir Dvorkin, Sergey Oznobishchev.– Moscow, IMEMO RAN, 2010. – 67 p.
ISBN 978-5-9535-0260-3

Non-nuclear Factors of Nuclear Disarmament (Ballistic Missile Defense, High-Precision Conventional Weapons, Space Arms)

This is the third publication of the series titled "Russia and the Deep Nuclear Disarmament", which is to be issued in the framework of joint project implemented by the Institute of World Economy and International Relations (IMEMO) and the Nuclear Threat Initiative, Inc. (NTI). It is based on the discussions at the conference held on June 22, 2010.

The authors express their gratitude to the IMEMO staff for comprehensive support in the production of this research paper and organization of the fruitful discussion. This research report was commissioned by the Nuclear Security Project (NSP) of the Nuclear Threat Initiative (NTI). For more information see the NSP website at http://www.nuclearsecurity.org.
The views expressed in this paper are entirely the authors' own and not those of the IMEMO or NSP.

To view IMEMO RAN publications, please visit our website at http://www.imemo.ru

ISBN 978-5-9535-0260-3

CONTENTS

FOREWORD

by Academician Alexander A. Dynkin, Director, Institute of World Economy and International Relations (IMEMO) of the Russian Academy of Sciences

Esteemed participants in the Conference,

This is the third of this year's four meetings under the general topic "Russia and Deep Nuclear Disarmament".

Before opening this conference, I would like to express deep sorrow on my behalf and on behalf of the entire Institute for the untimely demise of our colleague and friend Doctor Alexander A. Pikaev, a key expert at IMEMO, a talented scientist renowned both in this country and abroad, and one of the pioneers of this project. I am extending my sincerest condolences to his family and friends. Let us now hold a moment of silence for him…

Please be seated.

This day – June 22 – is deeply etched in the memory of generations of Russia's nationals and the citizens of almost every country of the former Soviet Union as the day when the Great Patriotic War began 69 years ago. For us, this is the day of deepest national sorrow, the date of the disastrous and inglorious failure of Stalin's foreign and military policy at large. Yet, at the same time this is the day to commemorate the supreme bravery of our people who eventually achieved victory at the cost of unthinkable sacrifices. In some general sense, the aim of our mutual effort here is to prevent any similar threat in the future, whatever its origin.

This NTI-IMEMO session will focus on the fundamental issue of strategic and political relations between the United States and its allies, on the one hand and Russia, on the other hand: the influence of the development and potential deployment of theatre missile defense (TMD) and, in the longer term, of global strategic ballistic missile defense on nuclear nonproliferation and further nuclear arms reductions.

However, in the course of implementing the joint IMEMO RAN-NTI program, we were forced to make certain adjustment to our plans. Due to circumstances beyond our control, namely the eruption of the volcano with a name that sounds like a tongue-twister, the participants from abroad could not make it to the previous conference in April. Back then, we were looking at the issues of deep nuclear disarmament in the context of NATO-Russia relations. This time we decided to use the window of opportunity offered by the temporary break in the volcano's activity and include this item in the agenda for this meeting.

It would be certainly unfair to limit the discussion of this subject to Russian perceptions that were outlined in the book published in the follow-up of the previous conference, the more so, as several reputable and widely recognized experts from the US and Western Europe have accepted the invitation to participate in our session. We appreciate their attendance and are happy to greet them at our meeting at IMEMO.

Thus, there are some changes to our agenda. At the first session of our meeting we will give the floor to the foreign participants in the conference and discuss their contributions. The second half of the day will be devoted to presentations by the Russian experts that we will later discuss together with our foreign colleagues.

Though I am by no means trying to predetermine the course of the conference, I would like to stress that the influence of BMD systems on nuclear disarmament and non-proliferation depends not only on specifications of the defense systems – in no smaller extent it is determined by the military-political format of their development. Developing BMD systems on the basis of NATO/US-Russia cooperation will, among other things, practically contribute to further reduction and non-proliferation of nuclear weapons. A recent evidence of this is the unified position of the great powers on the UN Security Council resolution on Iran concurrent with the cancellation of US plan to deploy a strategic BMD system in Europe and with the signing of a new START Treaty.

However, developing and expanding BMD on a unilateral basis or only within the framework of the existing alliances, is most likely to hinder further nuclear disarmament and disrupt the cooperation of the great powers in the sphere of non-proliferation with all the consequences that come with it, including the extension of the nuclear club and the possibility of terrorists' gaining access to nuclear weapons.

Yet, just to say that the great powers should cooperate on BMD would be far from sufficient. Indeed, despite the fact that in the 1990s and in the current decade the United States and Russia have made quite a number of unilateral proposals and even had a series of joint computer-assisted exercises and signed several joint documents, things have not got off the ground.

The truth is that joint development of BMD requires addressing a whole range of most complicated issues. In addition to technical and financial matters (such as secrecy, intellectual property protection, operational compatibility as well as the sharing of costs, research and development and, subsequently, the allocation of operational functions) there are serious strategic and political issues to tackle.

It is assumed that a joint tactical missile defense system (TMD) designed to protect the US, its allies and Russia against sub-strategic rockets would not cause major strategic frictions, since the two powers do not possess intermediate- and shorter range missiles. However, the dividing line between tactical and strategic ballistic missile defense is presently rather vague and will only be further dissolved as technologies advance.

Most or all of the missile capabilities of other nuclear states (China, India, Pakistan, Israel and the Democratic People's Republic of Korea (DPRK)) and non-nuclear-weapon states possessing missile capabilities (Iran, Saudi Arabia, Turkey, Egypt, Syria, Libya and Yemen) consist of shorter- or medium-range weapons. Hence, these states will surely assume that a joint US-Russia BMD is aimed against them.

Are the United States, Russia and their allies prepared for the reaction of the said states to their joint TMD, and are the great powers on the same page as to which of these states should be regarded a priority threat?

As to strategic BMD, things are even more complicated. For the time, the strategic relations between the US and Russia (plus the forces of the UK and France) are based on mutual nuclear deterrence, which in its turn relies on mutual ability to inflict unacceptable damage with intercontinental ballistic missiles (ICBMs) and sea-launched ballistic missiles (SLBMs); this model of relations was once again sealed by the new START Treaty. Then how will the parties be able to simultaneously build a joint BMD for intercepting the missiles of this particular class? Is it possible to draw distinction between a joint BMD designed for ensuring defense against third countries and a system destabilizing mutual nuclear deterrence?

Will a joint BMD imply abandoning strategic relations based on mutual nuclear deterrence? What will replace mutual nuclear deterrence until total nuclear disarmament is achieved? Are we talking about a full-scale military alliance between the Collective Security Treaty Organization (CSTO) and NATO, and if so, are the two parties ready for it (such an alliance exists between the US, the United Kingdom and France whose nuclear forces are not postured for mutual nuclear deterrence)?

Such an alliance, if it is ever feasible, would be regarded by China – the 21st century superpower – as an alliance against itself. Therefore, China should be engaged in the alliance and the creation of joint BMD, shouldn't it? Will the US and its partners on joint BMD in the Far East accept this? Will Beijing, as a state claiming leadership in the Third World, welcome such an alliance? What is then to be done with respect to India – a partner of both the US and Russia – whose nuclear forces are aimed against China and Pakistan? If India is embraced by the ballistic missile defense, what is to be done with Pakistan? Is it possible (similarly to the NATO-Russia alliance, which is still only a theoretical proposition) to renounce mutual deterrence and create a military alliance in the China-India-Pakistan triangle as well?

The implementation of the new START Treaty is indirectly associated with the preservation of BMD systems roughly within their current scope, which is underlined in the Treaty's Preamble. Hence the question: what changes to these parameters will undermine the Treaty? At what stage and in what forms should the development of ballistic missile defense systems become a joint task for the sake of preserving the Treaty? What are the limits of further reduction of strategic offensive arms under the next treaty in case of unilateral ballistic missile defense development or in the context of potential US-Russia cooperation on BMD?

Without at least basic answers to all the abovementioned, as well as to other questions, we may hardly count in earnest on the US-Russia cooperation, even if we call for such cooperation for another hundred times.

Further, how will the development of conventionally armed high-precision ballistic and cruise missiles by the US and NATO affects the outlook for the next stage of strategic offensive arms reduction and cooperation on BMD? As is well known, Russia's new Military Doctrine prioritizes the threat of an air-space attack, and, consequently, the building of air-space defense[1] system for Russia. One could hardly imagine Russia taking part in the development of a joint BMD with the US (NATO) while simultaneously building its own air-space defense system against the same states.

There is yet another question: what impact may the development of space arms have on strategic offensive arms reduction and the development of a joint BMD? Are any agreements and rules of conduct possible in the military space sphere?

Finally, what impact the developments in the areas related to strategic offensive arms, BMD, high-precision conventional weapons and space weapons systems may have in terms of nuclear weapons and missile technology proliferation on the global scale?

Untangling a most complicated knot of the said issues and processes or even outlining basic principles and criteria of, as well as paths towards solutions is one of the major objectives of the military and political expert

[1] Air-space defense includes command and control, early warning and information support systems, and interception systems of Missile-Space Defense, Air Defense, and Space Forces (of Russia).

community in Russia and the West at the current stage. The turning point that has been reached in the recent months must be consolidated and enhanced in every possible way lest the commencing constructive cooperation of the two powers be suffocated by the obstacles and conflicts that are characteristic of their relations. Thus, this session within the framework of the joint IMEMO-NTI project is of great importance and relevance.

Given the profile of the project and high professionalism of the participants, we may expect that the discussion will result in a profound analysis of the problems and will enable us to arrive at meaningful and applicable conclusions and proposals contributing to mutual understanding and practical cooperation between the parties on the complicated issues outlined above.

I wish you every success.

SUMMARY

To achieve deep reduction of nuclear weapons, a whole range of complicated issues needs to be resolved. From the viewpoint of priority, ballistic missile defense is at the top of the list of these issues, with its relevance significantly increased after the US withdrawal from the Anti-Ballistic Missile Treaty (ABM Treaty) and the appearance of the plans to deploy the elements of the US global ballistic missile defense system in Europe.

For quite a time there have been various discussions and proposals on the practical forms of cooperation between the US, Russia and NATO in the sphere of BMD. Alongside with a number of joint official declarations, such cooperation manifested itself in a series of joint computer-assisted command exercises on non-strategic BMD, both in the bilateral (US-Russia) and multilateral (NATO-Russia) format.

In other words, the parties have quite clearly expressed their intention to cooperate. The possible " division of labor" within such cooperation can also be plainly seen: the United States is an absolute leader in the development of non-strategic and strategic ballistic missile defense systems, while Russia could contribute by including its information support and interception capabilities in the joint BMD.

To overcome the persisting mutual distrust, it would be reasonable to begin with restoring the elements of the cooperation that have been lost over the recent years. Before everything else, it means urgently reviving the project of the Joint Data Exchange Center (JDEC) to monitor the launches of missiles and space vehicles. As an option, the parties may implement the proposal on creating a so-called virtual data exchange centre. In this respect, there are quite a number of complementary areas offering opportunities for cooperation between the US, the European members of NATO and Russia in terms of organization and technology that may be realized in the context of the current outlook for US-Russia strategic partnership.

In the expert and political community there is an increasingly popular opinion that cooperation on BMD may become a key element that will contribute to the enhancement of mutual effort in nuclear arms reduction, strengthening the regimes of nuclear weapons non-proliferation and ensuring international security at large. The principal recommendation of the participants of the IMEMO-NTI conference is to proceed without delay with the most simple and obviously doable first steps mentioned above,

instead of trying to foresee and elaborate problems and solutions for decades ahead (i.e. joint deployment and operating TMD and strategic BMD, abandoning mutual nuclear deterrence, constructively engaging China, India etc.). Moving ahead with obvious initial steps may gain the momentum of its own and make resolution of more complex issues much easier in the long run.

In the context of strategic offensive arms reductions, the issue of strategic high-precision conventional weapons has become a high priority subject. The Russian military, political and civilian experts often cite the increasing amount and effectiveness of such weapons as a means of a hypothetical attack on Russia. Strange as it might seem, now that the global confrontation is a thing of the past, the Russian military posture, while dismissing the probability of a global nuclear war, at the same time regards quite possible a war of the US and their allies against Russia with high-precision conventional weapons in the context of an air-space attack.

One should not overestimate the effectiveness of the said weapons in terms of a counterforce strike, capable of undermining Russia's nuclear deterrence potential. Indeed, some targets that could previously be attacked only by nuclear arms may now be destroyed by high-precision weapons. Yet, it its evident that high-precision conventional weapons cannot even come close to nuclear weapons in terms of effectiveness in a strike at strategic hardened or mobile military targets, let alone urban-industrial centers.

If NATO countries really sought to obtain the capability of a disarming strike against Russia, they would never wish to actually reduce their strategic and tactical nuclear weapons – especially given the inadvertent reduction of such weapons in Russia's possession due to economic and technical reasons.

Despite evident logical inconsistencies of the alarmist reasoning on the growing high-precision weapons threat to Russia's security, this perception has become a political reality reflecting itself in the Military Doctrine of the Russian Federation for 2010 and a huge volume of official and expert opinions in Russia's strategic community. Hence, alongside with establishing air and space defense, maintaining and developing major nuclear capabilities has been viewed in Russia as a fundamental guarantee of national security.

Thus, extensive development of high-precision weapons by the US and its allies gravely discourages further nuclear disarmament and, therefore, the strengthening of the non-proliferation regime and the cooperation of the leading states in addressing other common security threats. Partly and indirectly this problem was addressed by the new START Treaty. More comprehensive solutions should be elaborated in the follow-on

START and through specific confidence-building and cooperative measures related to long-range conventional ballistic and cruise missiles.

Ensuring security of military, dual-use and civilian orbital systems is becoming a key element of overall security for virtually all the developed countries. Meanwhile, given its increasing significance in terms of military and peaceful use, outer space may in future turn into the arena of a new arms race and potential use of force.

In the foreseeable future, the US, Russia and China are capable of realizing the existing potential for the militarization of outer space. The US holds absolute leadership in this sphere, as it possesses a wide range of state-of-the-art space technologies and scientific and technological capacity.

At the same time, as the country whose military activity is most dependent on space support, the US should be concerned about the safety of its own orbital systems more than any other country. Furthermore, it should be much more important for the US to ensure the security of its own space vehicles (SVs) rather than create a threat to other countries' satellites. Obviously, it would be feasible provided that adequately verified agreements are achieved with other powers.

Meanwhile, until recently it was Washington which most strongly opposed the adoption of any international legal rules that might restrain US freedom of activities in outer space. The US rationale referred to impossibility of negotiating adequately verified agreements, as well as to explicit desire of achieving superiority in weaponization of space.

There are certain reasons to hope that under the presidency of Barack Obama US position will be more constructive and the non-armament of outer space will be the aim of the negotiations. Russia should be prepared on the practical level for such a turn of events.

The success of the negotiations will greatly depend on the ability of states to agree on the subject of negotiations and treaties, as well as to elaborate realistically feasible and reliable verification and transparency measures. A correctly phased process and the right choice of format of the negotiations are equally important. The Russian-Chinese draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT) proposed in 2008 up to now has not met these requirements, although the draft Treaty was well received at the Conference on Disarmament in Geneva.

The first practical non-weaponization agreement in bilateral (US-Russian) or trilateral (US-Russia-China) formats might be based on the recognition of asymmetric strategic interests and capabilities of the parties and on the fact that some tests of space weapons would be easier to ban, than their actual deployment in space or on Earths. Thus, an agreement to ban tests of anti-satellite systems of any basing mode in parallel to a ban on testing of space-based BMD systems against real targets in space (satellites or missiles) could be the first step of practical space arms control. Collaterally this would address the disturbing problem of the growing amount of space derbies.

In view of the political, technical and juridical difficulties associated with the prevention of a space arms race, the first step could capitalize on an increasingly popular idea of adopting a code of conduct in outer space. Such a non-legally binding document could become the basis of voluntary limitations on certain kinds of activities in outer space and facilitate confidence-building among states.

INTRODUCTION

This publication further explores the issue of nuclear disarmament and its various aspects. The discussion summarized by this booklet started with revisiting the issues of European security and different areas of NATO-Russia relations that were tackled at the previous conference "The Future of NATO-Russia Relations" on April 20, 2010.

Western colleagues could not participate in April session because of the eruption of the volcano in Iceland. Their contributions at this session enriched and complemented the earlier discussion. First and foremost, they pointed out the relevance of ensuring military security for improving the relations, both in the bilateral (US-Russia) and multilateral (Euro-Atlantic area) format. In this context, it is important to achieve reduction of conventional and non-strategic nuclear weapons and secure joint development of ballistic missile defense.

In particular cooperation on BMD is the key to improving the architecture of Euro-Atlantic security. This view is shared by the Euro-Atlantic Security Initiative (EASI) – a multilateral high-level public commission that was newly created to develop conceptual parameters of the 21st century Euro-Atlantic security system. The importance of cooperation on BMD for Europe is recognized by the Group of Experts (chaired by Madeleine Albright) convened to develop a new strategic concept for NATO. It is assumed that for the different scenarios of BMD deployment, additional confidence-building measures must be elaborated to support strategic stability in NATO-Russia relations.

NATO-Russia cooperation on a joint BMD had achieved some progress. The results of the study on interoperability, with NATO and Russia retaining separate command and communications systems, were recognized as worthwhile. At the conference it was pointed out that beside cooperation on BMD, reviving the regime of the Treaty on Conventional Forces in Europe (CFE Treaty) is another key priority s in terms of improving NATO-Russia cooperation and l security in Europe.

Furthermore, cooperation in the sphere of ballistic missile defense would create additional guarantees against certain regimes outside Europe striving to provoke conflicts between Russia and the West by developing their own ballistic missile and nuclear programs. As it is known, Washington and Moscow are currently holding consultations on ballistic missile threats assessments However, in the opinion of some Western participants in the Conference, restrictions on the areas of deployment of the US (NATO) possible future BMD might be a step that would contribute to building confidence between the parties. Also it would be necessary to develop a mechanism allowing for compatibility of the existing BMD systems and elements of states and those that will appear in the future.

The persisting mistrust and conservatism of official agencies, as well as the fear of losing sensitive technologies are the main obstacles to implementing first joint steps. In mid-term perspective, there are several major issues related to the persisting reliance of strategic relations between the United States (NATO) and Russia on mutual nuclear deterrence which was reconfirmed — although at lower absolute levels of weapons — by the new Strategic Arms Reduction Treaty (START Treaty) in 2010. In the long term, reconciling the joint BMD with the political and strategic relations of NATO and Russia on the one hand and China, the US allies in the Far East, India and other third countries on the other hand, will be quite a challenge politically and technologically.

However, the participants of the discussion fully supported the view that it would not be right to try and resolve all the political and military technical issues for 10-20 years ahead. Otherwise no progress will be ever made. These issues should be solved in a step by step mode.

Meanwhile, practical measures should be taken without delay, and it is better to start with unobjectionable steps, such as reviving the project on the Joint Data Exchange Center (JDEC) and restructuring the JDEC for operating on a real-time basis, commutating the missile launches early warning systems and integrating the air defense systems within Greater Europe. Cooperation in these areas creates favorable conditions for resolving major mid- and long-term problems in a mutually acceptable manner. With due wisdom and political will of the parties, the cooperation in the sphere of ballistic missile defense could become the key factor for the consolidation of efforts of the great powers and their allies on addressing global security challenges.

The regulation of strategic high-precision conventional weapons is an increasingly sensitive issue which has been a pressing topic within strategic offensive arms reduction process. The concerns over the issue have recently increased in the Russian political and expert community with assessments made as to the expanding number and the effectiveness of these weapons as a means of an attack against Russia, including a disarming (counterforce) strike at its strategic nuclear forces, early warning systems and combat command-control centers.

The existence of the said threat and the need to mobilize resources to counter it appear rather disputable both from the political, strategic and military technical perspectives. Nevertheless, an opinion was expressed at the Conference that the perception of such a threat in Russia became a political fact and a reality of the official military policy, and therefore should be taken into account. The deployment of high-precision long-range conventional weapons will create obstacles to nuclear disarmament, cooperation of the parties on BMD and to resolving the issues related to tactical nuclear weapons (TNWs). Therefore, a dialogue and agreements between Russia and the United States (NATO) on the said issue appear to be of key importance in the foreseeable future.

On the path towards deep nuclear disarmament and in the course of the economic and technological progress the security of military, dual-use and civil orbital information systems will gain in importance. As to the use of space, the humanity has reached one of the history's key crossroads: the question is whether the space will turn into the arena of a space arms race or remain the sphere of peaceful and purely auxiliary military activities, international cooperation, ensuring strategic stability and disarmament. The main track will evidently be chosen in the nearest decade, or even in the years immediately ahead.

At this point, the space law does not prohibit the deployment of any weapons other than weapons of mass destruction (WMD) in outer space. There is no ban on the development, testing and deployment of anti-satellite weapons in outer space and on Earth. Since the US withdrawal from the Anti-Ballistic Missile Treaty (ABM Treaty) in 2002, there have been no restrictions on the development, testing and deployment of anti-ballistic missile defense systems or their components in outer space. Despite its current unlikelihood, the creation of weapons designed for strikes from space against land, sea and air targets is possible in the long term. The harbinger of things to come was the test of the X-37B Orbital Test Vehicle, a prototype for a space shuttle orbiter ("air-space bomber"), by the United States in 2010.

Until recently, the effort for the non-armament of outer space (in particular, the draft international treaties proposed by Russia, China and other countries) came up against resistance, primarily of the United States Republican Administration. Recognizing many deficiencies of such proposals, it should be emphasized that the gist of US posture was in principal a flat rejection of any limitations on the military use of space.

Unleashing the space arms race would cause major political tensions and create a threat of intended or accidental armed clashes between the great powers as well as provocative acts by third countries. What is more, military rivalry in space would disrupt deep nuclear disarmament and the cooperation between the leading powers on the strengthening of nuclear non-proliferation regimes.

Negotiations to ban space weapons can become a practical task, as the whole disarmament process and architecture is revived, especially if President Obama's Administration engages in the practical revision of the US military space policy of its predecessors. Some limited first steps, like a ban on testing anti-satellite and orbital anti-missile systems against real targets above the atmosphere might open the new venue of space arms control.

In view of the political, technical and juridical difficulties of the prevention of a space arms race, the approach advocating the approval of a so called code of conduct for outer space has currently received an increasing support. Although non-legally binding, this document would nevertheless provide a framework for voluntary limitations in certain military space activities and contribute to strengthening confidence among space faring nations.

At this time of political opportunities, the most important general goal should be, the creation of as many "links" as possible in various areas of arms reduction and limitation and collective security to minimize the possibility of a new round of deterioration of relations between Russia and the West, foremost the United States, after 2012.

1. PROSPECTS FOR COOPERATION BETWEEN THE US, NATO AND RUSSIA ON BALLISTIC MISSILE DEFENSE

Background. For around 15 years, there have been various discussions and proposals on the practical forms of cooperation between Russia and the US/NATO on BMD. In mid-1990s the Russian and US experts were proposing the joint use of missile early warning systems by the two countries. In mid-2000 Russian leadership tried to implement certain elements of such cooperation, including the initiative to use the missile early warning radars in Mingechaur, Azerbaijan (Gabala radar station), and near Armavir, Russia, to revive the Joint Data Exchange Center (JDEC) for monitoring the launches of ballistic missiles and space launch vehicles. However those proposals could hardly be successful, since Russia viewed them as an alternative to US planned deployment of strategic BMD sites in Poland and the Czech Republic.

Still, cooperation progressed in terms of arranging joint training exercises on non-strategic BMD. In the US-Russia format, five computer exercises on TMD were held alternately in Russia and the United States in 1996-2006. In 2003-2008 four trainings were held in the US-NATO-Russia format (in Colorado (US), the Netherlands, Moscow and Munich). There were further plans to explore the possibility of arranging a live exercise at a test range in Russia, including the use of operational S-300 and *Patriot* anti-aircraft missile systems. However, these plans were 'frozen" after the armed conflict between Russia and Georgia in 2008.

As the Democratic Administration came to power in the United States, the intention to cooperate was expressed rather clearly. During his Moscow visit, Barack Obama said, "I want us to work together on a missile defense architecture that makes us all safer. But if the threat from Iran's nuclear and ballistic missile programs is eliminated, the driving force for missile defense in Europe will be eliminated. That is in our mutual interest". US Deputy Secretary of State William Burns added that the "two countries have devoted more study and resources than any other to defending against the threat from ballistic missiles". NATO Secretary General Anders Rasmussen fully supported this idea, stating that NATO and Russia should cooperate in the development and building of defense against ballistic missiles. Russia's leadership also takes a favorable view of such cooperation. At the meeting of presidents of the United States and Russia on June 24, 2010, Barack Obama noted that various options of cooperation in this sphere had been presented to Russia.

Russia's cooperation potential. The United States is an unquestionable leader in the development of non-strategic and strategic BMD. Unlike the previous plans of the Bush Administration on the deployment of strategic BMD that had not been properly developed, the four-stage program announced by the current Administration appears to be quite well thought through. Sustained perfection of the profoundly tested *Aegis* sea-based BMD system with its SM-3 interceptors provides for further enhancement of the effectiveness and the range by increasing the solid-propellant mass of the interceptor (with the diameter of stages 2 and 3 increased by half from 13.5 in. to 21 in.), as well as by upgrading the guidance and control systems. It is expected that owing to the increased speed, the interceptor missile will be capable of destroying Iran's missiles in boost phase (providing that Aegis-capable ships are deployed in the Mediterranean Sea). Also there hardly will be any problem in adjusting them for deployment as land-based interceptors.

However, at this stage there is no ultimate certainty on the European deployment of not only the land-based version of the SM-3 interceptors, but also of the X-band (centimeter wavelength) radars. One cannot exclude the possibility of these radars to be deployed in Turkey, Georgia and Eastern Europe. In any event, these radars will be part of the general BMD of the United States and Western Europe which includes the radars of the missile early warning system.

At the same time, further buildup of GBI-type strategic three-stage ground-based interceptor missiles in Alaska (Fort Greely, 26 interceptors) and California (Vandenberg Air Force Base, 4 interceptors) is being suspended. Another 14 GBI launching silos are currently under construction in California. These launching silos are intended as reserve and will house the interceptors if necessary. Though it is assumed that these measures will protect the US against single ballistic missile launches, test launches of GBIs will continue. It is known that the flight tests have begun for the two-stage version t of GBI that was previously intended for deployment in Poland.

Despite the dominance of the US in this sphere, Russia also has certain cooperation potential - primarily in the field of information support and interception capabilities of a joint BMD. At this stage, the space echelons of Russia's missile early warning system can hardly be expected to make a major contribution to cooperation, given the current state of these echelons. And then again, the US space-based missile early warning system has growing capability in terms of predicting the trajectory of a ballistic missile once the launch is detected.

However, the probability of detecting missile launches by the space echelons may be affected by clouds at the launch areas, and therefore it may not be a hundred per cent reliable. The Russian radars of the Russian missile early warning system and of the US Ballistic Missile Early Warning System (BMEWS) are the most reliable means of missile launch detection and trajectory prediction. The US experts are well aware of the unique capability of the Russian early warning radar in Mingechaur and the one built near Armavir in terms of detecting missiles launched by Iran.

When a missile is test-launched southeastwards from the site in northern Iran, the Mingechaur radar detects it in 110-120 seconds as it progresses along its flight path, while in case of north-westward operational launches the detection speed of the radar is even higher, which is beyond the capability of any US BMEWS radars. According to the estimates of some independent experts, the integration of US and Russian missile early warning systems will increase the efficiency of detecting launches of ballistic missiles and space launch vehicles by 20 to 70 percent.

Further, there may be certain demand for Russian missile early warning radars with high manufacturing readiness that can be quickly built at the missile-threat directions.

As far as space launch vehicles, the effectiveness and range of interception is known to sharply increase if a space-based information system, such as Space Tracking and Support System (STSS), is deployed. Spacecraft of this type, each of around 650 kg, with infrared and visible-spectrum sensors should be placed in the circular orbits 1,350 to 1,400 kilometers above the ground with a 60 to 70 degree inclination. To place them in orbits, Russian launch vehicles may be used, foremost the converted heavy missiles developed under the Russia-Ukraine *Dnepr* Project.

In the course of the strategic arms race, the energy characteristics of the heavy missile were perfected to achieve the highest specific characteristics in its class in the world. A number of such launch vehicles converted from RS-20 (SS-18) ICBMs that had been retired upon expiration of their service life cycle were successfully used in commercial projects to launch foreign-owned satellites, demonstrating utmost reliability. Such a launch vehicle with a boost stage and an engine of multiple ignition capability may place in orbit two STSS spacecraft at a time at an altitude of up to 1,400 kilometers with the required inclination. Thus, a low orbit BMD information support force may be deployed much faster and at a significantly lower cost.

In the field of systems and capabilities of missile intercept, Russia's advanced experience in the development of unique software for the detection of attacking missiles, discrimination of reentry vehicles against decoys and jamming, as well as other developments may be quite useful. In addition, Russia has a well-developed ground test infrastructure with a network of radar, optico-electronic and telemetry stations. Finally, it would be reasonable to include Russian antiballistic missile systems in the BMD architecture in Europe as an important element of cooperation. For example, the *Triumf (Triumph)* S-400 air defense systems are considerably superior to the US *Patriot SAM* in terms of range of destruction of airborne targets and ballistic missiles. In the future, the use of still more advanced S-500 air defense system may also be considered.

It is important to emphasize that the above areas of cooperation would not make the parties critically dependent on each other in BMD systems and functions. Russia and NATO would retain the capability to independently provide for their defenses – albeit at a lower level of effectiveness. Also cooperation would not prevent the parties to take steps at independently raising the level of their BMD efficiency – provided it is not perceived by the other side as a threat.

Priority steps. In the meantime, all the joint projects mentioned above can hardly be implemented in the near term in view of the persisting mutual mistrust and conservatism of the state agencies of the parties, as well as considering their concerns for loosing sensitive technologies. To counter these obstacles, first of all it would be reasonable to restore the elements of cooperation that have been abandoned over the recent years. In the first place, the project of a Joint Data Exchange Center (JDEC) to monitor the launches of missiles and space launch vehicles must be immediately revived. The decision to establish the JDEC was made 12 years ago by the then presidents of Russia and the United States. The incumbent presidents of the two powers reaffirmed their intention to move on with the project at their Moscow meeting in 2009.

A more recent idea is to create a virtual JDEC which would in the first place allows avoiding the expenses for setting up a new facility to replace the one that was dismantled. In addition, it would facilitate the resolution of issues related to the liability for damages. To do so, it would be reasonable to call to mind its tasks and operational procedures that were fully agreed in the past.

The JDEC was supposed to facilitate sustainable exchange of data on ballistic missile and space launch vehicle attacks received from US and Russian missile attack warning systems (MAWS), as well as to minimize the consequences of false warning of missile and carrier vehicle launches and prevent false alarm missile launches in response. In addition, the JDEC was supposed to contribute to potential implementation of the multilateral regime of exchanging notifications on the launches of ballistic missiles and space carrier vehicles.

The basic missions assigned to the Joint Data Exchange Center were as follows:

- Providing information on announced and unannounced launches of ballistic missiles and space-launch vehicles detected by US ballistic missile early warning systems (BMEWS) and the Russian missile attack warning systems;

- Achieving fast resolution in the Joint Commission of possible ambiguous situations associated with information from early warning systems;

- Facilitating the preparation and servicing of a unified database for the multilateral regime of exchange of notifications concerning launches of ballistic missiles and space-launch vehicles.

Information was to be exchanged on the launches of ballistic missiles and carrier vehicles detected by the early warning systems, as well as on ballistic missile launches by third states that might pose a direct threat to the United States or Russia or might bring about an ambiguous situation and lead to its possible incorrect interpretation. The data intended for exchange is the information received from the space-based and ground echelons of the US and Russian early warning systems.

Information should be provided in a processed form, if possible, in near-real time.

The following formats were provided for the exchange of information:

- When a ballistic missile launch is detected: time of launch, generic missile class, geographic area of the launch, geographic area of payload impact, estimated time of payload impact, launch azimuth;

- When a launch of space vehicle is detected: time of launch, generic class, geographic area of launch, launch azimuth.

The process of data exchange was to develop in phases.

Phase I. In phase I of the JDEC operations, information was to be provided on detected launches of ICBMs and SLBMs belonging to either of the parties and, with rare exceptions, for detected launches of space-launch vehicles also belonging to either party, including firings of ICBMs, SLBMs and space-launch vehicles from territories of third states as well as launches of ICBMs, SLBMs and space-launch vehicles of third states made from the territory of the United States or Russia.

Phase II. In this phase it was assumed that Russia and the United States would provide information on detected launches included in phase I, as well as information on detected launches of other types of ballistic missiles belonging to either party with a range in excess of 1,500 kilometers and a maximum altitude in excess of 500 kilometers.

Phase III. The parties were supposed to exchange information on detected missile launches specified for the two preceding phases, as well as information on the detected launches of ballistic missiles of third states with a range in excess of 500 kilometers or an altitude in excess of 500 kilometers, if part of the flight trajectory of the ballistic missile as calculated by the launch azimuth was expected to go over the US or Russia's territory, or if the impact area of its payload was projected to be within either party's territory. Russia and the United States were also supposed to provide information on detected starts of space-launch vehicles of third states, if projection of the initial launch azimuth indicated an intersection of the territory of either party within the first half-orbit of launch. At the parties' discretion, information could also be provided on other detected launches of space-launch vehicles of third states, regardless of launch azimuth.

The US and Russia were to provide information on launches of third states that they believed could create an ambiguous situation for their respective warning systems and lead to possible misinterpretation of each other's actions. Subsequently, the Joint Commission was to consider the possibility of exchanging information on missiles that intercept objects not located on the earth's surface (i.e. BMD and ASAT systems). In the future, the US and Russia were planning to consider the possibility of expanded data sharing on detected launches of ballistic missiles and space-launch vehicles globally, taking into account changes in the global strategic situation and the level of development of multilateral regime for the exchange of notifications of launches of ballistic missiles and space-launch vehicles.

The US and Russia were to appoint their Heads (1 person each) and Deputy Heads (2 persons for Russia and 1 person for the US) who were to have equal rights in managing the activities of JDEC. The JDEC Heads were to jointly carry out the daily management of JDEC activities and be jointly responsible for the performance of the tasks assigned to the JDEC. Operations of the JDEC were to be carried out by specially trained personnel of the parties (the US and Russia – 12 persons each: 6 teams consisting of 2 persons).The maintenance was to be performed by technical support personnel (4 persons for Russia and 2 persons for the United States). Russia was to provide security and support personnel (62 persons).

If a virtual JDEC was created in Russia's territory at the command center of a MSWS or at the Nuclear Risk Reduction Center (Defense Threat Reduction Agency in the United States), national duty shifts were to be formed at each of the selected sites to exchange the information. The Russian duty shift would transmit the authorized information on the detected launches with a delay measured in minutes. The information transmitted to a duty shift did not need to be cleared from all false alarms, since it would be better if the BMD received erroneous information rather than missed actual missile launches.

The strengths of the virtual JDEC include reduced number of communications channels required, and increased promptness of data transmission achieved through the reduced number of transmission links.

The weaknesses of the virtual JDEC include the necessity to transmit the data through the channels of the Internet which raises the issue of protecting the exchanged data. Another weakness is the need to integrate the hardware/software of the Russian and US parts of the JDEC. Before the JDEC starts its operations, a series of additional joint research tests must be completed to resolve hardware- and software-related issues.

Still, considering the strengths and weaknesses of a virtual JDEC in terms of reliability of received information and avoiding confusion, reviving the previously agreed project appears to be the best option.

To resume joint exercise on BMD, it is essential to recreate the experience derived from the latest joint exercise on BMD in the US-NATO-Russia format when the parties achieved certain progress in the training on the conceptual structure and compatibility of information systems and means of interception. Interruption of such exercises result in the loss of the accumulated experience due to professional turnover. Meanwhile, joint research is in any case necessary to enable the parties to move from computer assisted exercises to full-scale command exercises and later on to using the US and Russian operational anti-missile weapons on test grounds, as it was agreed during the latest exercise in the US-NATO-Russia format.

Thus, the organization- and technology-related opportunities for the cooperation of Russia, the United States and the European members of NATO exist in a number of complementary areas. These opportunities may be realized if there are political decisions on the US-Russia strategic partnership at the top national level.

However, the joint exercise on TMD should reach beyond the limited theatre of operations, since given the recent developments; there is no point in convincing the Europeans that they may only be threatened by short-range ballistic missiles. In other words, the intention to cooperate with Europe only in the sphere of non-strategic BMD is an anachronism, to say the least.

There is divergence in the parties' actual positions on BMD. The rationale of the US opponents of such cooperation may be the reluctance to make additional commitments and therefore fall into a position of dependence on Russia, as well as concerns related to a potential technology leakage.

Russia does not regard Iranian and South Korean missile capabilities as a threat, with higher priority assigned to politico-military and technical threats emanating from the United States and NATO. In the recent years, the new endeavors of Moscow and Washington have somewhat defused this perception. However, a decisive turn for the better is still a long way to go.

Still, even aside from debates on whether Iranian and South Korean missiles are posing a threat to Russia, Moscow's cooperation with the US and NATO appears more than desirable for a variety of reasons.

First, such cooperation may play a crucial part in promoting positive strategic partnership of the two nuclear superpowers and other NATO countries. It will also embrace other areas of security and help to flesh out the new Euro-Atlantic security architecture proposed by the president of Russia with concrete programs.

Second, in case of unilateral implementation of the new plan on building BMD in Europe as proposed by the Barack Obama Administration, the absence of such cooperation will inevitably cause another BMD crisis between Russia and the West as the weapons within the BMD acquire strategic potential. Notably, a new crisis will have an even more acute and devastating character.

Third, despite the tough and well-tried measures taken by the members of the nuclear club to prevent unauthorized or accidental single missile launches, there is no hundred per cent guarantee that such launches will be always prevented. This issue is even more relevant for other existing and potential nuclear and (or) missile states. Therefore, it does make sense to protect against such cases.

Fourth, history shows that the relations between states may deteriorate quite drastically (especially in case of unstable, radical regimes), turning non-hostile nuclear missile capabilities into a key national security threat. This was the case with the USSR-China relations in the 1960s-1970s and with the US-Iranian relations in the 1980s.

Finally, even if Iran and the DPRK do not turn into Russia's enemies, Iran with its nuclear missiles and DPRK by further developing its capabilities may potentially destabilize the situation both regionally and globally, causing a chain reaction of proliferation (in Saudi Arabia, Syria, Turkey, Egypt, Libya, Japan, South Korea, Taiwan) that would create a threat for Russia as well.

For the past four decades, ballistic missile defense was a major area of strategic rivalry in the USSR/Russia-US relations. In the new environment, with due wisdom and political will, ballistic missile defense could become a major positive factor for the consolidation of efforts of the great powers and their allies on addressing new global security challenges.

2. STRATEGIC HIGH-PRECISION CONVENTIONAL WEAPONS

According to Russia's new military doctrine released in February 2010, one of the key tasks of the Russian Armed Forces is "to ensure the air defense of most important military facilities of the Russian Federation and (provide for) readiness to rebuff strikes by means of air and space attack".[2] Considering that there are currently no orbital weapons, and there is no prospect that they will appear in the foreseeable future, the notion 'means of air and space attack' apparently relates to conventionally armed cruise missiles and ballistic missiles, with high precision guidance provided by space information systems.

In the Russian expert community, including reports by the institutes of the Ministry of Defense, articles in, specialized magazines and newspapers, there have been plenty of comment on the increasing number and improved efficiency of such weapons in terms of a potential attack against Russia, particularly a disarming (counterforce) strike against its strategic nuclear forces, missile early warning systems, and combat command centers[3]. Moreover, Russia's senior military officials regularly declare the existence of this threat, the necessity to mobilize resources in order to counter it, and the critical lack of relevant capabilities, as an indisputable truth.

For example, Colonel-General Alexander N. Zelin, Commander-in Chief of the Russian Air Force said: "The development of anti-aircraft, missile and aerospace defense is a priority in building the Russian armed forces". He left no doubt, that he was not meaning defense against individual attacks from irresponsible regimes or terrorists: "I am not referring to the S-400 air defense systems that the five anti-aircraft missile regiments will be equipped with, I am talking about much larger numbers, and I also mean S-500s", designed to destroy ballistic missiles and their warheads,

[2] The Military Doctrine of the Russian Federation, 5 February 2010 English: http://www.sras.org/military_doctrine_russian_federation_2010

[3] See А.Храмчихин «Диагноз: отечественная ПВО в развале». (Alexander Khramchikhin НВО N 6, 19-25 февраля 2010 г. "Diagnosis: national air defense in ruins")

manned and unmanned aerial vehicles at all altitudes – from outer space to extreme low altitudes.[4]

General of the Army Anatoly Kornukov, Former Commander-in-Chief of the Russian Air Force says: "Presently, an airspace attack is a sure card, and when it is played, the game ends very fast. …Russia’s eventual adversaries are intensively developing airspace offensive and defensive weapons. They are preparing , while we are sitting on our hands. Aerospace defense is intended for sending a warning of a proper rebuff to a potential aggressor."[5] As former Chief of Armaments of Russia's Armed Forces, Colonel General Anatoly Sitnov put it, "…They were telling us, that we were not to engage in the militarization of space. So we quit, and the US took up the ball… All the experience we once had and then lost, is now being successfully used… by other parties, while we are trailing behind."[6]

This issue has invariably been the subject of extensive and detailed discussions in a number of military periodicals for quite a time. The discussion is based on the common assumption that the US and their allies represent the key threat in terms of an air-space attack. Indeed, The *Vozdushno-Kosmicheskaya Oborona* (“Aerospace Defense”) periodical, the mouthpiece of this establishment, expressly declares that “in the military political sense, airspace defense is one of the key factors of ensuring strategic stability, a deterrent against potential adversaries unleashing armed conflicts, a means of preventing the conflicts from escalating to a conventional and a nuclear war.” In addition, to leave no doubt about the identity of the adversary, the periodical emphasizes “the survivability of basic main forces of the Armed Forces while countering *massive strikes* (emphasis added) of airspace attack weapons with no significant loss in efficiency within the required period of time” as the main requirement to aerospace defense.[7]

The selection of similar extracts may indeed be very long. This testifies to the fact that in the top echelons of the Russian military establishment, the military-industrial complex, as well as among the vast majority of

[4] Военно-промышленный курьер, N 28(344), 21-27 июля 2010 г., С. 1. (Voyenno-Promyshlenny Kurier, # 28(344), 21-27 July 2010, P. 1.)

[5] О.Владыкин, «Прорехи космической защиты». НВО , N 18, 21-27 мая, 2010 г.

(Oleg Vladykin "The Holes in Space Defense". Nezavisimoye voyennoye obozreniye, # 18, 21-27 May, 2010. P. 3).

[6] Ibid.

[7] А.Борзов. «ВКО: Пора прекратить терминологические дискуссии», Военно-космическая оборона, N 4, (53), 2010

(Arkady Borzov «VKO: It’s Time We Stopped Terminological Discussions” Vozdushno-Kosmicheskaya Oborona, # 4, (53), 2010, P. 16.)

the country's expert community there is an explicit perception of a new and increasing threat from the US and their allies. This is a perception that receives no reaction from Washington and runs counter to Moscow's current foreign policy to promote cooperation with the West. Meanwhile, the perception is gradually taking root in Russia's military policy and is sure to affect the US-Russia strategic relations in the long term.

High-precision conventional weapons. Statistics shows that high-precision weapons are playing an increasing role in armed conflicts. Guided air bombs and missiles accounted for only 2 percent of the total ordnance dropped by American aviation during the Vietnam War in 1972, 8 percent of the total during the first Gulf War in 1991, around 30 percent in the Allied Force operation in Yugoslavia in 1999, more than 50 percent in the Enduring Freedom operation in Afghanistan in 2001-2002, and more than 60 percent during Operation Iraqi Freedom in 2003.[8]

As Russian experts claim, "the high-precision weapons in the US armed forces' arsenal today can be used to destroy a wide range of targets, including hardened fixed facilities (underground bunkers, reinforced structures and bridges), and mobile armored targets (tanks, armored vehicles and artillery). With due targeting, the existing types of cluster bombs can effectively destroy mobile land-based ICBMs. High-precision weapons could also pose a threat to existing silo-based launchers."[9]

In the opinion of some Russian analysts, using high-precision weapons as a means for a counterforce strike may be possible only when the attacking country is confident that this kind of large-scale surprise strike will be effective. The current US decisions concerning strategic programs are only adding to Russia's fears. The program documents released by the US Department of Defense give high-precision weapons and the related information technology and infrastructure development a key role. New concepts and principles are emerging, objectively aimed at expanding the range of applications for nuclear weapons. Meanwhile, non-nuclear high-precision weapons are gradually taking over the missions that were initially assigned to nuclear weapons.[10]

---

[8] Barry D. Watts, Six Decades of Guided Munitions and Battle Networks: Progress and Prospects, Center for Strategic and Budgetary Assessments, March 2007, p. 20.

[9] Evgeny Myasnikov. "Counterforce Potential of High-Precision Weapons"// Nuclear Disarmament: New Technology, Weapons and Treaties / Edited by Alexei Arbatov and Vladimir Dvorkin. Moscow, 2009. P. 107.

[10] Обзор состояния и перспектив развития ядерных сил США, Зарубежное военное обозрение, N 4, 2002 г., С. 2-20

("Overview of the Situation and Development Prospects of the US Nuclear Forces", Zarubezhnoye Voyennoye Obozreniye, # 4, 2002, P. 2-20)

The new US Prompt Global Strike operational strategy option is an example of these changes. Under this concept, the US is to maintain the capability of inflicting high-precision strikes from a great distance against targets in any corner of the globe in a minimum amount of time. [11] This program also includes converting part of the strategic delivery systems towards non-nuclear use.

The US is known to have converted some of its strategic bombers for non-nuclear missions as early as in the 1990s. The US Navy is currently completing the retrofitting of four Ohio-class nuclear ballistic missile submarines, equipping them to carry non-nuclear long-range sea-launched cruise missiles. In addition, the US Air Force and Navy are pursuing research on the development of effective conventional warheads that can be delivered by strategic ballistic missiles. Until recently large-scale deployment of these weapons has only been contained by the restrictions imposed by US Congress.[12]

By 2007, the US Air Force had 94 B-52H, 67 B-1B and 20 B-2 bombers.[13] The Air Force is planning to maintain the fleet of B-2 and B-1B aircraft in the medium term while reducing the fleet of B-52H bombers to 56, of which 44 will be kept at combat ready . [14] There are no current plans to buy new strategic bombers. Research engineering on the development of the next generation of planes in this class is currently underway. The new planes are expected to enter service no later than 2035.[15] All of the US Air Force's strategic bombers are based on US territory. However, in case of an armed conflict, the airfields of the US allies can also be used. For example,

---

[11] Gen. James E. Cartwright, Commander, U.S. Strategic Command, Statement Before the Senate Armed Services Committee Strategic Forces Subcommittee on Strategic Forces and Nuclear Weapons Issues in Review of the Defense Authorization Request for Fiscal Year 2006, April 4, 2005.

[12] А. Дьяков, Е. Мясников, "Быстрый глобальный удар" в планах развития стратегических сил США, Центр по изучению проблем разоружения, энергетики и экологии при МФТИ, 14 сентября 2007 г., С. 9.
(Anatoly Dyakov, Evgeny Myasnikov, "Prompt Global Strike" as part of the Plans on the US Strategic Forces Development" Center for Arms Control, Energy and Environmental Studies at Moscow Institute of Physics and Technology, 14 September 2007, P. 9).

[13] Susan H.H. Young, Gallery of USAF Weapons, Air Force Magazine, May 2007

[14] Statement by Maj. Gen Roger Burg before the Senate Arms Services Committee, Subcommittee on Strategic Forces, March 28, 2007.

[15] Statement by Maj. Gen Roger Burg before the Senate Arms Services Committee, Subcommittee on Strategic Forces, March 28, 2007.

the B-52H and B-1B planes that were used in the NATO military operation in Yugoslavia in spring 1999 were operating from Britain.

In the foreseeable future, the maximum number of the US high-precision long-range cruise missiles on strategic delivery vehicles and attack nuclear submarines may reach a total of 2,900 units.[16] It is possible to assumed that only hard-to-detect delivery systems may be used to carry out disarming strikes (*Stealth*-type planes, submarine-launched and air-launched cruise missiles). The potential for using air bombs and air-to-surface tactical guided missiles against strategic targets is limited by their range, which does not exceed 300 kilometers. To attack strategic targets, delivery systems for such weapons would have to operate within zones well protected by enemy air defenses. Therefore of all the existing delivery systems this mission can only be fulfilled by the 'invisible' strategic B-2 bomber.

If the programs of deployment of ballistic missiles with conventional warheads proposed by the US Navy and Air Force are implemented, the number of weapons posing a potential threat to Russia's strategic nuclear forces may increase by another 100 to 200 units.[17]

While keeping a watch on the implications of high-precision weapons development, it would be wrong go to the other extreme and overstate their effectiveness as weapons for counterforce strike against Russia and, therefore, as a force undermining the country's nuclear deterrence potential. In this scenario, both political and operation-strategic aspects of the issue should be taken into account.

Airspace attack threat: political aspects. Twenty years after the end of the global confrontation, the Russian military minds arrived at an unexpected conclusion: there is no Cold War, therefore the nuclear war is unlikely. Therefore, there is a possibility of a war of the United States and

---

[16] "Counterforce Potential of High-Precision Weapons"// Nuclear Disarmament: New Technology, Weapons and Treaties / Edited by Alexei Arbatov and Vladimir Dvorkin. Moscow, 2009. P. 105-128.

[17] The current plans of the US Navy include the deployment of up to 4 conventional warheads on each of the 28 *Trident* SLBMs (with each of the 14 submarines equipped to carry 2 SLBMs). The US Air Force is considering the possibility of deploying several tens of *Minuteman II* or *MX* conventional ICBMs. See: А. Дьяков, Е. Мясников, "Быстрый глобальный удар" в планах развития стратегических сил США, Центр по изучению проблем разоружения, энергетики и экологии при МФТИ, 14 сентября 2007 г., С. 9. (Anatoly Dyakov, Evgeny Myasnikov, "Prompt Global Strike" as part of the Plans on the US Strategic Forces Development" Center for Arms Control, Energy and Environmental Studies at Moscow Institute of Physics and Technology, 14 September 2007. P. 9.)

their allies against Russia using high-precision conventional weapons in an airspace attack. To counter such an attack Russia apparently needs effective air and missile defense weapons to cover its strategic forces, general-purpose forces and all the areas where the administrative-industrial centers are located.

Besides, any defense would be virtually useless in terms of protection against nuclear missiles, given the tremendous absolute destruction power of even the few warheads that manage to get past the defense. A different situation arises with high-precision weapons: the more weapons of this class are intercepted, the more will be Russia's advantage in the operation, including the power of its nuclear retaliation.

Apparently, this scenario results from mechanical extrapolation to Russia of the NATO operations in Yugoslavia in 1999 and in Iraq in 2003. However, Russia's recent Military Doctrine does not provide any specific scenarios of such a conflict, and therefore leaves much room for guesswork. Another mystery is why the escalation of such a conflict to the nuclear level is currently perceived as less probable, while during the Cold War it was viewed as an inevitable outcome.

At any rate, the Russian military minds in their conclusions proceed from the assumption that the US and their allies continue to be Russia's potential adversary and have inherently aggressive intentions. In addition, they keep in mind the development of modern military infrastructure and the recent experience of the largest-scale operations of the world's leading powers.

Meanwhile, it seems that the Russian political leadership declares the new foreign policy principles and priorities (globalization and interdependency, the new Euro-Atlantic security architecture, partnership for modernization, achieving a world free from nuclear weapons, etc.), disregarding the diametrically opposed implications of the military policy, including the Aerospace Defense Concept approved by the President of Russia in 2006, the recent Military Doctrine of 2010 and the State Arms Procurement Program for 2011-2020.

In particular, the Kremlin and the Government of Russia are apparently not a bit embarrassed by the fact that the country's military policy relies upon the assumed possibility of a global war between Russia and the West involving the use of conventional armed forces and weapons and, subsequently, of nuclear weapons. True, provisions related to peaceful resolution of conflicts, curbing wars and disarmament are scattered all about the text of the Military Doctrine. However, they dovetail perfectly with its basic ideas.

The line of military policy should not run through some independent plane exclusive from the plane of foreign policy and the economic strategy of the leadership. Russia's military policy, foreign policy and economy are inseparable in the long-term perspective, and either of them will be the one defining vector of the national security.

Airspace attack threat: technological and strategic aspects. Aside from discussions as to the relevance of the airspace attack scenarios from the political perspective, the military aspects of the issue require a more detailed analysis.

Indeed, some targets that could previously be attacked only by nuclear weapons may now be attacked by high-precision weapons. However, it its evident that despite the popular newfangled assertion, conventional high-precision weapons cannot be reasonably compared with nuclear weapons in terms of effectiveness in case of a strike at strategic hardened or mobile military objectives, let alone administrative and industry centers.

For example, given the accuracy and yield of the current US nuclear warheads (300-500 kilotons in *W-87/88* missiles and *Minuteman III* and *Trident II*), each adversary's launching silo is assigned maximum two warheads, positioned in such a manner that prevents the explosion of one warhead from damaging or distracting the other one. Therefore, if the missile does not fail during its flight, one can be 100 percent certain that the launching silo will be disabled, as it will inevitably fall within the range of the crater.

As to land-based mobile ICBMs, their main threat is the high-yield warheads on part of *Trident II* missiles (400 warheads on *W-88*-type missiles) covering a huge part of the operational deployment area of *Topol*, *Topol-M* and *Yars* ICBMs. The airfields of heavy bombers and bases of strategic nuclear submarines need not even be mentioned, as no surface-to-air missiles or fighters may prevent a strike by nuclear ballistic missiles. Maintaining durable deterrence implies an increased focus on mobile missiles, further development of missile early warning systems and control systems, and withdrawal of the submarines and aircraft from the non-survivable bases in a crisis.

The situation is totally different for conventionally armed cruise and ballistic missiles: the target destruction effectiveness must be verified since further strikes may be required. The electro-optical reconnaissance satellites will pass this point once in a few hours, at best. The information received from these satellites has to be analyzed to coordinate further strikes. In terms of missile release lines, conventionally armed cruise missiles are strictly limited by their maximum range (1,800 kilometers). In addition, the flight-in-time of *Tomahawk* subsonic cruise missiles is 1.5 hour (while SLBMs and ICBMs have the flight-in-time of 15 to 30 minutes). Reconnaissance and target-setting would require vast numbers of long-range unmanned aerial vehicles (UAVs), which would themselves be vulnerable during their prolonged air patrolling missions.

Another way to fight cruise missiles and SLBMs is to use electronic warfare, other active interference and decoy systems, etc. Finally, they may be destroyed not only by S-300 and S-400/500 surface-to-air missiles or Su-27/35 and MiG-29/31 fighters. Rapid-fire anti-aircraft artillery rocket systems, such as *Pantsir* convoying the mobile missiles and protecting the launching silos, will be sufficient.

As to massive high-precision weapons strikes against industry centers, this scenario appears even more absurd. Indeed, a prolonged massive attack by high-precision weapons on oil refineries, chemical factories and storage facilities, hydroelectric power plants and transportation hubs, not to mention nuclear power plants and nuclear cycle facilities, and nuclear weapons and radioactive materials storage facilities, would be equal to a WMD attack. If the US were the target of such an attack, it would no doubt resort to a retaliatory nuclear strike, so there is no need to apply other standards to Russia.

In a hypothetical limit, with a full load of high-precision weapons carried by their heavy bombers, multifunctional vertical launching systems of surface ships[18] and attack submarines, four strategic *Ohio* ballistic missile carriers, as well as part of its ICMBs and SLBMs, the United States could deploy up to 12,000 long-range cruise missiles and conventional warheads on ballistic missiles. Is it a large or a small amount?

It will be remembered that in a war against Yugoslavia in 1999, NATO used 15,000 air attack weapons, of which 30 percent accounted for high-precision weapons. In 2003, the US showered even more bombs and missiles on Iraq, with high-precision weapons comprising 60 percent of the total amount. In case of a strike against Iran or DPRK, much larger arsenals will be required. However, all these conflicts are absolutely incommensurable with a hypothetical large-scale war against Russia.

Unlike a nuclear counterforce strike, the mass use of high-precision weapons will require quite lengthy preparations (even operations against much weaker adversaries, such as Iraq, Yugoslavia and Afghanistan, required several months). It would be impossible to conceal these preparations, and the other party will have enough time to bring its nuclear assets, missile warning systems, combat control systems and general-purpose forces into advanced alert.

[18] In point of fact, in conventionally armed surface ships SLCMs comprise only around 30 percent of the combat load of the vertical launching system, the remaining 70 percent accounts for anti-submarine and air-defense missiles.

Further, unlike a counterforce strike, a high-precision weapons operation against strategic forces would take much longer (at least several days rather than several hours). Thus, in the course of the operation, the attacked party would have an opportunity to use its surviving strategic nuclear forces in line with its declared military doctrine. Moreover, the aggressor can never be certain that its attack with only high-precision weapons would not provoke a nuclear response, not to mention the fact that at the initial stage the missile warning systems would not be able to distinguish between a non-nuclear and a nuclear missile attack.

It turns out that deciding on the massive counterforce strike, the aggressor will have to stick to conventional weapons and will consciously run the risk of getting a much more powerful nuclear retaliation than in case of a disarming nuclear strike. Therefore, it is assumed that the US would take this risk in a phantasm of hope that Russia will never resort to a nuclear strike in response to an aggression with massive use of high-precision weapons.

However, there is no evidence of the fact that the US policy-makers and generals are prone to such reckless behavior. Worthy of mention is the utmost cautiousness – despite all the provocative actions of Pyongyang – in their approach to the issue of using force against the DPRK possessing only a couple of primitive nuclear devices without delivery vehicles.

An additional source of uncertainty for the potential aggressor is Russia's tactical nuclear weapons: they are much more difficult to rapidly search and destroy, and they can deliver strikes at the US forward bases and advanced navy and air force groups involved in the airspace mission (according to experts' estimates, Russia currently has up to 1,400 nuclear bombs, missiles and torpedoes of the Navy, naval and frontline aviation.)

Finally (and most importantly), there is a colossal risk of a nuclear escalation triggered by a high-precision weapons attack that is disproportionate to the real or expected gains of such an operation, especially with the Cold War over and the major powers moving towards greater economic, social and environmental interdependence, whatever the specific antagonisms between certain nations.

Disarmament and the issue of high-precision weapons. Nevertheless, it is obvious that the US high-precision weapons capability represents certain problem for Russia in military and strategic perspective. As long as Russia has considerable nuclear deterrence capability, direct military threat of massive use of high-precision weapons against it should not be exaggerated (neither should the capability of the planned US BDM to hold off a retaliatory nuclear strike). Hence, Russia should use the limited funds allocated for defense for maintaining an optimum deterrence capability, rather than developing a layered network of air defenses to counter invented threats.

Russia needs a ramified missile and air defense to counter a much more real threat of unintended or provoking multiple and single missile strikes on the part of new nuclear-weapons and missile countries, and terrorists' air attacks (including those involving cruise missiles with generally accessible space navigation and airplanes carrying WMD). Such Russian defense systems could be integrated with the US and NATO BMD and air defense and comprise common elements and programs. Such cooperation would greatly benefit both parties.

Yet, the deployment of long-range high-precision non-nuclear weapons would also hamper nuclear disarmament and cooperation of the powers.

Firstly, the US shifting their strategic resources (primarily cruise missiles) from strategic nuclear forces to the sphere of strategic high-precision weapons and removing such resources from the scope of limitations set forth for strategic offensive arms would inevitably bring about serious objections on the part of Russia as early as at the next stage of negotiations on strategic arms reductions. One can hardly expect that Moscow consents to lowering the threshold for strategic nuclear forces, for example, to 1000 warheads, while the US possesses up to 3000 conventional warheads on strategic platforms (converted SSBNs and HBs) and up to 2000 conventional warheads on tactical platforms (ships and nuclear submarines).

Most likely, Moscow would maintain its strategic nuclear assets at the levels provided for by the new START Treaty (1550 warheads) and retrofit them within these limits for the next generation of systems. Like the prospect of unilateral BMD deployment by the US and NATO, the deployment of long-range high-precision weapons would become an obstacle to nuclear disarmament at strategic level.

Secondly, besides NATO's superiority over Russia in general purpose forces in Europe, the deployment of high-precision weapons would hinder negotiations on Russia's and the US non-strategic (operative-tactical) nuclear weapons (TNWs). Moscow would consider such weapons as a counterbalance to the US high-precision weapons (as a means of striking against forward bases of the US air force and groups of navy) and an asymmetrical deterrent of the "threat of aerospace attack". There is an opinion that the use of TNWs at early stages in response to aggression with the use of high-precision weapons is more likely than mounting a retaliatory strike with strategic nuclear forces (which would provoke the other party to mount strategic nuclear strike).

Thirdly, the deployment of the US high-precision systems would constitute an additional obstacle to the US-Russian BMD cooperation. As it has already been mentioned, today Russian military community views the development of missile, air and aerospace defense primarily as a means of "holding off an aerospace attack" rather than a means of defense against the missiles of rogue states or terrorists. The former obviously means aggression from the part of the US and its allies.

With this attitude of the military agencies and the military industrial complex of Russia, one can hardly expect it to engage in meaningful political cooperation with the "potential aerospace aggressor", even if Russia's political leadership decides so. The military establishment would find a huge variety of ways and pretexts to obstruct such undertakings, guided by their own understanding of the country's security interests. (In fact, a similar attitude can also be expected from the part of the US military industrial complex striving to retain for the US the maximum freedom to develop BMD and to protect sensitive technologies).

At the same time, it would be absolute nonsense, in operative and technical perspective, for Russia to simultaneously develop two BMD systems: a joint NATO-Russian system for the defense against third countries and terrorists, and a system against NATO to counter its possible aerospace attack.

Possible legal-treaty solutions. With respect of US high-precision weapons, the new START Treaty has already made some progress. It has been agreed to apply the same counting rules to ballistic missiles with conventional warheads and to nuclear missiles (Article III), which prevents large-scale deployment of SLBMs and ICBMs with conventional high-precision munitions. Yet the issue of long-range cruise missiles with high-precision weapons will remain unsolved till further negotiations on arms limitation, confidence-building and transparency measures. In fact, the US strategic nuclear forces will be largely reduced not only through "offloading" a part of re-entry vehicles from missiles with multiple reentry vehicles, but also through retrofitting of some strategic submarines and bombers for non-nuclear cruise missiles.

If the parties exercise due political will, the problems caused by high-precision weapons can be resolved or eased by means of legal agreements. This implies, in particular, a ban on basing strike aircraft (in addition to non-placement of nuclear weapons) in the territories of the new NATO members. Russia may assume similar obligations with respect to its CSTO and CIS allies.

The hypothetical threat posed by the *Ohio* SSBNs equipped with SLCMs may be considerably diminished if such submarines are based on the US Western coast only (when in the Pacific and Indian Oceans, most of

Russian ICBMs bases remain outside their range, while passage for deployment in the Arctic Ocean entails operational difficulties).

Generally speaking, massive development of high-precision weapons cannot be stopped, due to its effectiveness in contemporary remote control wars against local adversaries. Russia will almost certainly pursue this course; it officially names scaling up high-precision weapons and its information support systems (including space-based ones) as a top priority of its armed forces modernization. At the same time, for local operations, no country needs possessing increasingly long-range high-precision weapons and accordingly retrofitting strategic platforms capable of covert deployment for massive attack. Local adversaries would hardly have efficient reconnaissance, detection and early warning systems to counter such systems in contrast to the leading powers.

For these reasons, during further strategic offensive arms negotiations Russia can decisively raise the issue of limiting the retrofitting of SSBNs and HBs to carry non-nuclear cruise missiles, keeping attack submarines, surface ships and tactical aircraft for these purposes.

It would also be helpful to introduce confidence-building measures involving the exchange of information on the practice of deploying high-precision weapons on ships, submarines and aircraft, on operational principles of their deployment and use in local conflicts, the exchange of visits and observers to attend military exercises. Subsequently, in the longer term, joint air force and navy exercises in operations of counter-proliferation, peace-enforcement, counter-terrorism and fighting sea piracy, could be held. As the US claims that their massive introduction of high-precision weapons is aimed against third countries and terrorists, Russia may insist on extensive confidence-building and cooperation measures, if it is ready to do that on a reciprocal basis.

Farther reaching measures could involve limiting the patrol areas of submarines carrying cruise missiles, in order to prevent possible deployment of major part of US submarines in the vicinity of Russia's territory and vice versa. This would also resolve other issues which had been repeatedly raised by Russia in the course of negotiations on strategic offensive arms (banning covert anti-submarine activities in SSBNs deployment and patrol areas and the prevention of collisions of nuclear submarines).

The extension of this ban to submarines carrying nuclear and conventional ballistic missiles (due to the difficulty of distinguishing between the types of submarines when submerged) would additionally increase the stabilizing effect of such arrangement. More specifically it would limit the counterforce strike assets with a short flight time, and would reduce incentives to keep strategic nuclear forces on high alert for a launch-on-warning strike upon receiving information from the missile attack warning system.

Certainly, it would be very difficult to verify compliance with such an agreement, given that stealth is the main advantage of submarines. Yet with the required will, solutions can be found in this area, too. For example, the parties could agree for submarines to surface in response to a request from the other party, and there could be an agreed annual quota for such requests. With the help of reconnaissance satellites, the parties will know approximately which of the other party's submarines are away from their base at any given time. This would make the risk of violations being discovered quite high if, upon Russia's request to the US national command, a submarine surfaces on the order of the latter in a prohibited area or does not surface at all.

Such an arrangement could turn out to be helpful in any case, as third countries develop their submarine fleets, and there is a danger of a provocative strike with SLBMs or SLCMs from underwater or from a surface vessel.

In any case, it is obvious that it is up to the US who created the problem, to take initiative and propose arms limitation, confidence-building measures and measures of cooperation on high-precision weapons, in order to encourage Russia's course towards nuclear disarmament and non-proliferation.

In a certain sense, despite all the technical differences between them, high-precision weapons can be compared to missile defense and space systems in terms of their military and political consequences. Originally developed to combat enemies more effectively at the regional and local level and to counter WMD proliferation and international terrorism, these weapons have begun to have a destabilizing effect on military and political relations of the US, Russia and other great powers.

In so doing they have started to undermine the nuclear non-proliferation regime and the prospects for cooperation among countries to counter common security threats. This was inevitable with the great powers maintaining relations based on mutual nuclear deterrence and developing new weapons systems (and using them locally) on a unilateral or alliance basis.

Like the prospective development of missile defense and space weapon systems, the development of high-precision weapons would create even greater obstacles to the progress towards complete nuclear disarmament.

However, if the parties concerned show political will, they can resolve or alleviate the problems created by high-precision weapons through a range of possible arrangements and legal means. They should agree upon ways to do that at the following stage of negotiations on strategic offensive arms reductions, or in parallel to it.

3. PREVENTING SPACE ARMS RACE

Outer space as a theater of military operations. Currently, there are 125 countries that conduct outer space activities. The US and Russia are the leaders in this field, with France, China, Japan, Germany, the United Kingdom, Canada, the Netherlands, Belgium and Spain playing a growing role. India, Pakistan, Argentina and Egypt are becoming increasingly active. About 780 space vehicles (SVs) operate in the near-Earth space, of which 425 belong to the US, 102 to Russia, and 22 to China.[19] By 2015, the overall number of spacecraft may increase by over 400 SVs.

Ensuring the security of military, dual-purpose and civil orbital systems is becoming a key element of overall security for virtually all the developed countries. Besides military support space systems, space vehicles ensuring telecommunications and Earth surface monitoring play a crucial role. Orbital systems are vital for supporting financial and economic activities in a globalizing world, as the majority of such operations are already employing space communication and relaying systems.

Space systems have become an integral part of the military assets of armed forces of the leading countries. The lack of space facilities renders the developed countries' modern warfare inefficient. Space reconnaissance, navigation, communications, and command systems contribute most. In general, the military SVs account for about 40 percent of all orbital spacecraft. Overwhelming majority of military satellites belong to the US, as the US expenditures for military space programs far exceed those of all other space-faring states together (and those of Russia, by about 20 times at commercial exchange-rate[20]).

With the conflicting nature of today's international relations and political and military contradictions among the leading powers and alliances of states, and in view of the rapid advances in science and technology, outer space, given increasing significance of its military and peaceful exploitation, may in the foreseeable future turn into a new arena of arms race and potential use of force. T this would pose an increasing threat for interna-

[19] Военно-промышленный комплекс. Энциклопедия. Том 1. Москва. 2005.

(Military Industrial Complex. Encyclopedia. Volume 1. Moscow. 2005.)

[20] Ibid.

tional security and entail immense expenses, which is especially hurtful in the situation of financial and economic crisis and the globalization of the world economy, politics, communications and information space.

Space weapons programs. History and present time. The space has become a "transit" zone and a weapons test area as far back as in the 1950s-1960s; first for nuclear weapon tests, then for flights of ballistic missiles, and then, of their interceptors of missile defense systems. Yet, apart from several experiment series and some anti-satellite weapons systems (ASAT) which were deployed and subsequently decommissioned by the USSR and the US, the large-scale militarization of space has never begun, at least with respect for the deployment of weapons for use in and from the space.

The first active steps to develop space weapons both in the USSR and in the United States date back to the early 1960-s. Their essence was very much the same.

The Soviet Union developed an IS anti-satellite system (satellite destroyer, *Istrebitel Sputnikov*), an analogue to the US SAINT (Satellite Inspection Technique) project designed for kinetic energy intercept of important and hardened space vehicles at low-orbit operation zone. All the main elements of this complex were developed by 1967 its tests began in October 1967 and lasted until the next decade. In February 1973 the IS complex was commissioned for an experimental service. It could intercept space vehicles at the altitude of 250 to 1000 km. Subsequently, the complex was upgraded, with the altitude of intercept increased, and in 1978 put into service under the designation of IS-M. In April 1980, the Soviet Union resumed the tests of this anti-satellite system (under the designation of IS-MU). A total of 20 flight experiments were held, of which 25 percent involved intercept of real targets. The last test took place on June 18, 1982.[21]

In August 1983, the USSR committed not to be the first to place in outer space any such weapons "while other states refrain from placing their anti-satellite weapons of any type in outer space"[22]. The IS-MU complex

[21] Molchanov B. Nuclear Proliferation: New Technologies, Weapons, Treaties. Chapter 9. Moscow, ROSSPEN, 2009. Тарасенко М.В. Военные аспекты советской космонавтики. Москва. ТОО «Николь», Агенство Российской печати,1992.

(Tarasenko M. Military Aspects of Soviet Cosmonautics. Moscow. TOO Nikol, Agentstvo Rossiyskoy pechati, 1992.)

[22] Черкас С.В. Современные политико-правовые проблемы военно-космической деятельности и основы методологии их исследования. МО РФ. Москва, 1995.

had remained in service until 1993, when it was decommissioned by Russian President Boris N. Yeltsin's decree.[23]

Up to early 1990-s, the development of the *Kontakt* (Contact) airborne missile system had been underway; it was designed to intercept space vehicles at altitudes of up to 600 kilometers. *MiG-31* (*Foxhound*) fighter-interceptor aircraft were to be used as carriers. However, as the funding ceased, the tests have never been completed.

Top projects, decision on which had been made as far back as in late 1970-s included the development of the *Kaskad* and the *Skif* orbital ASAT systems equipped with missiles and laser weapons. Nevertheless, the experts managed to convince the Soviet leadership that orbiting and testing such combat space systems would bring about a disproportionate response from the US in the development of space weapons, which would drastically deteriorate strategic positions of the USSR.

In 1980-s the Soviet Union's rapidly expanded the works on space weapons as a result of launching of the US Strategic Defense Initiative (SDI) announced by President Ronald Reagan on March 23, 1983. In the short term SDI posed no threat to Soviet nuclear deterrence capability. At the same time, the announcement of SDI served as a strong encouragement for the powerful military industrial complex of the USSR, whose interests were also almost immediately lobbied by senior military officials. In 1985/ Soviet development projects were divided into those related either to symmetrical of asymmetrical response and grouped into SK-1000, D-20 and SP-2000 programs[24]. The SK -1000 program titled "Multipurpose Combat Space System" comprised over 20 strike space systems projects and about as many projects relating to information support of space and earth-based combat systems. A project titled *Naryad-V* designed to intercept certain space vehicles and based on the *SS-19* ballistic missile system, advanced as far as the interim stage of flight test. The task of orbiting components of

(Cherkas S. Modern Political and Legal Issues in Military Space Activities and the Bases of Their Research Methodology. Ministry of Defense. Moscow, 1995.)

[23] Космические средства вооружения. Энциклопедия XXI век. Оружие и технологии России, Издательский дом «Оружие и технологии». М.2002.

(Space weapons, 21 century Encyclopedia. Weapons and Technologies of Russia. Oruzhie i Tekhnologii publishing house. Moscow. 2002)

[24] Pavel Podvig, "The Window of Vulnerability That Wasn't: Soviet Military Buildup in the 1970s--A Research Note", International Security, Summer 2008, Vol. 33, No. 1: 118-138

space battle stations for their further assembly on the orbit was one of the compelling reasons that prompted the development of the most powerful *Energia-Buran* shuttle orbiter.

As for space information systems, a number of projects for communication, intelligence gathering, relaying, navigation, missile attack early warning, and space surveillance have been completed successfully.

Russia is currently unable and will remain so to conduct such large-scale symmetrical and asymmetrical projects in the foreseeable future due to many reasons, including the collapse of cooperative ties among the military corporations and limited financial resources. However, in case the US deploys ASAT weapons, certain part of these projects, especially those related to asymmetrical response, may be revived despite additional burden on the national budget.

The US commenced work on ASAT systems in 1957. The most significant program was developed in the late 1970-s and early 1980-s. The system was based on *F-15* fighter aircraft armed with *SRAM/Altair* ASAT system, designed to destroy satellites at altitudes of up to 1000 km. A number of tests were conducted in 1984-1985, including interception of a real target-satellite. The program was curtailed in 1988. The greatest volume of space-related programs originated under the SDI in the mid to late 1980-s.

Currently, there are following anti-satellite systems under development, ground- and flight-tested, which are the nearest to completion:

Modified anti-missile (anti-satellite) sea-based *Aegis Mk-7* system with *SM-3* missiles;

Army land-based mobile systems developed under the KEASat program;

Laser anti-satellite and anti-missile air-based ABL system;

The MIRACL land-based anti-satellite laser to functionally disable vital information SVs.

Research or experiments are underway for the following projects:

- Space-to-Earth weapons;
- Reusable space maneuvering vehicle (SMV) to perform a wide range of tasks, including anti-satellite missions and destroying ground targets from space;
- Space-based electronic warfare;
- Space inspection technology using autonomous micro-satellites for the protection of and diagnosis of malfunctions in US SVs, and potentially for destroying spacecraft of an adversary.

A range of works is conducted under the ANGELS program (Autonomous Nanosatellite Guardian Evaluation Local Space). This dual-use program lends its results to both electronic warfare and space defense.

The US concepts of weapons for destroying targets on the Earth surface from space were developed simultaneously with the first satellites (the FOBS project to deploy nuclear bombs in space). However, specific projects of such weapons appeared only in 1987. Those are known to include the SBGV (Space-Based Gliding Vehicle) project intended to destroy from space strategic targets, primarily mobile missile launchers and surface ships deep within the enemy's defense perimeter, rapidly and with high precision.

Although there are currently quite a few publications on the development of space vehicles for destroying targets deep within the adversary's territory, it appears doubtful that today there is an operational and strategic rationale for such systems. Most importantly, there are no operational or strategic missions that a space-based or fractionally-orbiting weapon could carry out more effectively than land-, air- or sea-based weapons.

The US assigns an important role to weapons for counter-information in space and from space, in space electronic warfare. That is indirectly confirmed by the measures the US takes to protect its space systems from electronic warfare. In particular, the 76th Space Control Squadron was established within the US Air Force to destroy or disable foreign satellites using land-based active jamming.

Beside the US and Russia, China also engaged in the development of anti-satellite weapons. In 2007, the news broke about the first successful test (after three failures) of an anti-satellite weapon in China. Media reported that on January 11-12, 2007 Chinese FengYun-1-3 space vehicle had been destroyed, and fragments of the satellite were detected. The SV was destroyed over Central China at an altitude of 864 kilometers. Besides, a correlation was revealed between the time of the destruction of the SV and the launch of an intermediate-range ballistic missile from the Xichang missile test range.

Great powers' strategic concepts and interests. The existing potential of militarization of outer space can in the foreseeable future be realized by the US, Russia and China. The US holds absolute leadership in this sphere, as it possesses a wide range of state-of-the-art space technologies and scientific and technological capacity for the development of both land-based (fixed and mobile) and sea-based anti-satellite systems after 2010.

The development of such weapons has up to the present moment been envisaged in the US doctrines, with the rationale provided for in the US space policy. In particular US Space Command Long Range Plan Vision for 2020 specified the following priority actions:[25]

[25] Long Range Plan (Executive Summary). Howell M. Estes III General, USAF Commander in Chief march 1998.

- The development of means and methods for the comprehensive control of space;

- The search for new forms and means of carrying out global military operations (including the potential capability to use force from space in any part of the world) and the attainment of full functional interoperability of space, land, sea and air forces;

- The massive application of information technology in promising instruments of war at all levels of military operations.

In January 2001, the Commission on Space, authorized by the US Congress, strongly recommended that the United States maintain the capability of deploying weapons in space, and defined three possible tasks that space weapons should perform:

- Protecting existing US space systems;

- Preventing the adversary from using space and space systems;

- Carrying out strikes from space against any targets on land, at sea, or in the air.[26]

On August 31, 2006, the US President approved the new National Space Policy. This document replaced Presidential Decision Directive NSC-49/NSTC-8 (US National Space Policy) of September 14, 1996, and set the main principles and objectives of the US policy relating to space activities.[27]

Due to the limited financial resources and organizational and technical problems of Russia's military-industrial complex, current Russian space programs are certainly lagging behind American in terms of scale and advancement. However, professional editions and various forums recommend increasingly that Russia develops space weapons. This is explained by the necessity to directly counter the US space systems for the information support of conventional precision weapons today, and the purposes of combating orbiting space vehicles of possible US space missile defense in the future.

There can remain no doubt that the US has been the largest investor of military, commercial and scientific assets in space programs. In this way, both their strategic forces and their general-purpose forces depend to a great and increasing extent on the functioning of SVs of various purposes. This is much less true with respect to Russia, China and other leading military powers of the world. Therefore, the US should, first, be concerned about the security of their orbiting systems much more than any other country/ And, second, it would be much more important for the US to en-

[26] Report of the Commission to Assess United States National Security Space Management and Organization (Washington, DC, 2001).

[27] U.S. National Space Policy; Krasnaya Zvezda. March 5-11, 2008.

sure the security of its own SVs rather than put under a threat other countries' satellites.

Apparently, this is the primary reason why despite its clear superiority over other powers in the advancement and the diversity of space weapons programs, the US has so far confined itself to separate experiments and tests in the 1980s and the current decade, including the 2008 satellite intercept. Yet Washington has withdrawn its former space defense means from service and never began deploying new operational space weapons, relying on the collateral anti-satellite capability of strategic and theater BDM (GBI, *Aegis*/*SM-3*, airborne lasers, etc.).

Inherent vulnerability of SVs (predictability of orbits, difficulty of concealing and passive protection etc.) and greater dependency on space support systems of strategic nuclear forces and general purpose forces, may put the US at a disadvantage in case other countries deploy their own — even less efficient — ASAT systems. Moreover, the range of such countries may go beyond Russia and China, as it has been the case with the proliferation of nuclear weapons and missile technology/ The US initially had a great superiority in these spheres, but now deems the proliferation of these technologies to be the most serious threat to its security.

As for Russia, so far it relied less on orbital systems in the operations of its general purpose forces, yet it plans to actively build-up such space capabilities. China's interests are objectively similar to those of Russia, although its priorities may differ. For example, China might be less concerned over the US space reliant conventional strike assets, while it may be alarmed more than Russia by potential US space missile defense projects, as it has a relatively limited nuclear deterrence capability.

Against this background, the new US National Space Policy approved by President Barack Obama in June 2010 was perceived quite positively. It probably lived up to the expectations of reputable American experts who (apparently bearing in mind serious problems in the international politics and the unprecedented financial and economic crisis) stressed that "the United States has made the greatest investment in space assets and is substantially dependent on them for conducting global military operations. The potential vulnerability of these assets to relatively unsophisticated attack presents a more significant threat than any other danger in space... A ban on space weapons would disproportionately benefit the United States, which therefore has the strongest reason to set and maintain exacting standards of verification".[28]

[28] Nancy Gallagher and John Steinbruner, Reconsidering the Rules for Space Security. American Academy of Arts & Sciences. 2008. P. 80.

The extensive document approved by the US President should be studied and taken in consideration by Russia's and other countries' experts involved in developing competitive space science, technology and security, including the limitations in international cooperation set forth for the US Federal space programs. It is notable that the new US space policy is aimed at both maintaining the US scientific and technological and security leadership (including accelerated development of reconnaissance, communication, command and navigation systems), and close international cooperation, unimpeded access to space for all countries and transparency with regard to space activities. This is an important difference from the previous Administration's space policy. Besides, it provides for a response to and protection form any intended actions to disable or attack space vehicles or land-based infrastructure supporting space activities.

The new document does not make it clear what anti-satellite weapons programs may be aborted , "frozen", or be further developed, especially taking in consideration the announced need to protect space vehicles and the relevant land-based infrastructure. The status of these programs will be clarified later, as the basic provisions of the new space policy are implemented. It is also stated that the US is ready to consider arms control proposals and concepts, if these are equitable, efficient, verifiable and contribute to the US security.

Draft treaties, subject of agreements. Presently, space law does not prohibit placing any types of weapons except for WMD in space. Neither it is prohibited to develop, test and deploy anti-satellite weapons in space. After the US withdrew from the ABM Treaty in 2002, there have been no restrictions on the development, testing and deployment in space of space-based BMD and its components. Besides, there are no prohibitions on the systems and means of countering missile defense, on active and passive satellite defenses, on the deployment in space of anti-optical-electronic and electronic warfare, on conduct of any military-related space experiments, except for hostile environmental modification techniques.

On February 12, 2008, the Russian Federation and the People's Republic of China jointly submitted at the Conference on Disarmament in Geneva the draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT). This crowned the discussions which had lasted more than five years.

For the purposes of the Treaty, the term "weapon in outer space" means "any device placed in outer space, based on any physical principle, which has been specially produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth or in the Earth’s atmosphere, or to eliminate a population or components of the biosphere which are important to human existence or inflict damage on them". At the same time, it specifies that a weapon shall be considered to have been "placed" in outer space if it orbits the Earth at least once, or follows a section of such an orbit before leaving this orbit, or is permanently located somewhere in outer space. Hence, this excludes various classes of ballistic missiles from the scope of the Treaty, as they pass through space in order to fulfill their mission (including intercepting a space vehicle) but not follow an orbit around the Earth.

Under Article II of the PPWT, the States Parties undertake not to place in orbit around the Earth any objects carrying any kinds of weapons, not to install such weapons on celestial bodies and not to place such weapons in outer space in any other manner; not to resort to the threat or use of force against outer space objects; and not to assist or induce other States, groups of States or international organizations to participate in activities prohibited by PPWT.

It is also notable that the scope of the Treaty includes only weapons placed in space, and not Earth-to space systems, which are the fastest to develop and may enter service in the near future. Instead, it only deals with space missile defense and ASAT systems and space-to-Earth arms, which will be developed in the distant future, if developed at all. It offers a significant departure from an unrealistic, yet comprehensive Soviet position of the 1980s.

In general, the Russian-Chinese initiative has brought certain positive results, although of a political and propaganda nature, rather than as a practical solution to the problem.

The many years of initiatives and negotiations on these issues demonstrate primarily that among diplomats and experts there is a profound lack of clarity and understanding even regarding the very subject of treaties and legal regulation. In other words, the main and fundamental task of defining the subject of negotiations has remained unsolved.

There is a more or less common understanding among the experts, that space weapons are instruments of war developed and tested for strikes against any targets and used from space vehicles (i.e. objects that orbited the Earth at least once; other celestial bodies and orbits have not been mentioned so far), and instruments of war developed and tested to strike against space objects (i.e. objects that orbited the Earth at least once).

This means, that existing definition of space weapons refers to their location (space) and/or the location of their targets (space), and not to their particular technical specifications. For example, one can imagine how difficult the disarmament would have been if the subject of limitations or prohibitions were specified as "any sea-based weapons or weapons to strike targets at sea".

In the past, disarmament talks were a success only when able to enshrine (or attain commonly understood) specifications of weapon systems and agreed designations of their kinds and types. At the moment, no such characteristics apply to space arms.

An especially complicated task would be banning directed-energy weapons, primarily lasers. Those can be used both for destroying aircraft, satellites, ballistic missiles and their elements at the flight trajectory, and for detecting, sounding and identifying objects on the Earth surface, under water and in space, for targeting other weapons systems and in the longer term, for promptly transmitting enormous volumes of information, i.e. for communication.

The development and application of means to destroy or disable Earth-based information and command facilities supporting space systems virtually cannot be prohibited, as almost all conventional and nuclear offensive arms, electronic warfare and the systems based on new physical principles may be used for this purpose.

The greatest overlap is associated with strategic missile defense systems of all types of basing, since they have an inherent capability to intercept satellites at the altitudes of up to 1000 kilometers. Except for early boost phase and terminal re-entry phase, missiles intercepted by BMD pass through the same space environment where most SVs orbit with orbital apogees up to 1000 kilometers. The satellites on these orbits move a little faster than the top stages and reentry vehicles of missiles (about 8 kilometers per second and 5-7 kilometers per second, respectively), yet despite this, they are easier to intercept.

Control issues. If the disarmament is to be real, and not confined to declarations and propaganda, it is pivotal and imperative that there is stringent control over the compliance with agreements. In most former and existing disarmament treaties the control focused on deployment and operational service of weapons systems (ABM Treaty, SALT-1 Agreement, START-1 Treaty, INF Treaty, CFE Treaty, CWC, Prague START Treaty). This is also the case with the 1967 Outer Space Treaty (as regards non-deployment of WMD), although it does not provide for any control measures.

The control measures of the mentioned treaties to a much lesser extent apply to weapons testing (the CFE Treaty does not apply to it at all). The only exceptions are the former ABM Treaty and START I Treaty envisaging stringent control over testing (and even prohibiting the encryption of telemetric information), and the CTBT fully pertaining to the tests. As for the development stage prior to the testing – it remain outside the scope of any treaty besides ABM Treaty, CWC and BTWC, of which the former was prone to great controversies and the latter has never provided for any control.

Unlike other known weapons, the space arms would probably be the most difficult to ban or limit at the stage of deployment and operational service, especially if deployed in outer space, as provided for in the 2008 draft PPWT. It would be an enormous challenge to identify the prohibited satellites carrying weapons among approximately 800 SVs currently revolving on different orbits. It would be an even greater challenge to prove the applicability of the treaty to them without their inspection in outer space or retrieving to Earth (even if the treaty establishes specifications of the prohibited systems rather than their basing and the location of possible targets).

This is also true of prospective small satellites as a means of inspecting SVs on all orbits. Such space on-site inspections or retrieving spacecraft in many cases are technically impossible, dangerous, and are very unlikely to be acceptable for states for reasons of the protection of sensitive military or commercial information. The same presently relates to pre-launch on-site inspections, although in a distant future some cooperative measures of such type might become possible.

As for land-, air-, or sea-based space weapons which are more likely to appear in the foreseeable future (yet are not addressed by the Russian-Chinese draft), the picture is also mixed. The easiest to ban or limit would be systems based on ballistic missile launchers, like former Soviet *IS-MU* or recent China's vehicle. The experience of agreements on ICBMs and IRBM/MRBMs would be applicable. In case of the airborne systems like the 1980s American *F-15 SRAM/Altair* system and the Soviet ASAT system based on MiG-31 fighter, it would be very difficult to verify the deployment ban, due to the multi-purpose nature and the large number of such aircraft in operational service, as well as due to the fact that missile-interceptors are small and can be stored in any airfield storage facilities. Certainly, such ASAT systems have particular guidance and control systems, yet their prohibition would "interfere" with the general infrastructure of space complexes, and hence is not be feasible. Limiting the quantity of such systems would be more practicable, yet require greater transparency, agreeing upon functional distinctions of aircraft and missiles, measures to assist control, and permitted ASAT systems basing sites. It may also require the approval of the right of suspect-site inspections at short notice to other air force bases of the parties.

Prospects of agreements on space weapons. Negotiations to ban space weapons can become a practical task, as the whole disarmament process and architecture is revived, especially if President Obama's Administration engages in the revision of the US military space policy. In this case, previous experience and earlier proposed initiatives would require a new approach to the subject, format and ways to regulate through treaties this sphere of military and strategic relations among the space-faring powers.

It should be reminded that the treaties on strategic arms have in practice been based on the balance of the parties' asymmetrical military interests, rather than on their common peaceful intentions (i.e. heavy ICBMs reductions for cruise missiles limitations under START II). As for space, an obvious balance of the parties' practical interests could be achieved through banning or strictly limiting anti-satellite systems in exchange for space-based BMD (that is, space-based strike systems: interceptors). The first would benefit the US, and the second Russia and China. In this treaty format, technical overlap of ASAT systems and BMD which makes it difficult to ban one and keep the other, would promote measures to limit or ban both of them.

Instead of prohibiting the deployment, initial arrangement could indirectly resolve this task by banning the tests of anti-satellite systems and space-based strike BMD. This would imply tests involving intercept of a real target satellite or a ballistic missile and its elements in flight trajectory, similar to those conducted by the USSR in 1960s-1980s, the US in 1980s and in 2008, and China in 2007. Verification of compliance with such agreement could employ the parties' NTMs, preferably in combination with cooperative measures and certain transparency regime. For instance, the existing format of notifications of all launches, including space launches, could be enhanced and expanded to apply to all activities and experiments involving destructive effect on space objects.

Defunct satellites representing a danger in case of falling, should be eliminated under observation of another party (parties) and involve the provision of sufficient information to exclude suspicions with regard to covert ASAT weapons tests, similar to the 2008 SV intercept held by the US.

The initial treaty could have a limited duration (for instance, 10 years with possible extension) not exceeding the projected time of the development of technically usable missile defense. Like any other treaty of the kind, it would include an article on the right of parties to withdraw from the treaty in case their "supreme interests" are stake.

The arrangement could at first stage include the US, Russia and preferably, China as its parties, and provide for possible future accession of any other states. A permanent joint commission could be established to exercise control and resolve disputes.

For both political and military, and objective technical and physical reasons (in particular, the special nature of outer space), the proposed treaty would, as necessary, be partial and selective. In fact, this was also the case with the 1972 SALT I Interim Agreement and the 1979 SALT II Treaty. However, without those natural stages of disarmament process, the parties would have never achieve the unprecedented comprehensive reductions, limitations, and transparency measures provided for by the START I Treaty signed twenty years later and the 2010 START Treaty concluded in Prague.

Today, the humanity has reached one of the history's key crossroads: the question is whether the space will turn into the area of space arms race or remain the sphere of peaceful and exclusively auxiliary military activities, international cooperation, ensuring strategic stability and disarmament. The main track will evidently be chosen in the nearest decade, or even in the years immediately ahead.

A global world faces new security issues that cannot be addressed unilaterally, especially through the use of military force. To resolve these issues, the leading powers and all responsible nations of the world should engage in cooperation, including the use of outer space, for fighting against the proliferation of weapons of mass destruction, suppressing international terrorism, facilitating multilateral peacekeeping operations, verifying radical disarmament steps, taking efficient measures with regard to climate and environment in general, ensuring energy and food security.

This makes it imperative to promptly develop international agreements to prevent the armament of outer space. A first step towards this end could involve early adoption of the code of space conduct of states, enshrining common principles of peaceful and cooperative use of space to which states would voluntarily adhere.

4. CODE OF CONDUCT IN OUTER SPACE

The recent prolonged impasse in the conclusion of a treaty on "non-armament" of outer space have called for a search for alternative ways and forms of achieving this goal. A less formal — as compared to a treaty — code of conduct or a framework agreement for governing the activities in space have become one of such forms.

The principles of codes. The codes of conduct are used internationally in cases when the conclusion of a formal arrangement appears too complicated, redundant or hardly feasible. For example the International Code of Conduct against Ballistic Missile Proliferation (ICOC) was adopted in The Hague in 2002, and was signed by 93 countries. To date, more than 120 states have acceded to it.

This in itself is indeed telling. To compare, the missile and missile technology export control regime (MTCR) adopted over 20 years ago, in 1987, has a considerably smaller membership, that is, 34 countries, largely due to the fact that many countries consider the limitations under MTCR to be difficult to verify. Besides, as there are no reliable systems to ensure regional and global security, a considerable number of states prefer to retain freedom to develop missile technology.

The development of and voluntary adherence to a code of conduct for outer space activities might contribute to increasing the responsibility of states and serve as a step towards arrangements of a more binding nature. The purpose of the code of conduct could be to ban any activities aiming at destruction or undermining the stability of the functioning space systems, as well as to limit the development, deployment and use of weapons designed for these purposes. The code of conduct could also aim at establishing certain limitations regarding "provocative" deployment in space of destabilizing monitoring and reconnaissance space systems.

This prohibition should be in effect in peacetime and reduce technical and operational possibilities of destabilizing the situation (and uncontrolled escalation as the consequence of it) during armed conflicts. Some of its provisions could be also observed in wartime. At the same time, one could hardly expect the parties in an armed conflict to observe the prohibition on jamming systems like GLONASS, NAVSTAR, or Galileo, which are key to supporting the use of high-precision weapons, and the prohibition on disabling other military, dual-use and commercial support systems.

The idea of the code of conduct in space, with all the many shapes it has, has gained wide support. At the moment, several projects are discussed both by the expert community and at the official level.

According to Russian experts, the code of conduct should first of all specify those objects of space systems the effect on which disables them. Second, it should also specify ways and means of impact, and, finally, the types of weapons which can be placed in outer space or used from the Earth surface against space vehicles.

It should be stressed that the fulfillment of the mentioned conditions cannot be verified with national technical means of verification. However, it should be noted once again in this respect that the code is rather a document on intentions based on voluntary consent of states to act in a particular manner. For this particular reason it should contain neither rigid definitions, specific limitations and verification procedures, nor any sanctions for the breach of its provisions. In fact, this is what it has in common with other documents of the kind, for instance, with the above mentioned International Code of Conduct against Ballistic Missile Proliferation.

There are few possible ways to conceptually develop the idea of the code. One, chosen by some Western researchers, consists of proclaiming the principles of a rather general nature, acceptable for all and causing no objections. Another possible way:the call to prohibiting certain weapons systems or stages of their development (tests, for one), preferred by Russian experts.

Draft codes. In October 2007, a model Code of Conduct[29] was proposed, co-sponsored by non-governmental organizations of Canada, Russia, France, Japan and the US (coordinated by the Stimson Center). The Code provides for nine spheres of responsibility of space-faring states. Among those, the principle ones are: the responsibility to respect the rights of other space-faring states; the responsibility to abide by "rules of safe space operation" (not legally prepared yet), the responsibility to minimize space debris, and the responsibility to consult with other space-faring states regarding activities of concern in space. The responsibility to "refrain from harmful interference against space objects" is probably the most specific one. Although this provision could have many interpretations, it does nevertheless provide a framework for "consulting" mentioned above.

[29] Model Code of Conduct for Responsible Space-Faring Nations. Released by the Stimson Center October 24, 2007. (http://www.stimson.org/pub.cfm?ID=575)

The Framework for Space Security (SSF) prepared by the Eisenhower Institute (Washington, USA)[30], goes far beyond that. It can be classified as "a voluntary agreement rather than a treaty" and is intended to coordinate the activities of the leaders of "like-minded" nations that acknowledge the need to adopt certain principles in order to enhance the security of all actors in space.

Unlike the Code of Conduct, the SSF provides a whole set of basic definitions for its purposes, which seems quite justified. It proposes specific responsibilities to be assumed by every party. Those include a highly important responsibility to refrain from the space testing of "destructive anti-satellite weapons" and the deployment of any space-based anti-satellite systems. Besides, it proposes to ban the deployment and testing of the weapons and component of a space-based BMD, because it would be "indistinguishable from a destructive space-based weapon".[31]

In order to develop and enhance confidence-building measures, an establishment of a joint Coordinated Space Awareness Center is proposed; the Center would be capable of detecting, tracking, and identifying man-made objects orbiting the Earth. The SSF proposals are, therefore, more specific and, if accepted, could prevent arms race in space.

In late 2008, the idea of elaborating a code of conduct received notable support on the part of the European Union. The draft Code of Conduct for Outer Space Activities proposed by the Council of the European Union, sets forth important principles aimed at strengthening the "ideology" of preventing arms race in outer space.

For one, in accordance with its General Principles the subscribing states consent to abide by certain principles of the use of outer space. One of these provisions envisages the freedom of access to outer space "fully respecting the security, safety and integrity of space objects in orbit", while another provides for consent to "take all the appropriate measures and cooperate in good faith to prevent harmful interference in outer space activities".[32]

The section on measures on space operations says that the states shall "refrain from any intentional action which will or might bring about,

---

[30] Framework for Space Security: an Alternative to the Weaponization of Space

(http://www.eisenhowerinstitute.org/themes/international/fos/framework.dot)

[31] Ibid.

[32] Council of the European Union. Brussels, 3 December 2008. Annex II. Draft Code of Conduct for outer Space Activities.

(http://register.consilium.europa.eu/pdf/en/08/st17/st17175.en08.pdf) directly or indirectly, the damage or destruction of outer space objects". For these purposes the subscribing states "resolve" to annually exchange information on "national space policies and strategies, including basic objectives for security and defense related activities".[33]

This draft code does not directly address space arms development or deployment. Nonetheless, adoption of such code would clear the path for expanding the consensus among the world's leading nations (including many US allies) on the need to prevent such arms race in order to assure "the security, safety and integrity of space objects in orbit", and "to prevent harmful interference in outer space activities".[34] . European countries' accession to the code would also pave the way to further universalization of this initiative and its possible extension and the inclusion of new limitations.

All these, however, do not obviate the need for more rigid limitations in order to ensure peaceful use of outer space.

Certain hopes in this connection are inspired, in addition to the EU-proposed initiative, by the fact that the 2008 presidential elections in the US marked the tendency to serious changes in Washington's official posture. The Democratic presidential candidate promised to assure "restoring US leadership on space issues"…by seeking code of conduct for space-faring nations, including a worldwide ban on weapons to interfere with satellites and a ban on testing anti-satellite weapons".[35] This might be a monumental departure from the space policies of the preceding US government.

---

[33] Ibid.

[34] Council of the European Union. Brussels, 3 December 2008. Annex II. Draft Code of Conduct for outer Space Activities.
(http://register.consilium.europa.eu/pdf/en/08/st17/st17175.en08.pdf)

[35] Barack Obama and Joe Biden on Defense Issues
(http://www.barackobama.com/issues/defense/)

CONCLUSIONS

1. Cooperation of Russia, the US and NATO in developing a joint BMD is presently the key to further progress in nuclear arms reduction and limitation (deep nuclear disarmament), and shaping political partnership. Despite two decades of official and academic promotion of this idea, up to now it has not been implemented in practice in any tangible way (except a series of joint command exercises). Recent two years of “resetting” US-Russian relations have produced some changes which might open new prospects for cooperation on BMD.

President Obama's Administration has sent a clear enough message of intention to cooperate with Russia in this field. NATO leadership also agreed with the necessity to work together with Russia in developing and building joint defense against ballistic missiles. Russian leadership gives positive signals regarding the possibility of such cooperation.

2. The US is presently an absolute leader in the development of non-strategic and strategic ballistic missile defense systems. Nevertheless, Russia is still capable of making a considerable contribution by providing its early warning and interception capabilities to the joint BMD system.

Apparently, joint development of TMD, let alone strategic BMD, is a long-term program that requires the parties to solve many complicated political, military and technical, economic and legal issues. It is simply impossible to address or even foresee all of such problems in advance.

Yet, once the milestone decision is made and strategic course towards cooperation is defined, it is possible to start with relatively simple and indisputable measures and plan at solving future issues in due time . Very important that practical progress in this pivotal security sphere would by itself have a profound beneficial effect on the relations between the parties and facilitate resolution of issues that now appear to be insoluble. (Probably, it is for this particular reason why the strongest opponents of cooperation between Russia and the West campaign so zealously against any, even minor, practical measures of cooperation in this area.)

The participants in the conference held on June 22, 2010 and the authors of this booklet have no doubt that it is imperative that the parties promptly engage in such cooperation, and first of all restore the elements of cooperation that have been abandoned over the recent years.

First steps could be decisions to revive at a new level the efforts to integrate information components of missile launches early warning systems by reviving the project of a Joint Data Exchange Center and resuming the interrupted series of TMD exercises that should now reach beyond the limits of the theatre of operations There is no point in convincing the Europeans that they may only be threatened by short-range ballistic missiles. Furthermore, as technologies advance, the boundary between tactical and strategic BMD diffuses. Former intentions to cooperate only in developing non-strategic BMD appear an anachronism, although such cooperation format may become a first step of a long-term cooperation program.

The revival of the idea of virtual JDEC might facilitate its implementation and help avoid unnecessary expenses and organizational difficulties. Still, considering the strengths and weaknesses of a virtual JDEC, and taking in account political importance of this project, reviving the idea of a real (physical) joint Center retrofitted to gather real-time information appears to be a better option.

3. Although Russia does not presently view Iran's and North Korea's missile capabilities as a threat, in the longer term Iran possessing missiles and nuclear weapons can seriously destabilize the situation in the region and across the world, and this would pose a new threat to Russia. In addition to countering possible Iranian threat, there are several reasons that make the cooperation of Russia with the US and NATO desirable.

First, such cooperation may play a crucial part in promoting positive strategic partnership of the two nuclear superpowers and the leading NATO countries. This cooperation would also embrace other areas of security and help flesh out the new Euro-Atlantic security architecture proposed by the president of Russia with concrete programs.

Second, in case of unilateral implementation of the new plan on building BMD in Europe as proposed by the Barack Obama Administration, the absence of such cooperation will inevitably cause another BMD crisis between Russia and the West as the weapons of the BMD acquire strategic potential. Notably, a new crisis after “resetting” might have more acute and devastating character.

Third, despite robust measures taken by the members of the nuclear club to prevent unauthorized or accidental missile launches, there is no hundred percent guarantee that such launches will never happen. This is even more relevant for other existing and potential nuclear missile states. Therefore, it does make sense to protect against such cases.

Fourth, history shows that the relations between states may deteriorate quite drastically (especially in case of unstable, radical regimes), turning non-hostile nuclear missile capabilities into a key national security threat. This was the case with the USSR-China relations in the 1960s-1970s and with the US-Iranian relations in the 1980s.

Finally, even if Iran and the DPRK do not turn into Russia’s enemies, Iran with its nuclear missiles and DPRK enhancing its capabilities may potentially destabilize the situation both regionally and globally, causing a chain reaction of proliferation (in Saudi Arabia, Syria, Turkey, Egypt, Libya, Japan, South Korea, Taiwan) and creating a threat for Russia as well.

4. Notwithstanding the improvement of relations between Russia and the West, the Russian military minds still proceed from the assumption that the US and their allies are Russia’s potential adversaries and have inherently aggressive strategic intentions. Whatever the merits of such assumptions, many facets of US and NATO policies and programs during the last twenty years gave grounds for suspicions and mistrust of Moscow.

The new foreign policy principles and priorities declared by Russian political leadership (globalization and interdependency, partnership for modernization, resetting relations, achieving a world free from nuclear weapons, etc.), are not quite compatible with the implications of the new Russian military doctrine. Russia's military policy continues to rely upon the assumed possibility of a global war between Russia and the West involving the massive use of conventional armed forces and weapons and, subsequently, of nuclear weapons. The country's military course (including the military doctrine, the reform of the armed forces and the State Arms Procurement Program) obviously needs close and continuous political control in addition to general budgetary provisions and administrative decisions.

5. In the top echelons of the Russian military establishment, the military-industrial complex, as well as among the vast majority of the country’s expert community there is an explicit perception of a new and grpwing threat from the US and their allies. Those are believed to be able to use non-nuclear cruise missiles and ballistic missiles to attack Russia, including to mount a disarming (counterforce) strike against its SNF, early warning systems and command and control centers).

However high-precision weapons cannot be compared with nuclear weapons in terms of effectiveness of a strike at strategic hardened or mobile military targets, let alone urban-industrial centers. A colossal risk of a nuclear escalation triggered by a high-precision weapons attack is disproportionate to any expected gains of such an operation, especially with the Cold War over and the major powers moving towards greater economic, social and environmental interdependence/

6. Nevertheless, the fact remains that US high-precision weapons represents certain military and strategic problem for Russia. As long as

Russia has considerable nuclear deterrence capability, direct military threat of massive use of high-precision weapons against it should not be exaggerated (neither should the capability of the planned US BDM to hold off a retaliatory nuclear strike).

Yet, the deployment of long-range high-precision non-nuclear weapons would hamper nuclear disarmament and security cooperation of Russia and the West.

First. The US's shifting its strategic resources (primarily cruise missiles) from strategic nuclear forces to the strategic high-precision weapons and removing them from the scope of limitations on strategic offensive arms would inevitably bring about serious objections on the part of Russia as early as at the next stage of START negotiations

Second. Besides NATO's superiority over Russia in general purpose forces in Europe, the deployment of high-precision weapons would hinder negotiations on Russia's and the US non-strategic (tactical) nuclear weapons, as tactical nuclear weapons (TNWs) are considered as an asymmetrical counterbalance to the other party's superior high-precision weapons potential.

Third. The deployment of the US high-precision systems would constitute an additional obstacle to the US-Russian BMD cooperation. Russia's focus on building aerospace defense as part of its air and missile defense systems against the US and NATO would impede its cooperation with the US and NATO in developing BMD against third countries.

7. If the parties exercise due political will, the problems caused by high-precision weapons can be resolved or eased through agreements. This implies, in particular, a ban on basing strike air forces (in addition to non-placement of nuclear weapons) in the territories of the new NATO members. Russia may assume similar obligations with respect to its CSTO and CIS allies and possible new partners on other continents.

The threat posed by several *Ohio* SSBNs carrying SLCMs may be considerably diminished if such submarines are based on the US Western coast only (SSBNs patrol in the Pacific and Indian Oceans would leave most of Russian ICBMs bases outside their range, while SSBNs passage to the Arctic Ocean represents operational difficulty).

During further strategic offensive arms negotiations Russia can raise the issue of limiting the retrofitting of SSBNs and HBs for non-nuclear cruise missiles, leaving general purpose submarines, surface ships and tactical strike aircraft for these purposes.

It would also be helpful to introduce confidence-building measures involving the exchange of information on high-precision weapons on ships, submarines and aircraft, on operational principles of their deployment and use in local conflicts, the exchange of visits and observers to attend military exercises. Subsequently, in the longer term, joint air force and navy exercises to train use of high precision weapons in operations of counter-proliferation, peace-enforcement, counter-terrorism and fighting against sea piracy, could be held.

Farther reaching measures could involve limiting the patrol areas of submarines carrying cruise missiles, in order to prevent possible deployment of major part of the US submarines in the vicinity of Russia's territory and vice versa.

It appears that it is up to the US, which has created this problem, to take initiative and propose arms limitation, confidence-building measures and measures of cooperation on high-precision weapons, in order to encourage Russia's course towards joint BMD, nuclear disarmament and non-proliferation. Such decisions can be agreed at the following stage of negotiations on strategic offensive arms reductions, or in parallel to it.

8. With the conflicting nature of today's international relations and the rapid advances in science and technology, outer space, given its increasing significance in terms of military and peaceful use, may turn into the arena of a new arms race and potential use of force.

The US holds absolute leadership in this sphere, as it possesses a wide range of state-of-the-art space technologies and scientific and technological capacity for the development of land-based and sea-based anti-satellite systems after 2010.

Both US strategic forces and general-purpose forces depend to a great and increasing extent on the space vehicles. This is much less true with respect to Russia, China and other military powers of the world. Therefore, the US should, first, be concerned about the security of their orbiting systems much more than any other country. And, second, it would be much more important for the US to ensure the security of its own SVs rather than create a threat to other countries' satellites.

9. The increasing threat of space arms race would inevitably lead to "vertical" and "horizontal" missile and nuclear proliferation and the irreversible crisis of the whole nuclear disarmament and non-proliferation regime.

Against this background, the new US National Space Policy approved by President Barack Obama in June 2010 was perceived quite positively. The new document does not make it clear what anti-satellite weapons programs may be discontinued, or be further developed. The status of these programs will be clarified later, as the basic provisions of the new space policy are implemented. It is also important that the document referred to the US readiness to consider arms control proposals and concepts, which are equitable, efficient, verifiable and contribute to the US security.

10. The submission on February 12, 2008 of the joint Russian-Chinese draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects, at the Conference on Disarmament in Geneva, has brought certain positive results of a political and propaganda nature, rather than in terms of practical disarmament.

If non-armament of space, including fundamental control issues, is to become a subject of practical negotiations the parties will have to overcome many difficulties that have remained outside the scope of the 2008 draft Treaty.

In defining the subject of negotiations, it would be advisable — at least at first stage to narrow the scope of negotiations rather than try to ban all Earth-to-space and space-to-space systems with specifications as unclear as the possibility to verify compliance with such an agreement.

Instead of prohibiting the deployment, initial arrangement could indirectly resolve this task by banning the tests of anti-satellite systems and space-based strike BMD involving intercept and destruction of real targets in space (e.g. satellites and the reentry vehicles and elements of ballistic missiles in flight trajectory). The compliance with such agreement could be easier to verify with the help of the parties' NTMs, preferably in combination with cooperative and certain transparency measures. Besides, such arrangement would curb the dangerous growth of space debris. The initial treaty could have a limited duration (e.g., 10 years with possible extension).

The arrangement format could at first stage include the US, Russia and preferably, China as its parties, and provide for possible future accession of any other states.

11. A first step towards s preventing the armament of space could consist in an early adoption of the code of space activities of states, enshrining common principles of peaceful and cooperative use of space.

The development of and voluntary adherence to a code of conduct for outer space activities would contribute to increasing the responsibility of states and serve as a step towards arrangements of a more binding legal nature. The purpose of the code of conduct could be to ban any activities aiming at destroying or undermining the stability of the functioning space systems.

With regard to weapons designed for deployment in space for the purposes of destruction of targets in different media (in space and on the Earth) the code could call upon the states to refrain from the development, testing, production, deployment and use of such weapons.

The code could become a "starting point" for the agreement of different countries on the principles of limitations. Such agreement may in its turn serve as a basis for further negotiations towards legally binding instruments.

12. There are quite a number of complementary areas offering opportunities for cooperation between the US, the European members of NATO and Russia. However, they may only be realized if relevant political decisions in the context of the current outlook for US-Russia strategic partnership are made.

On the whole, as the experience of the powers' cooperation of the recent two years has shown, improving bilateral political relations, and implementing the arrangements already reached, are lagging behind expectations and existing opportunities. For these reasons, it would be of paramount importance to lay the groundwork in the near future for a large complex of negotiations and agreements between Moscow and Washington in the field of security, which would render the positive development of the two powers' relations irreversible after the year 2012 and beyond.

ABBREVIATIONS

ALCM	air-launched cruise missile
ANGELS	Autonomous Nanosatellite Guardian Evaluation Local Space
ASAT	anti-satellite
BMD	ballistic missile defense
BMEWS	Ballistic Missile Early Warning System
BTWC	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and Their Destruction (1972)
CFE Treaty	Treaty on Conventional Armed Forces in Europe
CSTO	Collective Security Treaty Organization
CTBT	Comprehensive Nuclear Test-Ban Treaty
CWC	Convention on the Prohibition of the Development, Production, stockpiling and Use of Chemical Weapons and on their Destruction (1993)
EASI	Euro-Atlantic Security Initiative
HB	heavy bomber
ICBM	inter-continental ballistic missile
ICOC	International Code of Conduct against Ballistic Missile Proliferation
IMEMO	Institute of World Economy and International Relations fo the Russian Academy of Sciences
INF Treaty	Treaty between the USA and the USSR on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (1987)
IS	Istrebitel Sputnikov (satellite destroyer)
JDEC	Joint Data Exchange Center
MoD	Ministry of Defense
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organization
NTI	Nuclear Threat Initiative
NTMs	national technical means of verification
PPWT	Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects

R&D	research and development
SAINT	Satellite Inspection Technique
SALT I Agreement	Interim Agreement Between the USA and the USSR on Certain Measures with Respect to the Limitation of Strategic Offensive Arms (1972)
SBGV	Space-Based Gliding Vehicle
SDI	Strategic Defense Initiative
SLBM	submarine-launched ballistic missile
SLCM	sea-launched cruise missile
SLV	space launch vehicle
SNF	strategic nuclear forces
SSBN	nuclear-powered ballistic missile submarine
SSF	Space Security Framework
START I	Treaty between the USA and the USSR on the Reduction and Limitation of Strategic Offensive Arms (1991)
STSS	Space Tracking and Surveillance System
SV	space vehicle
TMD	theater missile defense
TNWs	tactical nuclear weapons
UAV	unmanned aerial vehicle
UN	United Nations
UN SC	United Nations Security Council
WMD	weapons of mass destruction

ANNEX
LIST OF PARTICIPANTS IN THE MEETING HELD ON JUNE 22, 2010 IN IMEMO RAN

Alexander A. Dynkin, Director of IMEMO RAN, Academician of the Russian Academy of Sciences.

Alexei G. Arbatov, Head of the Center for International Security, IMEMO RAN, Corresponding Member of the Russian Academy of Sciences.

Vladimir G. Baranovski, Deputy Director of IMEMO RAN, Corresponding Member of the Russian Academy of Sciences.

Dr. Robert Berls, Senior Advisor for Russia and CIS, Nuclear Threat Initiative, Director of the Moscow Office (USA).

Sebastian Gerhardt, First Secretary, Embassy of Germany to Russia.

Vladimir Z. Dvorkin, Major-General (rtd.), Chief Researcher, Center for International Security, IMEMO RAN.

Anatoly S. Dyakov, Director, Center for Arms Control, Energy and Environmental Studies, Moscow Institute of Physics and Technology (University).

Marianna G. Yevdotyeva, Senior Researcher, Center for International Security, IMEMO RAN.

Victor I. Yesin, First Vice-President of Academy of Security, Defense, Law and Order, Colonel General (rtd).

Valery N. Ignatiev, Captain First Rank (rtd.), Principal Adviser, Defense Committee, State Duma.

Natalia I. Kalinina, Chief Researcher, Center for International Security, IMEMO RAN.

Alexander N. Kalyadin, Chief Researcher, Center for International Security, IMEMO RAN.

Sergey V. Kortunov, Deputy Dean, Faculty of World Economy and International Affairs, State University - Higher School of Economics.

Sergey A. Kulik, Director for International Development, Institute of Contemporary Development.

Professor Robert Legvold, Department of Political Science, University of Columbia (USA).

Yevgeni V. Miasnikov, Principal Research Associate, Center for Arms Control, Energy and Environmental Studies, Moscow Institute of Physics and Technology(University).

Sergey K. Oznobishchev, Head of Sector, Center for International Security, IMEMO RAN.

Colonel (reserve duty) Alexander V. Radchuk, Adviser to the Head of the General Staff of the Armed Forces of the Russian Federation.

Yatim Ramlee, Minister-Counsellor, Embassy of Malaysia to the Russian Federation.

Vladimir I. Sotnikov, Senior Researcher, Center for International Security, IMEMO RAN.

Page Stoutland, Vice President for Nuclear Materials Security Program, Nuclear Threat Initiative (USA).

Pyotr V. Topychkanov, Senior Researcher, Center for International Security, IMEMO RAN.

Sergey V. Utkin, Head of Sector, IMEMO RAN.

Stephen Flanagan, Senior Vice-President and Henry A. Kissinger Chair, Center for Strategic and International Studies (USA).

Alexander A. Khramchikhin, Deputy Director, Institute for Political and Military Analysis.

Sergey V. Tselitski, Researcher, Strategic Studies Department, Center for International Security, IMEMO RAN.

Michael Elleman, Senior Fellow, International Institute for Strategic Studies (Washington Office, USA).