

REVISING NUCLEAR DETERRENCE

Alexei Arbatov

Vladimir Dvorkin

Research and technical support: Vladimir Evseev

October 2005

CISSM

**Center for International and
Security Studies at Maryland**



Acknowledgements

The authors of this paper are grateful to the Center for International and Security Studies (CISSM) at the University of Maryland for initiating this study on the past, present and future of nuclear deterrence, and to the John D. and Catherine T. MacArthur Foundation for supporting the work. Our special thanks go to John Steinbruner, who provided valuable intellectual guidance and comments on the subject of the paper, and to Nancy Gallagher for organizing our efficient interaction during the whole research period. We also greatly appreciate the organizational help and support of CISSM and Carnegie Moscow Center staff, as well as the comments and advice of all Russian and American experts who have read all or parts of the paper, or discussed with us its various details. At the same time, the authors bear full responsibility for the assumptions, theoretical analysis and practical proposals of the study.

About the Authors

Alexei Arbatov – Corresponding Member of the Russian Academy of Sciences; Dr. Prof. Sc. (History); Director of the Center for International Security, Institute for World Economy and International Relations (IMEMO) Russian Academy of Sciences; Scholar in Residence, Carnegie Moscow Center; former (1993-2003) deputy chair of the defense committee of Russian Parliament (State Duma), former member of Soviet delegation at START I talks (1990).

Vladimir Dvorkin – Major Gen. (Ret.) Strategic Rocket Forces; Dr. Prof. Sc. (Technical Sciences); Senior researcher at the IMEMO Center for International Security; former Director of the 4th Central Scientific Research Institute of the Ministry of Defense.

Vladimir Evseev – Lt. Col. (Ret.) Strategic Rocket Forces; Dr. Sc. (Technical Sciences); Senior researcher at the IMEMO Center for International Security; former Chief of meteorological service of ICBM division.

List of Acronyms

AAD	anti-aircraft defense
ABM	Anti-Ballistic Missile (Treaty)
ALCM	air-launched cruise missile
BMEWS	ballistic missile attack warning system
BMD	ballistic missile defense (system)
C ³	command, control, communications
C ³ I	command, control, communications and intelligence
CMC	Carnegie Moscow Center
CFE	Conventional Armed Forces Reduction in Europe (Treaty)
CIS	Commonwealth of Independent States
CST	Collective Security Treaty (of CIS states)
CTBT	Comprehensive Test-Ban Treaty
CTR	co-operative threat reduction
DPRK	Democratic People's Republic of Korea (North Korea)
EU	European Union
EWR	early warning radar
FMCT	Fissile Materials Cut-Off Treaty
FMT	Fissile Materials Treaty
FY	fiscal year
HB	heavy bomber
HDBT	hard and deeply buried target
HEU	highly enriched uranium
IAEA	International Atomic Energy Agency
ICBM	intercontinental ballistic missile
INF	Intermediate-Range Nuclear Forces (Treaty)

IRBM	intermediate-range ballistic missile
JDEC	Joint Data Exchange Center
LEU	low-enriched uranium
LOW	launch (strike) on warning
LUA	launch (strike) under attack
MIRV	multiple, independently targetable re-entry vehicle
MNEPR	multilateral nuclear and ecological programs in the Russian Federation
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organization
NFU	non-first use (of nuclear weapons)
NPT	Non-Proliferation Treaty
NSG	Nuclear Suppliers Group
NW	nuclear weapons
3 ^D NWS	third nuclear weapon states
NWS	nuclear weapon states
OPSU	onboard power supply unit
P-5	five permanent members of the UN Security Council
PAL	permissive-action-links
PR	public relations
PRC	People's Republic of China
RF	Russian Federation
RML	road-mobile launcher
RMML	rail-mobile missile launcher
RNEP	robust nuclear earth penetrator
RV	re-entry vehicle
SALT	Strategic Arms Limitation Treaty
SDM	self-contained dispensing mechanism

SIOP	single integrated operations plan
SNF	strategic nuclear forces
SLBM	submarine-launched ballistic missile
SORT	Strategic Offensive Reduction Treaty
SSBN	nuclear ballistic missile submarine
SSN	nuclear-powered attack submarine
START	Strategic Arms Reduction Treaty
STSS	Space Tracking and Surveillance System
TNW	tactical nuclear weapons
UN	United Nations
US	United States
USSR	Union of Soviet Socialist Republics
WH	(nuclear) warhead
WMD	weapon(s) of mass destruction
WWI	World War I
WWII	World War II

Table of Contents

ACKNOWLEDGEMENTS.....	2
ABOUT THE AUTHORS	2
LIST OF ACRONYMS	3
1. Introduction.....	7
2. Controversial Nuclear Deterrence.....	13
2.1. The Paradoxes of Nuclear Deterrence	16
2.2. The Rationality of Nuclear Deterrence.....	27
2.3. Mutual Deterrence — the Rule or the Exception?.....	31
2.4. What Prevented a Nuclear War?.....	35
2.5. Nuclear Deterrence and Terrorism.....	36
3. Nuclear Programs of the Big Five	40
3.1. Russian Federation.....	40
3.2. United States of America	43
3.3. Great Britain.....	49
3.4. France.....	50
3.5. People’s Republic of China (PRC)	53
4. Nuclear Deterrence and Arms Control After the Cold War	58
4.1. Self-Generating Dynamics of the Nuclear Equation	58
4.2. Is Arms Control Relevant Anymore?	59
4.3. Global Partnership and Nuclear Deadlock.....	61
4.4. Unlocking the Trap of Nuclear Deterrence.....	65
5. Transforming the US-Russian Deterrence Relationship.....	67
5.1. Verifiable Ban on Launch-On-Warning Concepts	67
5.2. Verifiable De-Alerting of Strategic Forces.....	69
5.3. Deactivation Techniques.....	71
5.4. Inspection Procedures for Different Techniques of Deactivation.....	75
5.5. Possible Phases of Reducing Readiness Level	78
6. Doing Away with Nuclear Deterrence.....	86
6.1. Integrating Early Warning and Surveillance Systems	87
6.2. Cooperative Development and Deployment of Defensive Systems.....	91
6.3. Multilateral Control and Stabilization of Nuclear Arms.....	94
7. Conclusion	98
8. Appendix 1: Assumptions in the Model Demonstrated by Figures 6, 7, and 8.....	103
9. Appendix 2: A Tentative Sequence of Practical Bilateral and Multilateral Steps in Revising Nuclear Deterrence	105

1. Introduction

The goal of the present project is to elaborate on proposals that could help promote transformation of the continuing state of mutual nuclear deterrence, foremost between the biggest nuclear powers — Russia and the United States — into a new mode of relationship based on mutual management of nuclear weapon (NW) interaction and impact on international security. Transformation of this kind, beginning in a bilateral format, will at some future point have to embrace multilateral strategic relations among the five principal nuclear powers and new nuclear weapon states (NWS), as well as some aspects of conventional forces development, deployment and employment.

Even when dramatic changes take place in the political relations between nuclear states which make them stop seeing each other as adversaries, as with Russia and the United States after the Cold War was over, their armed forces, and foremost nuclear forces, retain the powerful momentum of confrontation and competition. These forces cannot adjust to new cooperative political relations on their own without well designed and consistent political and technical efforts on both sides.

Furthermore, newly emerging adversaries, contingencies, and challenges brought about by nuclear proliferation and various conflicts of national interests, may destabilize strategic relations between the former enemies. The result can be increased tensions in their strategic policies with highly detrimental political, military, and legal arms control consequences.

For example, the US decision of 2002 to test and deploy a strategic ballistic missile defense (BMD) system, allegedly designed to defend the nation from the new countries (“rogue states”) possessing ballistic missiles, and Washington’s withdrawal from the 1972 Anti-Ballistic Missile (ABM) Treaty made Russia place increased reliance on its offensive strategic nuclear forces (SNF). Thus, Moscow extended the service lives of its MIRVed heavy intercontinental ballistic missiles (ICBMs) and even purchased a few dozen missiles from Ukraine’s stockpile. Also, as reported by President Vladimir Putin, Russia has accelerated development of a new strategic offensive weapon system fitted with a gliding and maneuvering re-entry vehicle designed to penetrate “any BMD system.” Although no specific opponent has been mentioned in accordance with the “political correctness” of post-Cold War times, this new system, for obvious reasons, may only be designed to target the United States.

Russia reacted in a similar way to a new US program of nuclear earth- penetrating warheads allegedly designed to combat underground bunkers of terrorists and “rogue states.” Apparently this development was projected on Russia’s own hardened sites. As Russia’s Defense Minister Sergei Ivanov said, “Moscow is attentively tracking the developments in the US strategic nuclear forces. In particular, we are not indifferent to the US programs of



developing mini-nuclear weapons, for each new type of weapons adds up new elements to the general picture of global stability. We are to take it into account in our military planning.”¹

Since the end of the Cold War, nuclear deterrence between Russia and the United States has been receding into the background in terms of day-to-day foreign policy and official public relations. While still retaining thousands of nuclear warheads, these countries have ceased to be global rivals and the likelihood of a deliberate war between them has come close to zero. Despite serious differences on some issues, such as Yugoslavia (1999) Iraq (2003), Russian domestic politics and elections in Ukraine (2005), NATO extension (1999 and 2003), and US activities in post-Soviet space, Moscow and Washington are no longer the leaders of the two coalitions of states and political-ideological movements that had been dividing the world for almost five decades. Their relations — in spite of continuous ups and downs, frictions, disagreements and mutual recriminations — comprise numerous and important areas of cooperation.

This cooperation has embraced various economic and political spheres, peace-keeping operations, resolution of regional conflicts, non-proliferation of weapons of mass destruction (WMD), the struggle against terrorism, joint ground and naval force exercises, programs of securing and eliminating stockpiles of nuclear and chemical weapons, safe disposal of nuclear materials and old nuclear submarines, salvage operations at sea, and joint space manned systems.

Since the early nineties, the United States and Russia have halved their strategic nuclear forces in terms of nuclear re-entry vehicles (warheads) under the Strategic Arms Reduction Treaty (START I) of 1991-94, and are expected to reduce them by another 60 percent by 2012 under the 2002 Strategic Offensive Reduction Treaty (SORT). Combined with cuts in their tactical nuclear arms, the reductions will apparently amount to at least 80 percent over the 20-year period since the early 1990s.

But there is also the other side of the coin. Unlike before, the United States, Russia and some other great powers have openly or tacitly rejected the idea of nuclear disarmament as an indispensable, even if faraway, condition of general security. What is much worse, they are dismantling the complex of central nuclear disarmament agreements to keep maximum freedom of action in technical development and plans for combat use of nuclear weapons as reflected in their official doctrines, arms programs, and military budgets.

For instance, the United States does not consider it worthwhile even to discuss the subsequent (following the Moscow Treaty of 2002) measures of strategic nuclear reductions in the foreseeable future, and has rejected the ABM Treaty and the Comprehensive Test-Ban Treaty (CTBT) of 1996. It has apparently also lost interest in the Fissile Materials Cut-Off Treaty (FMCT), as well as universal measures to enhance the effectiveness of the Non-Proliferation Treaty (NPT).

Moreover, Washington is now emphasizing the right to launch pre-emptive selective nuclear strikes, thereby promoting a doctrine of actual nuclear war-fighting, rather than of traditional nuclear deterrence. The United States' nuclear triad was fully upgraded in the 1980s and 1990s and it will last them for many decades in the future. A serious program, although not without disputes and setbacks, is now underway in the United States to develop

¹ Sergei Ivanov explains to Britons the goals and tasks of the Russia Nuclear Forces http://www.rol.ru/news/misc/news/04/07/14_010.htm (visited on December 30, 2004).

advanced nuclear weapons allegedly designed to destroy hardened bunkers and other installations of “rogue countries” and terrorists with less fall-out and collateral damage.

This example is followed by Russia, although with some reservations and a vast variety of controversial official declarations. After a rather weak resistance, Moscow has, in fact, resigned itself to United States’ current lack of interest in arms control treaties, and demonstrated that it cannot oppose it effectively at political, diplomatic, or military-technical levels. Instead, with quite scarce funding, Russia unwisely attempts to carry out a ‘balanced modernization’ of all legs of its nuclear triad, shrinks from discussing tactical nuclear weapons, and seeks to make up for its setbacks through the export of nuclear technologies and materials, as well as massive arms sales abroad.

As early as 1993, the democratic Russia officially rejected the no-first-use commitment taken by the totalitarian Soviet Union in 1982. During 2000 and 2001, Moscow reconfirmed the position, and now it says that nuclear weapons play a leading role in ensuring its national security. Moscow even admits the possibility of “a selective and limited combat use” of the strategic weapons in order to “de-escalate the aggression.”² This implies accomplishing specific tasks of conducting and terminating nuclear warfare, rather than merely of deterring aggression through the capability of inflicting “devastating retaliation,” as previously claimed.

Great Britain, France, and China are not going to undertake any limitations of their nuclear forces through arms control treaties, alleging that they lag far behind the two major nuclear powers. They are implementing planned long-term modernizations, and, in some respects, a build-up of nuclear arsenals.

Now, as never before, nuclear deterrence looks like a factor that is most likely to remain forever a part of international relations, at least until another more devastating or efficient weapon is invented. Moreover, this posture is taken not because of the colossal technical or political difficulties of achieving “general and complete nuclear disarmament,” but because of presumably considerable “inherent advantages” of nuclear weapons as means of sustaining national security and “civilizing” international relations by making nations more responsible. Obviously, the Big Five openly or tacitly treat nuclear deterrence as an indispensable and legitimate instrument of their security and military policies, while claiming that other countries have no right to acquire nuclear weapons.

Using the traditional Chinese mode of presenting intellectual subject matter (and paying respect to the newly acquired popularity of China’s doctrines and policies among some Western and Russian experts) the authors of this study build their research around a concept, that may be called “3 x 3 x 3” (or a “cubed triple”) package of assumptions, conclusions, and proposals. To be more precise this formula implies that there are:

- three major paradoxes of post-Cold War nuclear deterrence in the world;
- three principle reasons why nuclear deterrence will not serve great powers’ national security and international security in the long run; and
- three main avenues of action to transform mutual nuclear deterrence into a more constructive and reliable model of strategic relationship, while staying short of “general and complete nuclear disarmament.”

² Aktualnye zadachi razvitiia Vooruzhennykh Sil Rossiyskoi Federatsii (Urgent Tasks of the Armed Forces of the Russian Federation). October 2003. Moscow, pp. 41-42.

The latter goal, as noble as it is, at this moment seems very distant and unrealistic, because it would require immense changes in the way international politics has been conducted and conflicts have been resolved during the centuries of known history. These broader changes are clearly far beyond the reach and task of this study.

As for the “cubed triple,” the authors of this paper believe that the decade and a half which has elapsed since the end of Cold War has demonstrated at least three great paradoxes in the sphere of nuclear weapons. The first is that mutual nuclear deterrence between the United States and the Soviet Union/Russia has smoothly outlived their global rivalry and confrontation, with which it had been closely associated from 1945 to 1991, and continued in its self-perpetuating momentum even after the collapse of one of the main subjects of deterrence — the Soviet superpower. These inexorable dynamics of mutual nuclear deterrence are acquiring a growing and negative “feedback effect” on political relations between former opponents, sustaining a background mistrust and fear of the tacit evil intentions of the “strategic partner,” of inadvertent or accidental nuclear attack, of possible loss of control over nuclear weapons leading to their acquisition by rebellious groups or terrorists, of the one’s plans to gain control over the other’s NWs or to deliver a disarming strike against nuclear sites — all this in the absence of any real political ground for such horrific scenarios or actions.

The second paradox is that with the removal of the fear of escalation of any nuclear weapon use to a global catastrophe, the United States, Russia and some other NWS have become much more “easygoing” in contemplating initiation of the actual combat use of nuclear weapons to perform various specific military missions. Thus, the end of Cold War has actually lowered, not raised the nuclear threshold, to say nothing of abandoning nuclear warfare planning altogether.

The third paradox is that with the end of Cold War, instead of doing away with nuclear deterrence and eventually the nuclear weapons themselves, the focus up to now has been on doing away with the regimes of nuclear arms limitations and reductions, transparency, and confidence-building. The victims of this process (primarily at the initiative of current US policy-makers) already include the ABM Treaty, START II and the START III Framework Treaty, an agreement on delineation between strategic and tactical BMD systems, near-term entry into force of the CTBT, constructive negotiations on the FMCT, and potentially even the NPT—at least this is how it looks from the results of a disastrous NPT review conference in May 2005. The whole structure of nuclear arms control is collapsing with most dire predictable consequences through the growth of new threats and risks.

Of the three main reasons why nuclear deterrence should be superseded by some type of constructive strategic relationship between the United States (the West) and Russia, and eventually among all NWS, the first is its irrelevance to the real threats and challenges of the post-Cold War era. Nuclear deterrence remains effective against the least probable or non-existent threats: nuclear or massive conventional attacks by great powers (and their alliances) against each other. But it does not work against new, “real and present dangers”: nuclear proliferation, international terrorism, ethnic and religious conflicts, drug and arms traffic, trans-border crime, and illegal migration, etc. Whether nuclear disarmament might prevent nuclear proliferation is the major debatable point. However it is certain that nuclear deterrence cannot stop proliferation and it is quite probable that deterrence encourages further expansion of the “nuclear club.”

The second reason is that the relations involved in mutual nuclear deterrence place tangible limitations on the ability of great powers to genuinely cooperate in dealing with new threats and challenges. The degree of cooperation of the Cold War times, when most arms control treaties, including the NPT, were concluded, is not enough for the new era. Such endeavors as the cooperation of secret service and special forces, joint counter-proliferation policies (proliferation security initiative — PSI, and actual combat operations against terrorists, rogue and failed states), officially initiated joint early warning and BMD systems, much more stringent nuclear and missile export control regimes, programs of greater safety and accounting of nuclear warheads and nuclear materials (implying broad transparency and access to each other's secret sites), verifiable cessation of production of weapons grade nuclear materials in the world, ambitious Global Partnership projects — all this requires a greater magnitude of trust and cooperative efforts among partner states. And all these are impossible to imagine while the US and Russia still target thousands of nuclear warheads at each other, keep missiles on hair-trigger alert, and modernize nuclear forces to preserve robust retaliatory capabilities against each other. Besides, as mentioned above, the momentum of nuclear deterrence in combination with new threats and missions may destabilize the very strategic relations among great powers and still further undercut their ability to think and act together.

Last but not least is the problem of resource allocation. Sustaining nuclear deterrence at current levels, and at even reduced levels (down to 1700-2200 deployed warheads under SORT), is an expensive luxury, taking into account that the two biggest powers assign the bulk of these forces the mission of destroying each other, as well as serving “as a hedge against future uncertainty”. This aimless “hedge” may be relatively inexpensive for the United States, which has the largest overall defense budget in the world (about as big as the sum of all other main military states), and which has fully modernized its strategic nuclear forces (SNF) during the 1980s and 1990s, having invested in “strategic capital” that will last for decades in future. Still, even for the United States it would be easy to find a much better allocation of these resources within its defense policy or outside it.

The burden of maintaining robust nuclear deterrence is relatively heavier for Russia, which is now implementing a “balanced modernization” of all elements of its strategic triad and planning to keep up with SORT ceilings of 1700 to 2200 warheads. Having huge problems of military reform to fund and resolve, as well as being badly in need of modernization and restructuring of its conventional forces, Russia suffers a lot from the wasteful amount of money spent on its NWs. The share of expenditures for nuclear deterrent is relatively still bigger for France, Britain and China.

By maintaining mutual nuclear deterrence, the great powers are wasting huge resources, which otherwise could be used for different, more appropriate and relevant, military and security tasks and missions. Moreover, large scientific and technical intellectual resources are tied up by nuclear deterrence. Big state, business, research, and political organizations are locked into sustaining nuclear confrontation in economic, technical, and mental respects instead of addressing the more realistic and urgent needs of national and international security.

Another more general objection to nuclear deterrence is of a different nature. It is not directly linked to nuclear weapons considerations, so the authors do not include it into their “3 x 3 x 3” package. Still it is worth mentioning, if only in passing. Russian domestic economic and political evolution is inseparable from its foreign policy. It is impossible to imagine Russia evolving as an advanced market economy and democracy without good

relations with the United States and gradual economic, political and security integration with the European Union.

For the Western community, consistent cooperation with, and integration of, Russia is potentially an immense asset in providing for security in Eurasia. The benefits include gaining from Russia's science, technology, and cultural resources, coping with the unpredictable future of the supply of energy and raw materials, containing Islamic radicalism, dealing with proliferation of WMD, dealing with international terrorism, and managing relations with a growing China.

Mutual nuclear deterrence between Russia, on the one hand, and the United States, Britain and France, on the other, is a latent but real barrier, placing tangible limitations on such cooperation and integration. Of course it would be too presumptuous to claim that Russian democratic development and economic reforms directly depend on doing away with nuclear deterrence. But transforming deterrence as an important aspect of forging much closer security relations with the West would certainly be quite beneficial to Russia's domestic progress in democracy, and its economic integration with the Western community. The time frame for both avenues, if the efforts to pursue them are successful, is comparable and compatible: two to three decades.

Lastly, the triad routes for revising nuclear deterrence and eventually doing away with it is as follows. One is further reducing and de-alerting the two biggest nuclear forces of the world: Russian and American. Another is developing and employing a joint ballistic missile early warning system (BMEWS) and a missile proliferation monitoring system. And the third is developing and deploying joint BMD systems. Initially the second and third avenues would be addressed to nuclear and missile proliferation threats, but eventually — in parallel with transforming nuclear forces of both sides — they would embrace a growing part of the strategic assets of the two powers and their allies, and would transform their present mutual nuclear deterrence into a qualitatively new type of strategic relationship.

This new relationship could be called "nuclear partnership," "joint management of nuclear weapons," "cooperative nuclear weapons policies," "common nuclear security framework," "mutual nuclear insurance (assurance) strategy," or a number of other names, depending on one's tastes and semantic skills. One way or the other, the main problem is not the term, but the substance, and it is the substance which is the subject of this study.

The next section of this paper deals with the historic experience of nuclear deterrence. Presently, as applied to the policies of the Big Five, nuclear deterrence is commonly perceived as a mythological phenomena, as something naturally emerging in the past decades and serving as a guarantee against a third world war. Historical and methodological analysis does not support such an assessment, although neither does it refute it completely. In contrast to some claims made by many politicians and experts, the evolution of nuclear deterrence, along with its character and impact on the likelihood of war, looks more ambiguous. Analysis of this matter gives much food for thought and creates apprehensions concerning the past and future of nuclear deterrence in the strategic relations among the Big Five powers.

The third section addresses the basic aspects of the nuclear policies of Russia and the United States, and outlines those of Great Britain, France, and China. Their strategic concepts, forces and programs of nuclear force development are investigated, for these factors are much more accurate and reliable indicators of an actual nuclear policy than are their official political declarations, which tend to be ambiguous and controversial.

The fourth section addresses the present dynamics of nuclear deterrence, its feedback effect on political relations, and the relevance and potential new roles of arms control in post-Cold War era.

The fifth section describes possible measures of transforming US and Russian offensive nuclear forces in order, first of all, to stabilize their balance at still lower levels (in view of some destabilizing prospects), to move them away from hair-trigger alert statuses, and to unlock them from overwhelmingly targeting each other. These initial steps would lay the groundwork for abandoning mutual nuclear deterrence as the cornerstone of strategic postures of both nations.

The sixth section presents proposals for building on the initial initiatives to do away with mutual deterrence by integrating early warning systems and antimissile defense systems of the United States and Russia. Methods of integrating third nuclear weapon states into the new mode of strategic relationship are also suggested.

The conclusion contains some general observations on the dialectics and dilemmas of nuclear weapons, as well as a detailed list and tentative timeframe of technically, strategically, and politically realistic steps to be implemented in bilateral and multilateral mode to achieve the stated goal: getting free of the exhausting and deadlocked chains of nuclear deterrence.

2. Controversial Nuclear Deterrence

Despite common expectations of the late 1980s and early 1990s, nuclear weapons and concepts for their further development and combat employment (which constitute the notion of nuclear deterrence), have survived the end of the Cold War. In the beginning of the 21st century, they look like they will be around forever, even if in new military balances and new international settings.

Even when political relations between certain nations change drastically and they stop viewing each other as enemies (as did Russia and the US at the end of the Cold War), their armed forces face new opponents and new targets presented by nuclear proliferation. This may in many cases destabilize the strategic relations between the former enemies/new partners and once again lead to an increased emphasis on nuclear confrontation and competition in their strategic relations, with all of the attendant political, security, and treaty-related legal consequences.

After the end of Cold War, nuclear deterrence (at least between Russia and the US), began to be seen as only secondarily important. Although they continued to maintain thousands of nuclear warheads, they significantly reduced their nuclear forces and the programs to renovate them were largely curtailed, at least compared to the rounds of massive and fast arms races in the 1950s (bombers race), 1960s (ballistic missiles race), 1970s (MIRV race) and 1980s (counterforce MIRV and cruise missiles race). The two powers ceased being the chief opponents on the world stage and the likelihood of an intentional war between them decreased to practically zero. Confrontation was replaced by growing economic and political cooperation despite deep disagreements on a number of problems (Yugoslavia in 1999, Iraq in 2003, NATO expansion in 1997 and 2003, elections in Ukraine in 2005, and Russia's domestic politics from 2000 to 2005), There was also cooperation in securing and eliminating

stocks of nuclear and chemical weapons and nuclear materials, and in dismantling nuclear submarines.

By the warhead numbers, SNF of the US and the RF have been cut by about 50 percent since the early 1990s (in line with the START I Treaty), while by 2012 they are to be reduced by another 60 percent (SORT of 2002). Together with tactical nuclear forces, the overall reductions during the 20 years since early 1990s would amount probably to around 80 percent.

Over this time period, through nuclear proliferation, the nuclear forces of other nations may significantly grow both in absolute and relative terms (see Figure 1). Of course, the illustration below is the worst case scenario. What is more probable in the next 10 to 15 years, is “8+2” (the present NWS plus DPRK and Iran), or “8+3” (those mentioned plus Japan). Worst case scenarios, however, should not be discarded, and the final outcome may be even more worrisome than the one below. Arab states might eventually overcome their rivalries and join financial, technical, and political resources to create collectively owned and operated nuclear weapons (thus doing something NATO failed to do in the early 1960s). In the Pacific, Indonesia, Vietnam, and Australia could also join the “club.” These developments would have enormous international, political, and military consequences despite the US, Russia, and possibly China, maintaining (or in the case of China achieving) an overwhelming nuclear superiority over any other nation or coalition of nations with NWs.

Hence, it is not surprising that since the early 1990s, nuclear and missile proliferation, and later nuclear terrorism, have moved to the center of international security anxieties and policies of the United States, and in their wake (at least at a declaratory level) of other great powers.

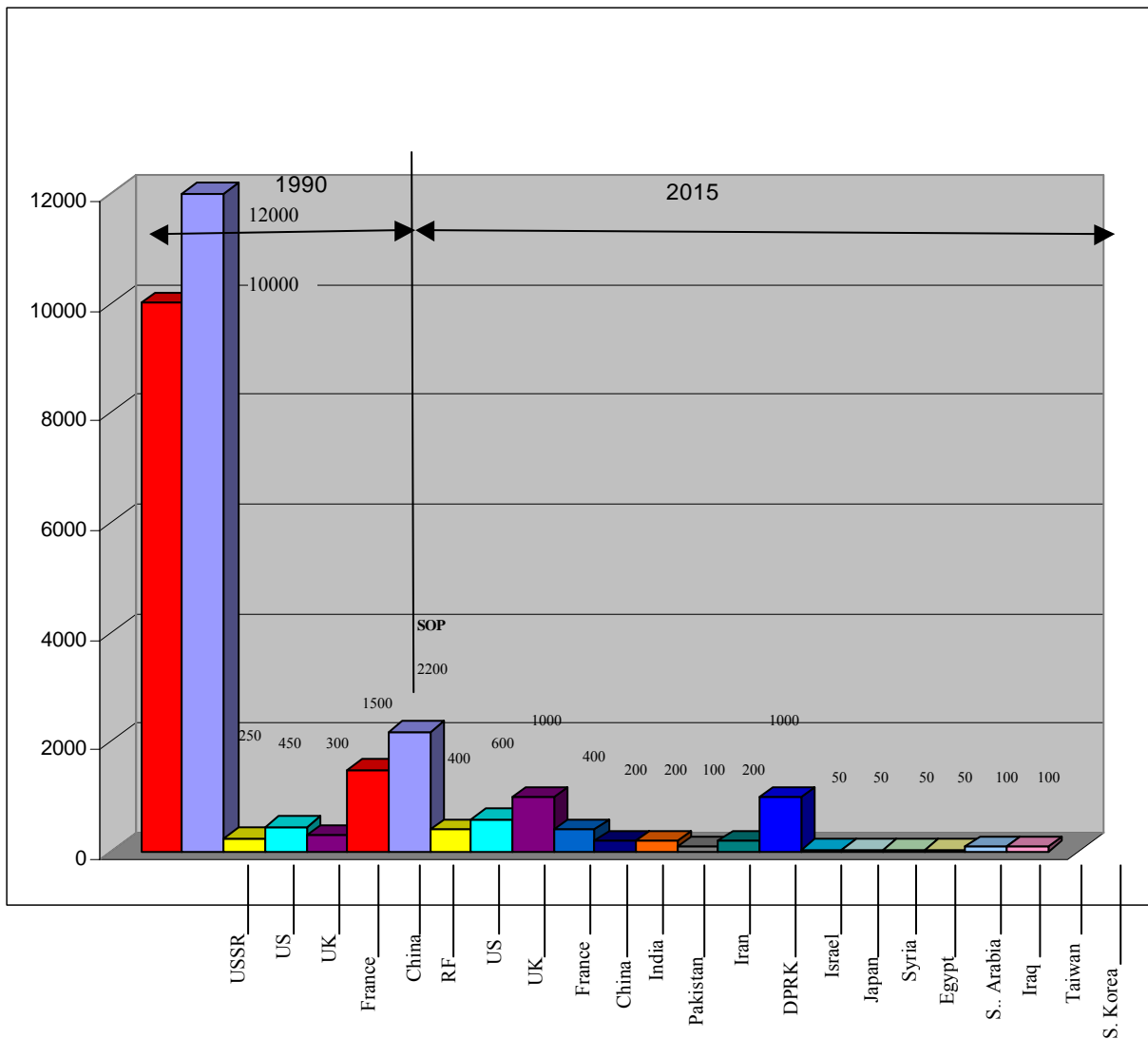


Figure 1. Nuclear proliferation in numbers of nuclear weapons states and nuclear weapons (worst case scenario)

At the same time, despite growing concerns about proliferation, attitudes towards nuclear disarmament have changed profoundly. Today, nuclear disarmament seems like a "romantic" relic of the Cold War, when its desirability was almost an article of faith, and the great powers were doing everything they could to prove themselves to be "true believers" and their opponents "sinners" in the eyes of world opinion.

In contrast to the past, the US, the RF, and other major powers have in fact abandoned the idea of nuclear disarmament as an intrinsic, if not near-term, condition for finite overall nuclear security. They are disassembling the entire complex of accords on central nuclear disarmament in order to ensure maximum freedom of action for themselves in the technical development and planning of real combat application of NW, as reflected in their official military doctrines, armament programs and budgets.

Nuclear deterrence now, as never before, appears to be a factor that will remain in international politics forever — at least until even more destructive weapons have been invented. This is not only due to the difficulty of achieving complete nuclear disarmament,

but also to the significant advantages that are supposedly inherent to nuclear weapons in providing security and "civilizing" international relations by encouraging restraint in the use of force. A historical analysis of the evolution, present state, and future prospects of nuclear deterrence — along with its various modes and practical implementation in weapon systems and operation plans — raises serious doubts about such a benign evaluation of the doctrine.

2.1. The Paradoxes of Nuclear Deterrence

As long as nuclear weapons exist, nuclear deterrence will remain the most important means for the indirect use of this type of weapon and the basic element of strategic relations with the nations that possess this kind of weapon. In an ideal world, nuclear deterrence would mean that nuclear weapons are not a means for waging war. Rather, they would be political instruments that guarantee that nuclear weapons would not actually be used in practice — neither in the context of a premeditated attack, nor as a result of the escalation of a non-nuclear conflict between nuclear powers. Now, in the sixth decade of the nuclear era, this position is commonly taken for granted. However, historically, this has not always been so, and the validity of this theory of strategic behavior has always been, and continues to be, subject to question. As for the future, it may be quite different and more controversial still.

Deterrence and war-fighting. In order for nuclear weapons to be used as an instrument of psychological pressure intended to deter an enemy, a full military political theory had to be created, which did not happen immediately. Throughout the 1940s and 1950s, atomic and hydrogen warheads deliverable as bombs dropped by aircraft and warheads in missiles were produced by the United States in huge numbers. They were generally considered to be weapons of total destruction of an enemy's armed forces and urban-industrial targets (cities), if the USSR were to attack US allies in Europe or Asia (the strategy of "massive retaliation").

If deterrence had any place in this strategy, it was as a secondary product or a political by-product, not the main goal of US military policy and forces development. Only by the end of the 1950s, following 15 years of NW stockpiling and, most importantly, after the Soviet Union had developed similar weapons and delivery systems, did the concept of deterrence occupy the center stage in American military and political strategy. Only then did the political leadership in the United States grudgingly recognize that nuclear weapons are not viable for direct military use. As President Dwight Eisenhower was the first to say at the top state level in the mid-1950s, "only a lunatic would see victory in the total destruction of a human race." In the meantime, the number of nuclear bombs reached many thousands, and land and sea-based ballistic missiles began to enter service.

Strategic theory in the United States was developed not by generals, as a rule, but by civilian specialists, including natural and social scientists⁴. The works of such theoreticians as H. Kissinger, B. Brodie, T. Shelling, A. Wohlstetter, A. Yarmolinsky, W. Panofsky, R. Bowie, J. Kistiakowsky, G. Kennan, and others, gave rise to a theory which saw nuclear weapons not simply as a more destructive means for waging war, but as a qualitatively new kind of weapon that could destroy the entire world and leave no victors. This led to the epochal conclusion that nuclear weapons must be used not for defeating an enemy in war, but for preventing such a war from happening in the first place, or, more accurately, for dissuading a potential enemy from undertaking actions that could culminate in a big war.

In the 1960s, following a number of experiments with the concepts of "counterforce" and "damage limitation," US nuclear strategy became firmly centered around the concept of "assured destruction." The chief theoretician and practitioner of this strategy was US Secretary of Defense R. McNamara and his civilian assistants, called "whiz kids" (A. Enthoven, H. York, G. Rathjens, J. Ruina, H. Brown, D. Ellsberg, and others). It presupposed maintaining a strategic arsenal capable of surviving an enemy nuclear strike in sufficient numbers to cause the enemy unacceptable damage in a counterstrike (which was set to be an immediate destruction of up to 70 percent of the industrial potential and 25 percent of the population).

No doubt, even under McNamara's rule in the Pentagon, US official doctrinal declarations were not fully reflective of the actual operational planning (SIOP and target lists). Such planning included first strike and launch-on-warning options, in addition to second-strike, and emphasized attacking military sites rather than urban-industrial targets. Still, official doctrines reflected Washington's general ideas of strategic forces development, deployment and employment criteria, as well as the logic of sufficiency, which was persuasively demonstrated by McNamara's "flat of the curve" models of assured destruction. This philosophy of sufficiency and a less biased view of the main opponent's motives for NW build-up (the so called "action-reaction" phenomenon) provided the conceptual framework for the practical strategic arms control and reductions talks and treaties of the 1970s to the 1990s, in contrast to propagandistic "talk-shows" around "general and complete nuclear disarmament" of the late 1940s to the early 1960s.

The Soviet Union arrived at similar conclusions about NW, nuclear war, and sufficiency significantly later, since no social scientists, natural scientists, or military officials could freely discuss such topics. All were expected to follow unswervingly the dogmas of Marxism-Leninism and the rather wretched official military doctrines spun by the military leadership. At the ideological level, the theory of deterrence was branded as being the handmaiden of the "aggressive policy of imperialism," against which stood the "peace-loving course of the USSR." All of this was against the background of Khrushchev's hysterical missile bluff, which also was a kind of "offensive deterrence," or, more accurately, of "spooking" the West during the Suez, Berlin, and Cuban missile crises of the 1950s through the early 1960s. At the level of military strategy, under the careful watch of the Main Political Directorate of the Soviet Army and Navy and the marshals (heroic victors of the Great Patriotic War), nuclear weapons were viewed just as much more destructive arms, fitting in the classic canons on conducting world war and achieving victory in it.

Strategic theory in the West was based on certain connections between politics and military strategy, and vice versa, which was enhanced through free discussion between political scientists and military experts, and greater openness of military information, as well as the regular movement of civilians and military personnel between government posts and the academic world.

By contrast, in the USSR there was a "watertight" separation between politics and strategy and civilian and military specialists, and complete defense secrecy. Hence, the fundamental thesis of Soviet military doctrine was: the USSR's policies are peaceful, but if war begins, the Army and the people "under the wise leadership of the CPSU," will achieve the defeat of the enemy and will be victorious. The nuclear and conventional armed forces of the country were to be ready for this victory, to which end they were to work to achieve supremacy over the enemy and be ready to undertake offensive action. The thought that these preparations in themselves could cast doubt upon "peaceful" Soviet policy and impel the

other side to undertake countermeasures was considered a monstrous heresy. Up until the late 1960s, it could cost somebody their freedom, and even up through the early 1980s could have elicited drastic "consequences" for their career.

Of course, in the 1990s, the situation in Russia changed fundamentally. Access to military information, discussion, and work movement by military and civilian specialists, all increased, as did freedom of thought and opinions. But in many respects the Soviet heritage has not died out to the present day — there is inadequate openness of information and decisions on military matters are made completely behind the scenes. Most importantly, there is a stable stereotype of reasoning that military matters are the affair of the military, and political matters are the affair of the politicians and political scientists. This has to a great extent bred the contradictions and inconsistencies in Russian foreign and military policies and the national security policies on the whole, about which more is written below.

Only at the beginning of the 1970s did the Soviet Union start to change its official position on nuclear war and weapons. With many conditions and reservations, the idea was accepted of the impossibility of gaining victory in a nuclear war because of its totally destructive consequences. Consequently, the view was adopted that nuclear weapons were good only for "deterrence against imperialist aggression." This shift was greatly facilitated by the ideological argument with China (reflecting the great political schism of the communist world), the leadership of which was openly pronouncing the possibility of achieving the victory of communism through all-out nuclear war. In 1982, Moscow took the symbolic but politically significant step towards reinforcing the strategy of deterrence by declaring that it would not be the first to use nuclear weapons.

In practice, the relationship between the two principle views on NW (as tools of deterrence or war-fighting) is quite contradictory and mute. Strategic nuclear forces are carrying out the political mission of deterrence solely through their capability to conduct military operations. They have operational plans, lists of targets to strike, and flight programs entered into the on-board computers of the ballistic missiles and cruise missiles. The operational plans, as a rule, anticipate the use of these weapons at some level of effectiveness for the pre-planned first strike, pre-emptive strike, delayed retaliatory strike, strike (launch) on warning (LOW), strike (launch) under attack (LUA). The latter two scenarios require launching upon receiving signals from satellites in space and the ballistic missile early warning system before the enemy's warheads reach their targets or as they are exploding over their targets.

In theory, the needs of pure deterrence (no war-fighting) could be met simply with realistic replicas of missiles and aircraft, while the exclusive task fighting a war (no deterrence) could be performed by nuclear arms whose existence is held in full secrecy. In reality, though, with the systems that actually exist — land-based intercontinental ballistic missiles, submarine-launched ballistic missiles (SLBM) on nuclear submarines with ballistic missiles (SSBN), heavy bombers (HB) with gravity bombs or air-launched cruise missiles (ALCM) — the line between deterrence and war-fighting has always been and remains rather vague and blurred. Hence, it is more appropriate to think instead in terms of the priorities of various kinds of operational plans or target lists, which in turn reflect priorities given either to deterrence or to actual war-fighting.

For example, weapons that have a high survivability and are targeted on industrial targets (land-based mobile ICBMs and SLBM of lower accuracy) may be considered to be objectively more suitable for a retaliatory strike, and thus serve as primary weapons of

deterrence policy. On the contrary, the forces that are more vulnerable at their launch positions and/or which are targeted mainly on the enemy's nuclear and conventional forces (ICBMs with multiple warheads launched from fixed silos and SLBMs with highly accurate high-yield warheads) objectively indicate priorities of a strategy for actually conducting war. In this case, NW are primarily assigned to deliver a disarming (counterforce) or damage-limiting strike, which may be interpreted as having the goal of winning a nuclear war. The logic here is that it is precisely the certainty of terrible losses that makes victory unattainable and nuclear war itself unthinkable, hence a strategy of avoiding or limiting damage may indicate the goal of winning nuclear war or making it less unacceptable. Theoretically it is possible to deter the enemy by a strategy of winning nuclear war, but since it is predicated on one's own first nuclear strike, it cannot logically be seen as deterrence of nuclear attack by the opponent, but rather as deterrence against other actions that will be discussed below.

In the USSR at the end of the 1970s and early 1980s, the SNF corresponded more closely to the model of forces for war-fighting (about 70 percent of warheads were on ICBMs with MIRVs based in silos), although at the political level, deterrence was placed at the forefront. From the 1990s on through the foreseeable future in the RF, the SNF will correspond predominantly to the deterrence (second strike) model. Their first strike (counterforce) capability will be degrading, although their survivability will also deteriorate, if their present modernization program is not corrected or new arms control agreements are not achieved. Paradoxically, at the declaratory level since 1993, the mission of Russian NW openly proclaims their possible employment in a first strike, which is associated much more with war-fighting, rather than deterrence.

It is interesting to note that in the 1950s and 1960s, Soviet forces also corresponded objectively to the deterrence model in their capabilities for lack of any ability to deliver a disarming strike against the United States. In light of dogmatic ideology and the complete closure of military policy to non-departmental criticism, however, their doctrinal goals were to "defeat the enemy decisively" and to "win in global nuclear war." At the same time, first use of Soviet nuclear forces could be motivated by their high vulnerability at launch positions and poor effectiveness of C³I and early warning systems, which left little hope that they could survive a US nuclear preemption, at least until mid-1960s when sufficient number of SSBNs and silo-based ICBMs were deployed. (At that time and until the late 1970s, hardened silos provided high survivability against ballistic missiles with then relatively poor accuracy. Much higher accuracy and yield of MIRV warheads has made silos vulnerable since the early 1980s.)

The United States' NW were openly intended for victory over the USSR and China through the total destruction of their military potential and administrative and industrial centers, which in the 1940s and 1950s was based on the fact that continental United States (CONUS) territory was out of range of the Soviet Union's NW. After losing this geographic advantage during the first half of the 1960s, this war-fighting strategy relied upon the supremacy of the American SNF many times over (which was seen as a basis of counterforce or damage-limitation strikes), and on forward-based nuclear forces in Eurasia capable of enhancing a disarming strike on the strategic forces of the Soviet Union. Only after the mid-1960s, with the growing numbers and survivability of Soviet SNF, and in particular through the political experience of the 1962 Cuban missile crisis (which revealed the dubious practical applicability of nuclear war-fighting plans), did the relative concepts of "conducting war" and "detering war" switch places in Washington's military policy, seriously and for the long term, in favor of deterrence.

In the 1970s and 1980s, and especially the 1990s, despite the increasing accuracy, selectivity, and flexibility in use of the SNF (i.e., expanding their capabilities in actually conducting war), the fact that the strategic balance between the USSR and the US had evened out and retaliatory capabilities had become more assured worked to increase the emphasis on deterrence. Negotiations on SALT/START were progressing and political relations were improving, which also helped achieve this end. Subsequently, in the 1990s even deterrence was removed to the background in the two powers' political relations, which were reoriented towards cooperation and partnership.

In the foreseeable future, the relationship between deterring and conducting war in Russian military policy may become even more ambivalent. With the maintenance of generally good political relations between the RF and the US, both the doctrine of mutual deterrence and the military and technical reality standing behind such deterrence would be of very little importance. But if political tensions rise, the leadership in Russia might be faced with a very unpleasant reality.

The decisions made in 2000 and 2001 to transfer resources to the conventional forces from the SNF brought little in the way of tangible benefits to the former, while deeply hampering the latter. As a result, in 10 to 15 years, over 90 percent of the Russian SNF could be exceedingly vulnerable to a salvo of less than a hundred "Trident-2" SLBMs which corresponds to only 3 to 4 (of 14) American strategic submarines. By contrast, the United States will have 80 percent of its nuclear forces (in numbers of warheads) that are not vulnerable and simultaneously will have a high disarming counterforce strike capability against Russian SNF. This all falls within the US-Russian treaty of 2002 on the reduction of strategic offensive weapons to 1700-2200 nuclear warheads.

In contrast with the American SNF, the SNF of Russia and their C³I system will not be able to survive a first strike by the United States and cause an adequate amount of damage in retaliation. The only possibility for them to cause such damage would be by carrying out a preemptive strike or LOW strike in response. In the former case, Russia would suffer destruction through nuclear retaliation by the United States and its allies. In the latter, given the unreliability of the Russian Missile Attack Early Warning System (due to degradation of the space systems and location of half of the radar stations outside of the RF within the territory of the CIS), the risk of accidental nuclear conflict will be exceptionally high due to technical breakdowns in warning systems or errors in the evaluation of information when there is absolutely no time to spare in deciding to launch missiles — with approximately equal amounts of resulting damage. This will be all the more dangerous under a multi-polar nuclear balance and an expanding number of nations possessing ballistic missiles and WMD launchers near Russian territory (See Figure 2).

It would be possible not to worry about these apocalyptic scenarios because of the nearly unthinkable nature of a deliberate nuclear war between the RF and the US. If, however, it is accepted that deterrence does in fact play a role in preventing war and insuring security and that it will stay as a basis of US-Russian strategic relationship for a long time, then the technical and military state of deterrence is also of serious significance. Otherwise, it would have to be concluded that mutual deterrence is simply irrelevant for security in US-Russian strategic relations, despite relatively big resources dedicated to its maintenance (especially by Russia), and the absence of any alternative mode of nuclear postures and strategic relations between the two nations. The latter would be quite a schizophrenic way of thinking about such important, explosive, and expensive subject as nuclear weapons.

Historically, such a mentality may not be unprecedented, but it should clearly not be desirable after the end of Cold War and in an era of partnership and cooperation.

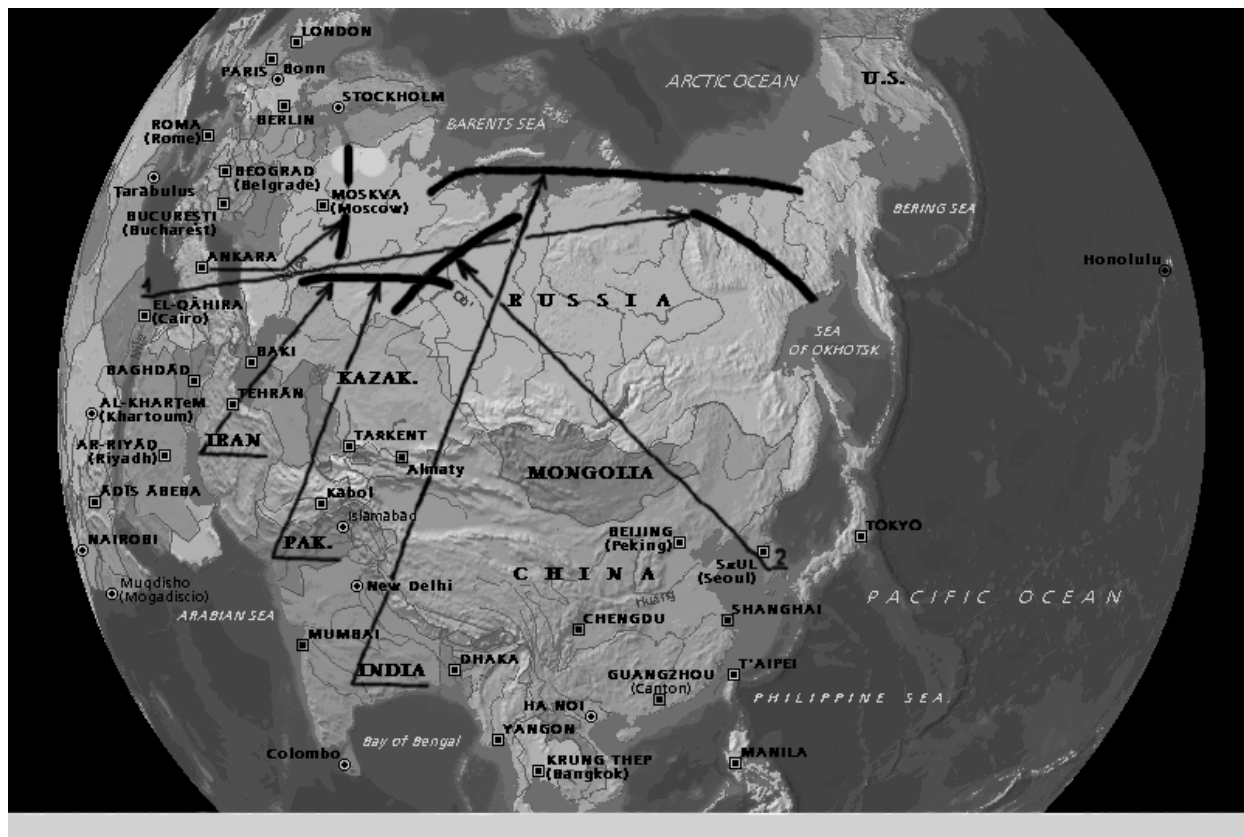


Figure 2. The potential threats to Russia caused by the proliferation of weapons of mass destruction and missile technology (Israel in the drawing is shown with the number 1, and the DPRK is shown with the number 2)

As for the present moment, factors of single order must not be viewed in different planes. The decision by the Russian leadership to extend the service lives of the heavy SS-18 ICBMs (RT-36M) and purchase SS-19 ICBMs (type UR-100N UTTKh) from Ukraine, as noted by President Putin at the General Staff conference on October 2, 2003, in order to maintain the numerical levels of SNF and their capability to defeat "any BMD system," was intended exclusively to deter the United States (albeit with obsolete systems that were already vulnerable to a hypothetical strike by American "Peacekeeper" and "Trident-2" missiles as far back as the late 1980s). It is too early to speculate on the cost-effectiveness of the new strategic system with gliding and maneuvering warheads, development of which the Russian president declared in early 2004, but it is clear that this system would also be assigned the mission of deterring the United States despite its BMD deployment program. Likewise, the development of the expensive new SSBN/SLBM system — Borey class 955 (Yuriy Dolgorukiy type) boomer, equipped with the Bulava-30² missile system for deployment in northern waters — has no other purpose than to bolster deterrence against the United States and NATO (even more so because of its location).

The United States takes the task of maintaining a robust deterrence posture no less seriously in strategic and technical terms, even though it is no longer overtly declared in official nuclear posture and policy statements. This deterrence posture has multiple

operational options and a huge “margin of safety,” and is overwhelmingly directed at Russia. American reluctance to reduce SNF below 1700-2200 warheads, its insistence on maintaining a two-ocean Trident SSBN navy (to cover thoroughly both the European part of Russia, as well as China and Russian Siberia), its relocation of counterforce W-87 warheads from dismantled MX Peacekeeper missiles to Minuteman-3 ICBMs, its retention of several hundred tactical nuclear bombs in Europe, and other choices are all indicative of such strategic policy.

Since the maintenance of a deterrent capability is considered so important by both sides, the fact must not be taken too lightly that the Russian SNF planned for the next 10 to 15 years will be extremely vulnerable and incapable of surviving a first strike to launch a retaliatory strike. Moreover, continued reliance on the concept of a launch-on-warning will pose a greater danger of a nuclear war by accident, miscalculation, or a third party provocation.

This is the first paradox of nuclear deterrence and it lies in the classic and up to now the most stable or “pure” Russian-American model of this kind of strategic relationship. Deterrence is meaningless without the capability of the strategic forces to conduct actual combat operations. At the same time, preserving such a capability may oblige Russia in the foreseeable future to increasingly rely on first-strike or launch-on-warning concepts that are prone to a catastrophic collapse of deterrence leading to inadvertent nuclear war. In an acute crisis, Russian first strike/LOW strategic posture might make it look as though a nuclear exchange was unavoidable, and thus could provoke the United States to capitalize on its huge nuclear superiority by implementing a preemptive strike. Knowing this, Russia, in turn, might be still more trigger-happy. Under such conditions, political miscalculation, technical failure, a provocative third party’s missile attack or a terrorist nuclear explosion in either (or both) capitals might trigger a nuclear holocaust, a disaster that the two nations managed to avoid during four decades of the Cold War.

Thus, even the central deterrence between the RF and the US may contain the seeds of its own collapse. This is true under Moscow's current strategic modernization program. It is also true with Washington’s lack of desire to continue nuclear arms reduction and limitation talks, to say nothing of jointly elaborating a new policy designed to supersede mutual nuclear deterrence by an alternative kind of strategic relationship, immune to traditional factors of instability.

Tactical nuclear weapons. The second problem arises because, even more than with the strategic weapons, the “grey zone” of ambiguity between deterrence and nuclear war-fighting affects operational-tactical and tactical nuclear weapons (TNW), sometimes also called sub-strategic nuclear arms. Tactical nuclear weapons have traditionally been used mainly on dual-use delivery systems: strike aircraft; mid-range bombers; artillery and surface-to-surface rockets for ground forces; demolition munitions (nuclear mines); anti-aircraft air-to-surface missiles and air defense fighter-interceptors; naval rockets and torpedoes of various types on submarines and surface ships; and carrier-based and land-based naval aviation. At the peak of the Cold War, the United States had up to 20,000 TNW, and the USSR had over 30,000 TNW warheads. Even now, based on available information, the United States and Russia continue to maintain thousands of NW of this class, while 200-400 US tactical nuclear bombs remain stored in Western Europe.

Although in the broadest sense the presence of TNW in the conventional Western and USSR/Russian forces may be said to comprise part of nuclear deterrence, in practice these

weapons have always been seen primarily as arms for fighting war, at least much more so than the strategic weapons. In light of their destructive power, TNW were viewed as helping to achieve a quicker success in the theater of military operations or to compensate for enemy superiority in conventional forces. Such views affected the policies for producing, perfecting, storing, deploying, and using tactical nuclear weapons, as well as the principles for authorizing their employment and guarding against their unauthorized use, which are much less stringent than for SNF.

In the area of TNW, it is nearly impossible to draw a line between deterring and waging war. At the same time, however, the very differentiation of NW into strategic and tactical categories is itself very contextual. For the USSR, the American TNW, in the form of the forward-based nuclear systems (FBS) in Eurasia, were always equated to strategic weapons, since they could reach deep into the territory of the USSR if fired from forward bases and from surrounding seas. For Western Europe and the Soviet neighbors in Asia, the USSR's TNW were equivalent to strategic weapons in terms of range and destructive power.

Since tactical nuclear weapons are much more closely intermixed with conventional forces both technically and operationally than SNF, they can be quickly integrated into conventional warfare, either as munitions on dual-purpose delivery systems, or as targets of conventional strikes (whether intentional or not).

As long as TNW remain an element of US and Russian nuclear arsenals and operational plans, the line between nuclear deterrence and war-fighting, or between nuclear first and second strikes, or even between conventional and nuclear war will remain blurred. This will add an additional factor of instability into the US-Russian nuclear deterrence relationship.


“Enhanced and extended deterrence.” The third general problem of deterrence lies in the fact that there is an ambiguous meaning attached to the very core of the concept. In common usage, deterrence implies that nuclear weapons will deter a potential opponent from implementing a nuclear strike. This function is called "minimal" or "finite deterrence," and logically implies the ability and probability of a second strike by a small and relatively invulnerable force on a limited number of the aggressor's most valuable administrative and industrial targets.

The forces and the concepts of "minimal deterrence," in whatever terms it has been or is formulated by the countries at the official level, in fact were maintained by the Soviet Union against the United States until the mid-1960s. They were maintained by Great Britain, France and Israel against the USSR until the end of the 1980s (after which the nuclear firepower of the first two grew sharply following deployment of MIRVed missiles), as well as by China with respect to the Soviet Union until the early-1990s, and against the United States in the near future.

Nuclear weapons were, however, frequently intended not only to deter enemy nuclear attack, but also to deter other undesirable actions, foremost being aggression with the use of other types of WMD or conventional forces only, as well as other actions that could lead to an armed conflict. This is called "enhanced deterrence." This version of deterrence is much more widely used than is usually assumed, while what is thought of as deterrence in general is only one of its types — namely "minimal deterrence." When thinking of broader notions of deterrence, it is not always understood that these notions usually imply the first use of nuclear weapons — i.e. the initiation of a nuclear war.

Naturally, each side contemplating nuclear first use to deter conventional aggression assumes that it would be acting in a purely defensive and legitimate way, and that all the responsibility for nuclear employment would lie with the aggressor. In reality, however, an armed conflict or war does not always have a clearly defined, broadly agreed aggressor and victim. Examples of this from the Cold War were the wars of the 1950s through the 1980s in Korea, Indochina, Afghanistan; the three wars in the Middle East; and following the Cold War, the wars in Yugoslavia in 1999 and in Iraq in 2003. Characteristically, in none of these instances did those on either side of the conflict recognize themselves as aggressor. Neither the UN nor the international community was unanimous on this point either. Theoretically, both sides in any of the above conflicts, if being defeated and possessing nuclear weapons, could have considered themselves justified in using those weapons first to achieve "enhanced deterrence."

Since the end of WWII, the US relied upon "enhanced deterrence" to prevent an attack by the superior conventional armies of the USSR and Warsaw Pact against its allies in NATO, and in Asia to prevent an attack by the USSR and/or China and DPRK on US allies in the Western Pacific. Washington has never abandoned this kind of deterrence and has always implied its willingness to use NW first in extraordinary circumstances. In recent times, this has applied to the "rogue nations" if they use chemical or bacteriological weapons against the US, or are seen as having nuclear capability. This is allegedly the main justification of the plans to develop new types of nuclear warheads capable of destroying command bunkers and WMD storage facilities.

Russian military doctrine has also long included a NW first-strike policy. This was rescinded in 1982, but again openly revived in 1993, and confirmed in a clarified form in 2000. "Enhanced deterrence" for Moscow's part unambiguously assumes a first use of nuclear weapons "in response to large-scale aggression by conventional weapons in situations deemed critical to the national security of the RF."³ It is clear that Russia is now viewing deterrence specifically in its enhanced version, in light of how increasingly far behind NATO's conventional forces Russia  now — and will be behind China in the foreseeable future. This conception might be theoretically justified by the disparity in conventional forces, but it could work in practice only if it were reinforced not just by a declared willingness to use nuclear weapons first, but also by the corresponding material balance of nuclear forces. Put simply, it requires superiority over the other side both in TNW and SNF, so that an enemy wouldn't have the potential at either level to preemptively disarm Russia, or to inflict on it unacceptable damage in retaliation.

For this reason, the Russian strategy is hardly credible with respect to NATO. After all, with a growing quantitative and qualitative supremacy in conventional forces, NATO could rapidly create superiority in TNW by bringing American weapons into the theater. Meanwhile, in SNF, US forces (especially together with the English and French) will for the next 10 to 15 years continue to expand their superiority over Russia, including in their capability to deliver a disarming strike against the Russian tactical and strategic nuclear forces.

It is true that deterrence in the Western direction may not cause concern, since deliberate conventional war and nuclear war between Russia and the European Union/NATO are unthinkable. The economic and political interests of the democratic countries of Western Europe, and the unacceptability to their communities of even minor losses, will serve as the

³ Military doctrine of the Russian Federation// Nezavisimaya gazeta.-/ 74 of 22 April 2000.

primary guarantee against attacking the RF or its allies. But if, hypothetically, in place of the Western European powers there were an aggressive authoritarian power (or union) with the same military capabilities, then the Russian strategy of "enhanced deterrence" in its current mode would be put to a severe test.

In this sense, the strategic situation along the eastern borders of the RF cannot but cause concern. At present, both the political relations between Russia and China and the balance of military forces between them are satisfactory from the standpoint of security. But in 10 to 15 years, the relations could worsen, and there might be grounds for a conflict of interest between the two countries, while the balance of forces, both conventional and nuclear, including the strategic forces, could significantly shift to the detriment of the RF. This threatens to destroy its concept of "enhanced deterrence" in its eastern azimuth.

Within Russia, the current strategy is commonly accepted and supported simply because there is no systematic open discussion of such matters in the country. There is also no broadly knowledgeable parliament, mass media, or public organizations to serve as a forum. The military and political leadership may deign to ignore independent criticism coming from individual experts and make all decisions behind the scenes.

Other nations have also endorsed the strategy of "enhanced deterrence," as did Great Britain and France in declaring their nuclear forces to be for deterring both a nuclear strike by the USSR and an attack by conventional Warsaw Pact forces. Their nuclear potential, however, as is now the case with Russia and NATO, did not objectively provide the basis for an "enhanced deterrence" of the Soviet Union. But in contrast to the current position of the RF, they had a strong protector and defender in the United States, under whose huge "nuclear umbrella" these two countries could afford all their strategic experiments. In the coming 10 to 15 years, the nuclear forces of Great Britain and France (with full complements of warheads for their SLBMs with MIRV) will become comparable to the Russian SNF for the first time in history, while the number of warheads on highly survivable missiles capable of mounting counter-force strikes will for the first time exceed them even without counting US systems.

Israel has used a variation of this same strategy by using its undeclared NW to deter attack by the conventional armies of Arab nations. If a critical situation arises, Israel will make a first nuclear strike against them. This strategy has been, and continues to be, quite credible, since the Arab countries and their Islamic brethren don't have their own NW yet. Israel's strategy explains theist attack on the nuclear reactor in Iraq in 1982 and its alarm at the Iranian nuclear programs. The development of NW by Pakistan in 1998 was undoubtedly a watershed event that threatened Israel by opening the way to an Islamic atom bomb.

The objective geostrategic difference between the USSR/Russia and the United States has shaped their use of this strategic notion. Since United States' geographic location and its sea power made a large scale conventional attack on it virtually impossible, the option of the first use of NW in response to a conventional aggression was only associated with defense of its allies in Europe and the Far East. Hence, for the United States, a more common term to define this concept is so-called "extended deterrence." This model anticipates the granting of nuclear guarantees for the security of allied nations, meaning the promise to use NW in response to an attack on the allies by either conventional or nuclear weapons of a common enemy.

For the Soviet Union, and still more for Russia, it has been different. Moscow had to take into account the contingency of being directly attacked by conventional forces of the enemy in the west or in the east, in addition to its commitments to allies. True, for the USSR

this was not too scary in view of its (and its alliance's) conventional superiority over NATO and China. For Russia, which is becoming ever more inferior in conventional forces, and which has also lost most of its allies while facing NATO and China right on its borders, the concept of "enhanced deterrence" occupies the central place in doctrine and strategy beside the concept of "extended deterrence."

For half a century, the strategy of "extended deterrence" was the basis of allied relations in NATO and the Warsaw Pact. It continues by default to the present day in NATO, even though the nations of Western Europe are no longer threatened by any attack from the East. Moreover, NATO has a growing supremacy over Russia in conventional forces and in the near future will gain supremacy in nuclear weapons as well.

In the meantime, this deterrence model assumes that claims will be even further-ranging and the demands on its material basis will be even greater, which determines whether the strategy is a realistic instrument of policy and war, or just an empty rhetorical bluff. It is clear that the concept of "extended deterrence" also provides for the first use of nuclear weapons and thus the initiation of a nuclear war. But in contrast to "enhanced deterrence," these actions (prone to the most catastrophic consequences, especially if the enemy also has NW) must be undertaken, not in the name of protecting the vitally important interests of one's own country, but for the sake of another nation.

In order to have credibility, such a strategy must rely either on a nuclear weapons monopoly or an overwhelming nuclear superiority over the opponent. In 1949, the US gave guarantees to NATO that were based on its nuclear monopoly. But in 1952, Great Britain acquired its own NW in order to avoid full reliance on the willingness of the US to keep its promises in case of a major war in Europe. After the creation of Soviet ICBMs, France also began to doubt the reliability of US nuclear guarantees, which added to its determination to acquire its own NW (in 1960), and in 1967, France left the NATO military organization. Thus, mistrust was expressed for US promises in case of an outbreak of war, to use the vernacular of the day, "to trade New York for Paris." As strategic parity developed between the USSR and the US, American "extended deterrence" under NATO became even more dubious and caused deepening conflicts within the alliance (i.e. the crises of the early 1980s, precipitated by US deployment of medium range missiles in Europe). But then the Cold War ended unexpectedly, the Warsaw Pact and the USSR collapsed, and the question of the reliability of American nuclear commitments was removed from the NATO agenda.

Russia has made promises such as these quite easily to its partners in the Collective Security Treaty (CST signed in Tashkent in 1992). This easygoing attitude might exist because a direct attack on Russian allies from abroad is not considered very likely. It might also be that "extended deterrence" isn't given too serious a meaning, or that the underlying strategic sense of such guarantees is simply not understood by present Russian political leadership and military commanders. In any case, while Russia's allies under the CST are not threatened by aggression from a nuclear power (or union), the guarantees of "extended deterrence" look quite nice, like an unnecessary insurance bonus. But if the situation were to change in the future, Russian leadership may face a dramatic dilemma and an agonizing decision to support the creditability of its promise to "trade Moscow for Minsk or Yerevan" (not to mention Dushanbe, Bishkek or Alma-Ata).

Thus, yet another factor of great ambiguity in nuclear deterrence in the modern world is the fact that, in contrast to how it has been widely presented, in only a small number of cases and during limited periods of time has deterrence been perceived and practiced in the

narrow meaning of the concept — i.e. as a strategy for preventing nuclear war. Much more frequently, deterrence has been given and continues to be given a broader strategic meaning that provides for the first use of nuclear weapons. This is yet another inherent contradiction in nuclear deterrence: it commonly assumes the willingness to initiate a nuclear war.

Fortunately, over the past half-century, this apocalyptic paradox has mostly remained in the domain of theory. But in the future, proliferation of NW and the ever more multipolar nuclear relationships between states, threaten to place it in the range of the practical.

2.2. The Rationality of Nuclear Deterrence

The idea of nuclear deterrence has so engrained itself into the blood and fiber of military and political relations between nations over the past half-century that it is universally accepted to be completely rational and lacking in alternatives. Without a doubt, nuclear deterrence is less irrational than the doctrine of actually conducting nuclear war, especially between nuclear powers. However, if judged from other than a strictly military and strategic angle, for example from the social and political point of view, then the rationality of deterrence looks much more dubious.

Even the more defensive (in the sense of excluding first strike) and stabilizing variant of this strategy — "minimal deterrence" — is quite paradoxical. After all, what is being suggested is striking back to retaliate for a nuclear attack by destroying tens of millions of civilians in the other country. This act of revenge, in the first place, is irrational, since the slaughter of the population of the other country will not return the lives of the citizens of the attacked country nor will it rebuild the destroyed materials. More than that, in contrast with the strategic bombing of Germany and Japan in WWII, as controversial as they were, a nuclear strike against civilians will in no way affect the ability of the enemy to continue the war, which will depend entirely on its surviving nuclear weapons and the functioning of its command-control system.

In the second place, if in the pre-nuclear age it used to be impossible to start or conduct a war without the support of at least a portion of the population in the aggressor's country, a nuclear war can be started without any agreement on the part of the nation, simply through upper leadership issuing an order to the crews of the missile launch control centers (and in the newest command-control systems foregoing even them and connecting directly with the launchers). The people, who are the main targets in a nuclear retaliation, have no direct responsibility for the aggressive decision made by the upper leadership in the government. This is especially true in authoritarian and totalitarian regimes, where the people not only do not elect their own leaders, but may not even be seen by the latter as being of the greatest value. This attitude towards the population was demonstrated, for example, by the leadership of the People's Republic of China (PRC), when in the 1950s and 1960s it proclaimed total war as the path to "final victory" over imperialism.

At the end of the 1970s, suspecting the Soviet leaders of the same attitude towards their people, US President J. Carter in his Presidential Directive PD-59 asserted a so-called "countervailing strategy," which called for strikes against what the Soviet leaders were thought to value above all else — their own lives. This meant the destruction of the hardened underground bunkers and nuclear-proof shelters, as well as other sites where the party and government leaders could take refuge.¹⁰ It goes without saying that this concept evoked an

extremely painful reaction in the USSR, where they called it the "strategy of decapitating strikes" and evaluated it as the latest scandalously aggressive step in the American strategy of launching a disarming strike against the USSR. This fear led to enhanced Soviet reliance on launch-on-warning strategy, thus increasing the danger to both sides.

Other attempts to make nuclear deterrence more rational also, as a rule, had the opposite effect. For example, the improved ability of SNF to launch counterforce strikes against the aggressor's reserve strategic forces, which may not have been used during its first strike, would definitely be seen as an enhancement of the potential for making not a second, but a disarming first strike. And not without justification; the missile launch silos, submarine and bomber bases, and deployment areas of the land-based mobile ICBM's are all the very targets that need to be taken out in the first strike in order to avoid retaliation or reduce the damage from it. The response to such strategic experiments, aside from increasing the survivability of SNF, has generally been to give greater priority to the concept and the technical systems for LOW concepts and to plan for the use of more massive numbers of weapons.

Hence, the principal attribute of nuclear deterrence is that while being generally accepted by politicians and public in peacetime, it could suddenly look horrible in a crisis situation, when it is really supposed to do the job of preventing war. It is then that its practical implications come to the forefront of decision-makers' deliberations. Since deterrence may fail in many ways (crisis escalation, technical accident, miscalculation of the military, etc.), the decision to carry out the threat on which deterrence is based seems to be the ultimate irrationality. As a rule, efforts to enhance the credibility of deterrence by improving its applicability (through selective targeting and reduction of the collateral damage effects of the NW, and through plans for the use of limited numbers of warheads, etc.) are usually perceived by the other side as indicating an increasingly aggressive stance in nuclear strategy towards a first strike capability to achieve victory in nuclear war.

The fundamental paradox of nuclear deterrence lies in the fact that the deterrence posture that is the best in making nuclear war unthinkable (massive strikes, maximum damage, high speed and certainty of retribution — up to a fully automatic nuclear counterattack, called "doomsday machine" in the US and "dead hand" in the USSR) would be the worst option if deterrence failed and NW were actually used. But at the same time, attempts to "build into" the forces any "more rational" options for the use of NW in case deterrence fails tend unavoidably to lower the "nuclear threshold" and weaken deterrence itself.

Finally, there is another, perhaps the most important, factor in the paradoxical nature of deterrence. Considering the catastrophic consequences of its use, especially its use in error, no other class of weapon needs to be effectively controlled by the political leadership to such a great extent. The paradox is that at the same time, it is more difficult to ensure real political control over the use of nuclear weapons than with any other kind of weapon. This is caused by the technical characteristics of NW, in particular the SNF, which could require the actions of thousands of people at all levels operating the most technically complex systems to be synchronized to the minute. This synchronization must occur under intense pressure and in a situation when the systems of command and control, early warning systems and weapons themselves, are targeted by the enemy's nuclear forces and may be hit at any moment. All of the following must be considered: the flight time of strategic missiles (maximum of 30 minutes for ICBMs, minimum of around 10 minutes for SLBMs); the time needed to receive, verify and evaluate the signals of missile attack early warning systems; the time to issue the

order for subordinates to launch missiles; and the time to prepare the launch, fire a missile from its launch silo, and have it get away from the probable attack zone. In the best case scenario, the top leadership has only several minutes to make a political decision. In the worst case scenario, it has "negative time," — i.e. the flight time of the enemy's missiles is less than the time it takes to receive and evaluate the attack information, plus the time needed to launch a missile counterstrike of one's own (see Figures 3 and 4).

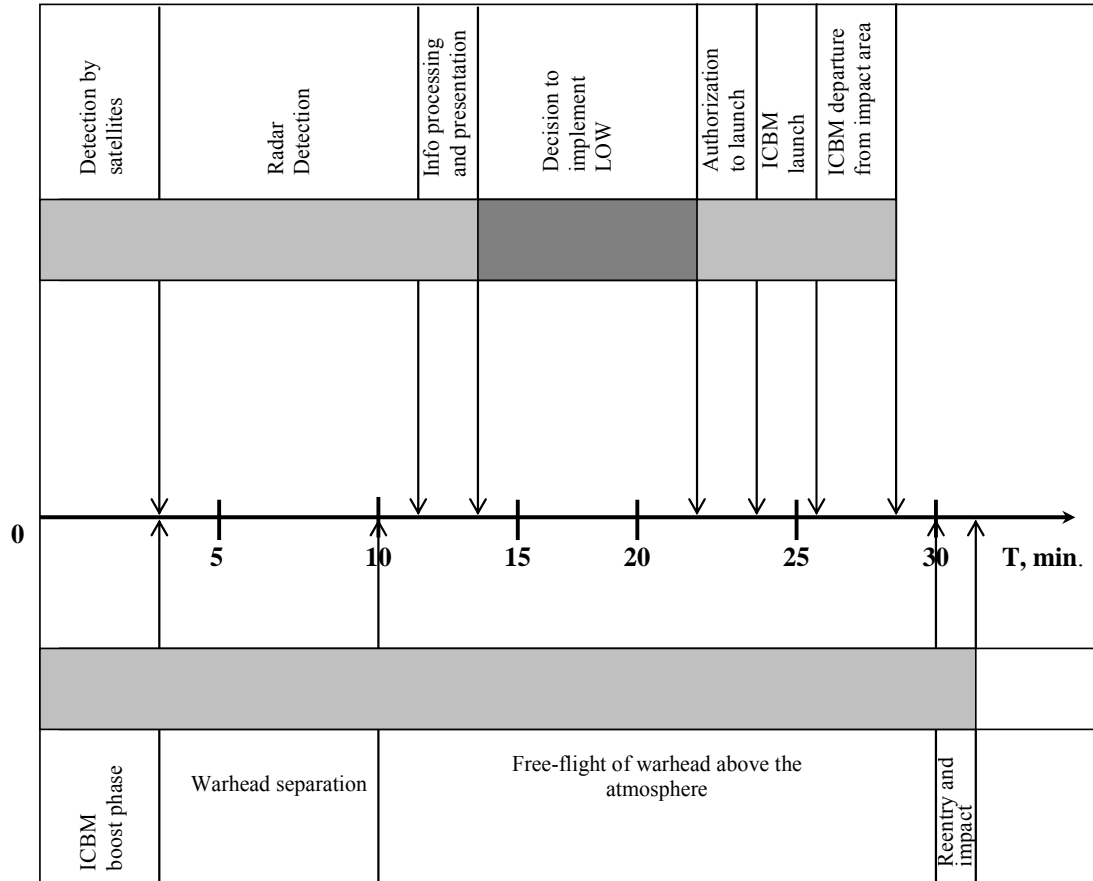


Figure 3. Time Scale of Command-Control and Missile Attack Warning System Functioning (the case of ICBMs attack)

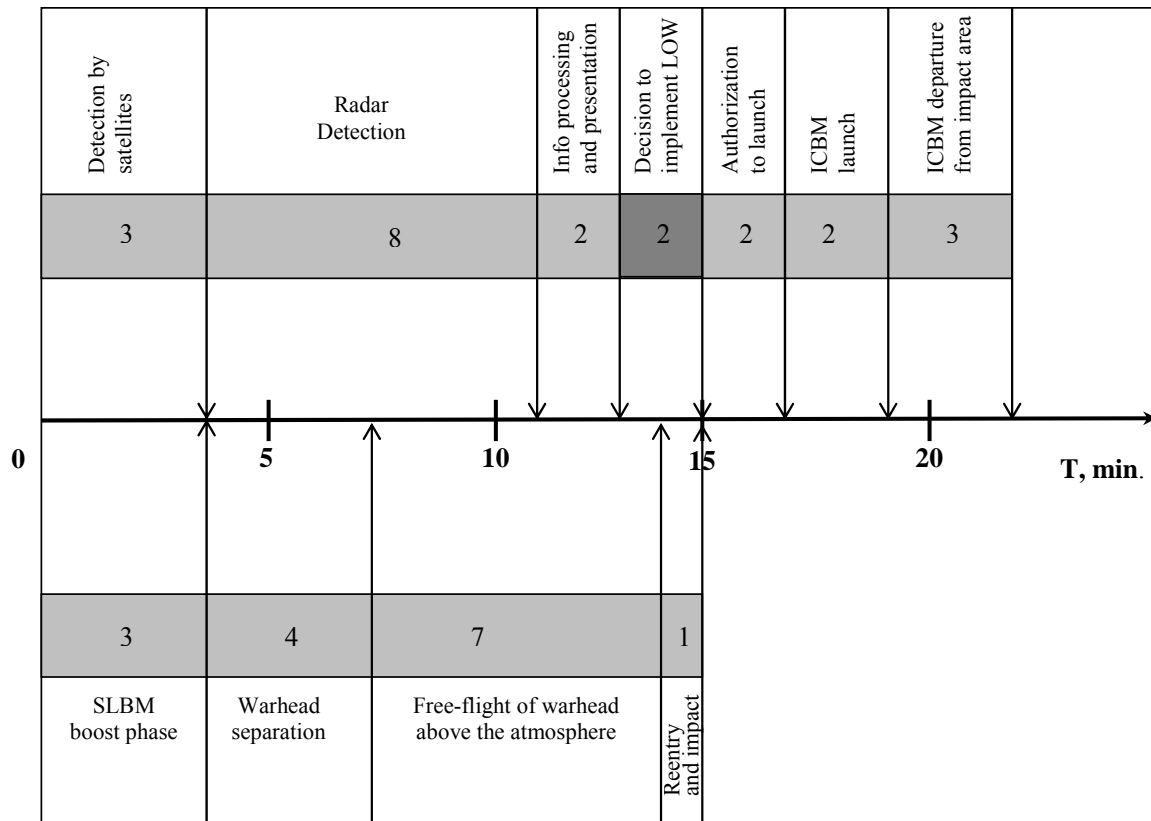


Figure 4. Time Scale of Command-Control and Missile Attack Warning System Functioning (the case of a SLBMs attack)

Moreover, at such time the leadership will act on the basis of reports from subordinates and their evaluations of the situation, and will not be able to re-check this information, or depart from already established operational plans. Otherwise, leadership would have to face the risk that retaliatory strike would not be implemented at all. In essence, the role of leader is relegated to a formality, and when the time comes, a leader must act like a monkey trained on a machine to pull a lever when a light shines to get a banana. This is all particularly true in the context of concepts of a launch-on-warning or launch-under-attack and will be greatly aggravated by the growth of the number of countries possessing nuclear missiles and with the broadening of the scope of potential attack azimuths.

During peacetime, government leaders, to judge from the numerous ridiculous statements they make on the subject, never get around to thoroughly studying the apparently surrealistic scenarios of, and plans for, nuclear war. There is seldom access for state leaders to independent critical expertise that could disabuse them of many of the absurdities and dangers in nuclear military planning (and those experts usually do not possess top secret information on the subject). And yet, in the course of routine operational planning, the military is always making the guarantee of launching NW under the worst circumstances (called “positive control”) its top priority, instead of guarding against nuclear war breaking out by mistake, unauthorized actions, false signals, or technical breakdown (“negative control”). Numerous organizational and technical trade-offs between positive and negative control are usually resolved in favor of the former— implementing the assigned mission is always the military’s top priority.

In a real crisis situation, if the use of NW is no longer an abstraction, but a reality, there will be neither the possibility nor the time to review the technical characteristics of various systems or the operational plans for using nuclear weapons. Thus, the government leadership will be held hostage to secret departmental decisions that were closed to any criticism and adopted many years ago in different circumstances and based on completely inappropriate considerations.

An impressive classic historic analogy, with all the conditionality that accompanies such analogies, are the plans for troop transportation by railways made by the German General Staff before 1914, which, naturally, the Kaiser and his government were loath to review during peacetime. When the international crisis began in the Summer of 1914, the German leadership found itself faced with a choice: either begin the planned shipments under the well-known Shliffen Plan, which provided for an attack to the West and then to the East, or change the plan and doom both the troop transportation to complete chaos and Germany to a defeat in the War on two fronts. Berlin chose the former, prepared through the scrupulous technical work of military specialists during peacetime, based on strictly operational considerations and blind to all dramatic turns and dilemmas of the political crisis of 1914. The political leadership ended up as hostages to a pre-planned military strategy and the military technical base of operational planning. This made WWI unavoidable — with the well-known consequences for Germany and the entire world, felt all the way to the end of the 20th century.

A historical analysis of the development of that tragedy that was stunningly influential was presented in the book The Guns of August by the famous American historian, B. Tuchman. President Kennedy read this book shortly before the Cuban Missile Crisis of October 1962, and was deeply impressed by it. At the time of the Cuban Missile Crisis, the leaders of the US and the USSR had nearly crossed the Rubicon of a nuclear conflict, being trapped in the dynamics of the military and political escalation of the crisis and nearly losing control over the situation, with incomparably worse potential consequences than in August 1914. It could be that Tuchman's book prompted Kennedy to exercise extra caution and flexibility and to adopt a more critical attitude to the recommendations from the US military command in those dramatic days. This allowed both sides to step back in time from the brink of the abyss.

Unfortunately, from all appearances, neither Khrushchev nor the subsequent Soviet and Russian leaders have read books such as this. Neither is it clear whether subsequent American leaders have read such books. Otherwise, they would have scrutinized the details of the nuclear strategy and weapons programs much more deeply during peacetime, bringing in independent experts and not relying totally on the military agencies, so as to retain real control over the course of events when the fateful hour comes.

2.3. Mutual Deterrence — the Rule or the Exception?

Analysis of historical experience and the current situation shows that the relations of mutual deterrence between nuclear powers are more of an exception than a rule, especially if stable deterrence is meant, which is supposed to minimize the probability of nuclear war. Aside from all of the above-mentioned specific versions of deterrence, the latter may exist in its most general form in two forms.

One may be called "existential" deterrence — the political and psychological effects of prudence and caution that nuclear weapons are able to inspire in the opposing side(s) by the mere fact of their presence. This is independent of technical characteristics, numbers of such weapons, their command-control systems, or of the effectiveness of their use. "Existential" deterrence is inherent to NW simply in light of a certain probability of their use in the event of war, inasmuch as the side(s) in the conflict does (do) possess them, and because of the huge destructive consequences of the use of even individual weapons of this class. At the same time, the role of such a level of deterrence is seriously dependent on the acuteness of conflict in the political relations of the sides, the degree to which third countries would get involved, regional military balances, and so on. If the crisis is severe indeed, and there are no allied obligations on the part of third powers, this type of deterrence could lead to the outbreak of a nuclear war, since the state that launches a first strike would as a rule gain great military advantage.

In contrast to this, the other general form of deterrence, which may be called "qualified deterrence," assumes the reasonable likelihood that the nuclear forces will succeed in meeting whatever specific goals they have been given under the assumed circumstances of a war breaking out. There are numerous versions of this kind of deterrence, from "minimal," to "extended," and everything in between. A variety of versions of "qualified deterrence" have been seen in various countries in different periods of time. "Qualified deterrence," understandably, is a much more reliable and predictable means for ensuring the defensive capabilities of a nation, in spite of all of the stipulations and paradoxes of the various models of such deterrence considered above. This level of deterrence is assumed to provide for a reasonable level of strategic stability in spite of any tension in international relations and even during times of crisis between states. And it also may create the material base for nuclear weapons limitation and reduction agreements as valuable specific tools for ensuring mutual security, transparency, and greater trust between nations.

The classic version of "qualified deterrence," which is mutual and decreases the probability of nuclear war and armed conflict in general to a minimum, is the strategic relations between the USSR/Russia and the US beginning in the late 1960s and extending through to around 2010 or 2012. After this, because of the reasons listed above, Russian deterrence will be predictably transformed into a "minimal," and then, perhaps, "existential" deterrence, at least with respect to strategic relations with the US. That is, of course, if the RF nuclear forces development program is not fundamentally corrected in the near future and no new arms control agreements are reached.

Until the mid-1960s, the British and French nuclear forces, in themselves, could render only "existential" deterrence against the USSR, while from the mid-1980s and on to the mid-1990s they were capable of "minimal" "qualified deterrence." The Soviet and Russian SNF during this whole time had the overwhelming capability of launching a disarming strike against these European countries. Only the alliance with the US and its nuclear guarantees under NATO allowed Britain and France to experiment freely with their nuclear forces and concepts, using them for the goals of prestige and as factors in relations with allies, without having any real fear for their own security. For the next 10 to 15 years, while Russian SNF are decreasing and the potential of English and French weapons is increasing, the latter two will attain parity in their capacities for "qualified deterrence" with Russia.

After creating nuclear weapons in the mid-1960s, China had the potential for only "existential" deterrence against the USSR, and no deterrence at all against the US until the

early 1970s. By the 1990s, the PRC had acquired the capability of a "minimal" deterrence against the USSR/RF and "existential" deterrence against the US. Based on the rates of production and modernization of the Chinese SNF, over the next 10 to 15 years, the PRC might acquire the capability of a robust "qualified" deterrence against Russia (together with superiority in conventional forces in the Far East) and "minimal" and "qualified" deterrence with respect to the US.

Israel, having obtained its NW at the beginning of the 1980s, had by the end of the decade gained the capability of "qualified" deterrence against the neighboring Arab countries that lacked such weapons, and "existential" deterrence against the USSR.

Over the next few years, India and Pakistan will have the classic version of mutual "existential" deterrence, which is exceedingly unstable and dangerous with respect to the outbreak of nuclear war in a severe regional conflict. At present, according to available information both states lack efficient command-control systems (in particular, negative control systems to prevent an unauthorized missile launch) and keep their missiles separate from their nuclear warheads. Under these circumstances, such a regime is better than if they had fully coupled nuclear forces, which would be a recipe for disaster: both missile forces are vulnerable to a disarming strike, both nations are lacking early warning or reconnaissance systems, missile flight times are extremely short (5 to 10 minutes) and official military doctrines allow for a first nuclear strike (equivocally for India and unequivocally for Pakistan).

After entering the "nuclear club" the two states have up to now shown greater political cautiousness in crisis and agreed on notification of missile launches and some confidence building measures. Their mutual nuclear deterrence, however, remains extremely fragile since both parties lack the capability to make sure that the other side keeps missiles and warheads decoupled. If some future crisis escalates to an armed conflict, both nations would rush to couple missiles and warheads after which there would be a strong incentive for India to implement a preventive conventional or nuclear-conventional counterforce strike, while for Pakistan there would be an irresistible motive for pre-emption through the "use-it-or-lose-it" theory.

In the early missile era, both the United States and the USSR (similar to India and Pakistan), kept their first generation ICBMs decoupled from warheads, but after a few years, with technical improvements, they abandoned this practice and deployed missiles with warheads permanently in the nose cones. Most probably India and Pakistan will follow this trend. In this case there may be a more stable deterrence on the peninsula if both nations, beside coupling their missiles and warheads, simultaneously acquire more effective command-control systems (including permissive-action-links – PAL) and reconnaissance capabilities (air or space-based), as well as survivable missile basing modes (hardened silos, ground-mobile or sea-based forces). Otherwise, their nuclear balance will become highly unstable. Taking this into consideration, the United States and Russia might render technical assistance in some of these areas in exchange for the two nations entering bilateral arms control talks and joining various nuclear arms control regimes.

A still better alternative would be to have India and Pakistan reach an agreement to keep missiles and warheads separate, and to agree on reliable verification provisions for this agreement. For this, US-Russian sponsorship might be an effective tool as well. India and Pakistan could even serve as a test model of one of the methods of implementing a possible future US-Russian de-alerting and deactivation regime.

Besides the Indo-Pakistani nuclear balance, India will in the near future have "existential" deterrence with respect to China, which will maintain its significant nuclear supremacy over India until it gains a "qualified" deterrence in 5 to 10 years. Islamabad will soon gain, if it has not already acquired, "existential" deterrence with respect to Russia (technically covering a large part of its Siberian territory), in spite of the clear nuclear superiority of Moscow.

If the DPRK and Iran are allowed to create their own NW in the foreseeable future, then the maximum that they would be able to gain is "existential" deterrence against the US, which might serve as the strongest factor in provoking a use of force by the American side, going so far as a pre-emptive air and missile attack with high-precision conventional weapons and even nuclear strikes. This likelihood could grow even more given the deployment of an ABM system in the US, depending on the actual capabilities of its improved follow-on components.

	US	Russia	Great Britain	France	PRC	Israel	India	Pakistan	DPRK	Iran
US		stable			un-stable				un-stable	un-stable
Russia	stable		stable	stable	stable	un-stable		un-stable		
Great Britain		stable								un-stable
France		stable								un-stable
PRC	un-stable	stable					un-stable			
Israel										un-stable
India					un-stable			un-stable		
Pakistan		un-stable				un-stable	un-stable			un-stable
DPRK	un-stable									
Iran	un-stable		un-stable	un-stable		un-stable		un-stable		

Figure 5. Bilateral Deterrence Relationships

On the whole, it must be concluded that, in spite of the perceptions broadly accepted after the end of the Cold War on the stabilizing role of nuclear weapons, relations based on a "qualified" mutual deterrence are a rare phenomenon indeed. From Figure 5, it is clear that relations between countries possessing NW may not be based on deterrence in a number of situations:

- First, when the nuclear weapons of the two sides are deployed out of range of each other's territories or important foreign targets (Britain and France, on the one side, and the PRC, India, and Pakistan on the other);
- Second, when targets may be within range of each other's weapons, but the states are military and political allies (US, Britain, France);
- Third, when the countries are within each other's range, and do not have formal alliance relations, yet still do not have nuclear deterrence relations because the NW of the two sides are obviously directed at some other third power (India and Russia, Pakistan and China, Israel and France);
- Fourth, when one power has significant superiority in offensive and/or defensive weapons, deterrence might be predominantly unilateral and unstable (US against PRC, DPRK, or Iran, as well as potentially between the US and RF);
- Fifth, when states' nuclear weapons are vulnerable and there is a lack of reliable command-control systems and early warning systems, deterrence may be quite fragile and mutually dangerous (India—Pakistan, Israel—Iran, DPRK—Japan, South Korea, Taiwan, provided that the last five states “go nuclear”).

From the above analysis it follows that the state of a stable mutual nuclear deterrence relation is and has been the exception rather than the rule. Hence there is no reason whatsoever to hope that in the future, nuclear relationships between and among new NWS, and even between some traditional nuclear powers would remain a solid guarantee against actual nuclear war, as it has been in the past sixty years. Moreover, even when considering past experiences, the role of nuclear deterrence is not an absolute truth.

2.4. What Prevented a Nuclear War?

Yet another crucial question on this subject is the following: was nuclear deterrence a real factor in preventing total war in past years? If, God forbid, such a war had actually occurred, then the answer to this question would be quite definitely negative, if there were anyone left to answer it. Fortunately, war was successfully avoided, but for that very reason the answer must be purely hypothetical. Considering the strict bipolarity and acute confrontation in international relations from the late 1940s to the beginning of the 1970s (which historically always preceded great wars), it is quite possible that if the major opposing sides, otherwise evenly matched, had not had nuclear weapons, a third world war would have in fact happened. According to this line of reasoning, it is possible that the existence of NW exerted a constant and unseen influence, playing the role of an inherent deterrent factor, independently of the military and technical specifics of the ever-changing nuclear weapons balance between the opposing sides.

At the same time, it must be remembered that the nuclear arms race in and of itself became an important factor in causing tensions between the opposing sides and that it gave rise to periodic crises in relations, for example, the crisis arising from the deployment of American medium-range missiles in Europe in 1983. What exactly prevailed in the sense of greater or lesser probability of war will forever remain a topic of hypothetical speculation.

The only example of a direct effect of mutual deterrence would be in a situation when the nuclear and conventional forces have been placed on high alert in anticipation of war, but the powers then stepped back from the brink under the fear of nuclear catastrophe. This kind of classical episode happened only once — in October 1962 during the Cuban Missile Crisis. It is true that at that time the deterrence emanating from the USSR was more "existential" than "qualified," since it had only several operational ICBMs, which were completely vulnerable on open launch pads. US leadership knew this, but was not absolutely certain due to the low effectiveness of the reconnaissance systems of that time. Besides, the USSR had a number of long range bombers and many medium range missiles and bombers, which could devastate US allies and forward based forces. Hence, some kind of mutual nuclear deterrence did exist even though in an asymmetric form.

Only one factor prevents this instance from being firm confirmation of the positive role of nuclear deterrence. This is the fact that the crisis of 1962 was predominantly caused by the very dynamics of nuclear deterrence. Moscow decided to deploy medium range missiles in Cuba in order to close the growing gap with the American SNF and forward-based nuclear forces. And the sharp acceleration in US ICBM and SLBM programs was implemented in response to the bluff by the USSR leadership regarding their ability to "crank missiles out like sausages."

So it turns out that nuclear deterrence presents yet another paradox: it worked best for preventing a war, the risk of which was caused by the evolution of the nuclear deterrence itself (the cure saved the patient from the illness caused by the cure itself).

2.5. Nuclear Deterrence and Terrorism

Nuclear deterrence cannot be used against transnational organized terrorism, even when such organizations have acquired a nuclear weapon or an explosive device. Terrorists have no territories, industries, populations or regular armies that can be targeted for retaliation. In instances when they are given a base by a government, such as the Afghan Taliban gave to Al-Qaida, nuclear deterrence with respect to such a state would still find little application, since it would hardly be likely to exert a restraining influence on the terrorists, who are quite free in their activities and able to pass through borders quickly and secretly. It is possible that terrorists would even be interested in provoking a nuclear strike on one or the other host country in the name of political advancement of their cause.

The struggle against catastrophic terrorism is related to deterrence only in the sense of deterring (through the threat of retribution, including nuclear) some countries from supporting terrorism by granting bases or providing other assistance. But it is difficult to imagine that any state would openly support terrorists possessing nuclear weapons. And a nuclear strike on any country, even a "rogue state," considering the secondary consequences and political shock in the rest of the world, is too strong an instrument to use without a fully obvious "corpus delicti." Quite revealing in this regard has been the reaction of the world

community to the poorly justified American operation in Iraq in 2003, using only conventional forces, and with minimal secondary losses and material damage. The breakup of the anti-terrorist coalition to a huge extent has inspired the resistance movement and international terrorism in Iraq and has drawn the US into a swamp of an open-ended occupation.

This relates directly to the present American concept of developing "clean" nuclear mini-charges that penetrate deep underground to could destroy bunkers, warehouses, and other underground terrorist or "rogue state" targets. Even without mentioning the political consequences of such a use of NW, from a tactical and technical standpoint, the use of nuclear mini-charges elicits a great deal of doubt. In order to avoid nuclear contamination of the locale, a sub-kiloton charge must penetrate the earth to a depth of 150 to 200 meters, which is impossible. Penetration to a depth of 10 to 15 meters is the imaginable technical limit, especially in hard rock formations. Then, the "coupling effect" (of warhead with the surrounding matter) would provide about 10 times as great a shock wave effect than of an air or surface burst of the same yield. However, at such a depth, the collateral damage of a nuclear explosion for the area would be almost the same as with a surface burst – but with all the ensuing physical, military, and political consequences.

Moreover, in order to destroy the target with a penetrating nuclear mini-charge, its exact location must be known with a precision of at least a few hundred meters. If that is already known, however, then contemporary non-nuclear high-precision warheads and high-yield charges could destroy the target, especially if multiple use is an option. Repeated attacks would be possible since such underground sites are not "urgent" targets, which must be destroyed quickly and at once, like ICBM silos. If the target is an ICBM silo or underground tunnel for missile or aircraft, it may be easily destroyed by the existing counterforce hard-target killing nuclear warheads. Command bunkers or WMD storage places are not urgent targets and may be repeatedly attacked by conventional munitions. Also, conventional troops and special forces could be used, particularly if such an operation is conducted by coalition forces and on a legal basis (under UN mandate).

As for the political aspects of the issue, an indirect showcase happened in the spring and summer of 2005, when the DPRK leadership, having violated the NPT, withdrew from the treaty, and then declared its success in manufacturing a nuclear weapon. The DPRK was suspected of preparing a nuclear underground test in a well known location. It would be hard to imagine a more clear and provocative case for the United States to demonstrate its will to carry out its counterproliferation strategy. The US could have attacked and destroyed the nuclear test site and other key nuclear facilities of this classic "rogue state," thereby thwarting North Korea's nuclear weapon development program for many years, possibly forever.

However instead of using military power, Washington used diplomacy to get the DPRK back to a six-party negotiating table. As "ideal" as the setting for the application of military power was, it turned out to be too risky and politically counterproductive to use even conventional precision-guided weapons, which might take out the dangerous facilities with high probability and low collateral damage. It is appropriate to assume that it would be still less thinkable to use a nuclear weapon, even one designed to reduce fallout, against a "rogue state" in a situation other than that of imminent threat of a nuclear attack against the United States. And in such a situation, a great variety of existing SNF and TNW systems would be available.

It is not surprising in this regard that the new American nuclear weapons program was received in Russia quite badly, in spite of its rather modest financing and early stage of development. The rumors that periodically circulate about Washington considering scenarios for a “preventative surgical strike” against Russian NW (in the case where Moscow's control over them has been lost) were combined with the mini-charge program. Thus, it was logical to make conclusions about their possible use to disarm the RF with minimal secondary damage in order not to elicit a retaliatory strike against the US with the surviving missiles.

Although the new earth-penetrating warhead program appears to be blocked at the moment, due to Congressional opposition, it may well reappear in the next budgets of the Republican Administration.

For the most part, the struggle with nuclear terrorism consists of active special operations, destruction of material and financial infrastructures, protection of nuclear warheads and materials storage facilities, and above all, a tightening of the nuclear non-proliferation regime. The key role here is played by cooperation between the great powers and regional participating countries in antiterrorist actions and measures to strengthen NPT regimes, to which US application of a nuclear threat, not to mention the actual use of NW, would be a true disservice.

Thus, as the discussion above has shown, the essence of the phenomenon of nuclear deterrence and its role in international security over the past half-century has been exceedingly ambiguous and contradictory. Perhaps nuclear weapons have been a factor in preventing a third world war, or perhaps the human race has just been very lucky. If that's the case, then it is very good that history has no subjunctive mood. But the evolution of nuclear deterrence in the foreseeable future, following the end of the Cold War, against a backdrop of an expanded geography for regional and local, domestic and transnational conflicts, in parallel with the proliferation of WMD and means for their delivery, is a matter of great uncertainty.

The new, so-called "pragmatic" approach of the US and, subsequently, Russia and probably other nuclear powers, evaluates the advantages of nuclear deterrence, the political and military applicability of NW, and the processes of nuclear weapons limitation and reduction, and, as a consequence, dismantles certain regimes. It is often justified by the changing international security environment. However, as the authors of this study believe, such policy is a faulty response to new challenges and, even worse, it creates threats to international security in and of itself.

Thus, another paradox of nuclear deterrence is that it may remain relatively effective in performing its task against the threats that are no longer relevant (aggression by the US, NATO, Russia, China against each other), but it is not able to deter the threats of the present and future. One threat in particular is transnational terrorism, which flourishes in the environment of local conflicts in rogue and failed states. Transnational terrorist groups could potentially be armed with WMD.

The dialectics of nuclear deterrence and proliferation are in agreement with Hegel's classic law. In the beginning, nuclear deterrence (as a policy of the indirect use of nuclear weapons for political aims) gave rise to proliferation because more and more countries strove to take advantage of the fruits of deterrence to achieve their interests. As the circle of countries possessing nuclear weapons grew, however, deterrence became ever more ambiguous, unstable and contradictory. This was explained as being a result of both its



expanding multilateral nature and the internal paradoxes inherent in deterrence, including its ambiguity with respect to the possibility of a first use of nuclear weapons, the dubious rationality of a number of its fundamental assumptions, and the ephemeral nature of the control over its use by the political leadership.

The final stage of proliferation is when non-state actors (terrorist organizations) gain access to NW, which will completely and finally end deterrence as a doctrine of the indirect use of NW to protect national security. The terrorists need NW not for deterrence, but for direct use and blackmail of various countries, or of the entire civilized world. In turn, nuclear deterrence on the part of governments is helpless against terrorists.

The dialectics of nuclear deterrence and proliferation have been reflected in the processes of arms reductions and disarmament as well. Born out of the fear of nuclear war, the desire of the leading powers to stabilize mutual deterrence created a basis for NW limitation and reduction agreements. At an early stage in this process (after the Partial Test-Ban Treaty of 1963), the end of nuclear proliferation began to be viewed as a mandatory condition for progress in nuclear disarmament. After the NPT was signed in 1968, the powers moved well along the path of partial nuclear disarmament (ABM Treaty, SALT I and SALT II, IRBM/ICBM Treaty, START I, II, and III, CTBT, permanent extension of NPT and its Protocol of 1997, etc.).

Arms control did not stop proliferation, though it possibly slowed its progress. It was, however, of great importance for ending the Cold War and the massive central nuclear arms race. At the end of the 1990s, proliferation accelerated for reasons that were not connected to nuclear disarmament. This made proliferation the central concern of the great powers, foremost the US and the RF, which was absolutely justifiable. What was not justifiable at all was abandoning altogether further efforts by these states to reduce and limit their NW, instead of making central nuclear arms control the key subsidiary to non-proliferation, and embarking on a new policy of profound revision of mutual nuclear deterrence.

To defend against states that have newly acquired (or were suspected of the intention to acquire) nuclear weapons, and to fight the threat of nuclear terrorism, the US, with other leading powers following its lead, have initiated the development and perfection of defense systems, as well as the creation of a new generation of nuclear weapons to be used preemptively against terrorist bases and the "rogue nations" that give them refuge.

Against the background of mutual nuclear deterrence as the continuing basis of great power strategic relations (exacerbated by Russian nuclear inferiority and US nuclear superiority complexes), this policy disrupts the foundations of stable mutual deterrence between the main powers. It also leads to the disintegration of the arms limitation and disarmament infrastructure (falling victim here were the already-mentioned CTBT, ABM Treaty, START II and START III, potentially INF/SNF, START I, and SORT).

And in closing the circuit of nuclear dialectics, the collapse of these treaties will most likely destroy the NPT and undercut the basis of the main non-proliferation regimes and mechanisms.

3. Nuclear Programs of the Big Five⁴

The real, rather than the declared, policy of Russia, as with any other nuclear state, depends on the actual condition of its nuclear weapons and armed forces in general, the approved programs of their development, and the existing plans of combat employment of the nuclear forces. Of these factors, the plans for combat employment are classified as are, for the most part, the programs of development of Russia's nuclear forces.

None of the Nuclear Club official member states makes public their plans for combat employment, except for some occasional excerpts from the US Single Integrated Operational Plan (SIOP), which have never been acknowledged officially. As for the programs of nuclear force development, however, only Russia (the Soviet Union) and China normally do not make them public, although the Russian special and popular press often reports factual data and offers analysis that fully conforms to the corresponding Western standards. As for the plans of combat employment and targeting of the Russian nuclear forces, the open press gives no information whatsoever, even in the non-committal form of private experts' conclusions. No official data are available about tactical (operational-tactical) nuclear weapons, programs of their development and plans of use. This is why the present chapter mainly deals with the nuclear forces in the strategic context, describing the strategic nuclear forces, with the tactical component covered only in passing.

3.1. Russian Federation

The last official full presentation of the Russian nuclear policy was given in the Military Doctrine of the Russian Federation endorsed by President Vladimir Putin on April 21, 2000. It notes that Russia maintains its status as a nuclear power, and proceeds from the need for a nuclear deterrent potential "assuring a preset damage on the aggressor in any conditions."⁵

Following the lengthy discussions of the doctrine, in line with the previous Basic Provisions of the Military Doctrine (1993) and in contrast to the Soviet-declared no-first-use commitment, it was announced that "the Russian Federation reserves the right to use nuclear weapons in response to the use against the country and/or its allies of nuclear or any other types of weapons of massed destruction, as well as in response to a large-scale aggression involving the use of conventional weapons in the situations that are critical to the national security of the Russian Federation."⁶

Such a statement has, in fact, brought the nuclear posture of Russia to the principles of nuclear strategy shared by the United States, Great Britain and France for many years. These countries have never denied that they can initiate first use of their nuclear weapons if

⁴ This chapter partly borrows from the research paper: Arbatov, A. and Dvorkin, V., 'Nuclear deterrence and non-proliferation'. Carnegie Moscow Center. Moscow. 2005.

⁵ Aktualnye zadachi razvitiya Vooruzhennykh Sil Rossiyskoi Federatsii (Urgent Tasks of the Armed Forces of the Russian Federation). October 2003. Moscow, p.37.

⁶ Voyennaya Doktrina Rossiyskoi Federatsii (Military Doctrine of the Russian Federation). – *Nezavisimaya Gazeta*. No 74, April 22, 2000.

attacked by superior Soviet-led general-purpose forces of the Warsaw Pact. That is why, given the fact of a considerable weakening of the general-purpose forces of Russia, such a change in the use of nuclear forces should be acknowledged as meeting the generally accepted standards. It is not discussed here how reasonable this concept is as part of the Western strategy and whether such scenarios of a 'large-scale' war conform to the political relations between the Russian Federation and the West.

The latest versions of the national nuclear strategy introduce more novelties. In particular, they assign a mission of "de-escalation of aggression ... through a threat of launching or actual launching of strikes of a varying scale by using conventional and/or nuclear weapons." Also noteworthy is the task of "dosed (selective, limited) combat use of some components of the Strategic Nuclear Forces," as well as demonstration of the determination "through enhancing the level of their combat readiness, conduct of exercises and relocation of some components."⁷

Thus, it is for the first time that Russia has officially declared that it can conduct a limited nuclear war, involving the use of the Strategic Nuclear Forces, and listed the measures used to enhance their readiness, such as deployment of nuclear-powered ballistic missile submarines to sea, dispersion of mobile intercontinental ballistic missiles along their patrol routes, and the flight of heavy bombers to alternate aerodromes, as demonstrations of power in case of a crisis. Here, again, attempts are apparently made to copy American strategic innovations of the 1970s and 80s, although Russia declares the intention of using in such a particular way the weapons that are expected to be less fit in terms of both their number and qualitative characteristics in the foreseeable future.

Theoretically, when used against the United States and its allies, such measures can lead to a nuclear conflict, with the United States retaining a sufficient capability of launching a disarming attack — a topic to be dealt with in more detail below. It is possible that such language is addressed to China, Pakistan, and new potential nuclear countries that can challenge Russia. If so, the question needs to be addressed separately.

After all of the doubts, Russia has finally confirmed that its national nuclear policy is aimed at maintaining an approximate balance (parity or equality) with the United States in strategic nuclear forces. There is, however, no consensus on the issue. Some hold the view that the Russian SNF should be maintained at a sufficient level comparable to that of Great Britain and France. In terms of classic deterrence, it would most likely be sufficient after the end of Cold War, and should Russia start building SNF from scratch, such a position would be quite reasonable. But since there is an actual parity between the Russian and US nuclear forces and the existing agreements can contribute to its maintenance at a considerably lower level, acceptable in terms of resources, there is no point in Russia's rejecting it unilaterally.

The past few years have seen significant changes in the program of development of Russia's nuclear forces as a result of changing the system of treaty-related strategic relations with the United States, as well as some arbitrary top-level decisions lacking a well-substantiated political, operational-strategic, and military-economic rationale.

As is known, the previous program of the SNF modernization was developed in 1998 by a commission of experts headed by N.N. Laverov, Vice-President of the Russian Academy of Sciences, with START II provisions in view. It was approved by President B. Yeltsin. In

⁷ Aktualnye zadachi razvitiia Vooruzhennykh Sil Rossiyskoi Federatsii (Urgent Tasks of the Armed Forces of the Russian Federation). October 2003. Moscow, p. 42.

line with some financial restrictions, it planned to keep from 2007 onwards a total of 1,500 warheads, including over 400 single-warhead fixed and ground-mobile ICBMs. By then, the parties had already signed the draft START III framework agreement of 1997 and had initial consultations on the issue. It was supposed that the treaty would at least remove limitations on development, testing and deployment of mobile ICBMs with MIRV warheads, since their performance characteristics did not differ in terms of strategic stability from those of the submarine-launched ballistic missiles for which prohibition on MIRV had never been considered before. If this were the case, it would be logical to maintain the traditional structure of Soviet/Russian SNF, in which the ground component accounted for about 60-70 percent of the warheads.

Unfortunately, it was the last substantiated decision to develop Russian strategic nuclear programs and the national nuclear policy. Already in 2000, the head of the General Staff of the Russian Armed Forces persuaded the national leadership to redistribute the funds in favor of the General Purpose Forces and revise the approved program of the SNF, which led to a sharp cut in the land-based ICBM force and badly affected the rate of procurement and deployment of new Topol-M missiles (SS-27). In particular, it was proposed that by 2003 the number of warheads on ICBMs should be reduced down to around 150.⁸

This was and remains a grave strategic blunder for a number of reasons. On the one hand, cost savings resulting from reducing the SNF ground component were insignificant as compared to funding the development of the General Purpose Forces. On the other hand, such a decision remained geared to the expectations of entry into force of the START II Treaty, which was in conflict with the real political situation. It is widely believed in Russia that this arbitrary and unilateral curtailment of the most effective leg of its SNF made it much easier for the United States to take the ultimate decision of abandoning the ABM Treaty, START II and framework START III.

The Moscow 2002 Strategic Offensive Reductions Treaty specified future limits on Russia's warheads with no other conditions. In a sense the terms are quite acceptable, since replacing START II with the new agreement has removed a number of treaty-related limitations on the maintenance and development of the SNF. First, it allows the RF to prolong for some time the service life of heavy ICBMs which otherwise would have to be discarded by 2007 under the START II. Second, Russia can now equip Topol-M missiles with MIRVs. In this case, Russia can easily maintain the forces up to the limit of 2,200 warheads, unless it dismantles, ahead of schedule, their basing infrastructure or stops the previously authorized program of producing Topol-M missiles. Fitting them with MIRV would not only relatively increase the total number of warheads in the SNF, but would also cut costs of production of the missiles themselves, for much fewer missiles would be needed for the same warhead level than if they were fitted with single warheads.

The status of Russia's SNF is as classified as possible under the transparency provisions of START I, and the country is second only to China in terms of secrecy. In 2005, the Russian strategic nuclear triad numbered 815 delivery vehicles and 3,479 warheads. In particular, there were 545 ICBMs and 1955 warheads in the Strategic Missile Forces (85 SS-18 heavy missiles, 129 SS-19, 291 SS-25 and 40 SS-27 ICBMs). Sea-based forces consisted of 12 nuclear submarines carrying 192 launchers and 672 warheads (6 Delta-3, 6 Delta-4

⁸ Sud'ba RVSN (The Fate of Strategic Missile Forces). *Yadernaya bezopasnost (Nuclear Security)*, Nos 38 – 39, July – August 2000.

SSBNs and 1 Typhoon boat waiting for new Bulava type missiles).⁹ In the air component there were 78 heavy bombers (34 Tu-95MS-6, 30 Tu-95MS-16 and 14 Tu-160) carrying 852 air-launched cruise missiles.

As a result of the wrong decisions taken in 2000-2001, the long-term SNF program does not include a key indicator of strategic stability and robustness of nuclear deterrence, — i.e., survivability of the nuclear forces, including the command and control system, in a hypothetical nuclear and non-nuclear war. In late 2004 and early 2005 various representatives of the Defense Ministry reported from time to time that in the long term, the Strategic Missile Forces was planning to get a few divisions of mobile Topol-M missiles. Unless, however, the authorities announce that the initial decisions on drastically slowing down the program are to be revised, it can be assumed that the Russian Strategic Nuclear Forces would have to rely more heavily on silo-based ICBMs and on the concept of first-strike or launch-on-warning. With Topol (SS-25) missiles being withdrawn due to their ending service life, with heavy bombers being less and less combat capable and extremely vulnerable at few airfields, with Typhoon and then 667 BDRM (Delta-4) SSBNs going out of service by 2015, and with very few new 955 class (Borey–Yuri Dolgoruki) submarines being commissioned (and still fewer at sea at any given time), above 90 percent of Russian SNF may become vulnerable to just 200 to 300 nuclear warheads, which is what two to three Trident submarines carry on board. Moreover, for the first time in history, Russian SNF may become vulnerable to non-US nuclear weapons states' forces.

At the same time the United States, by just maintaining its forces at START I or even SORT levels, will be inadvertently gaining an overwhelming and increasing capability of a disarming counterforce attack against the Russian Federation. This growing instability of the Russian-American strategic balance against the background of their continuing relations of mutual nuclear deterrence would not only be dangerous in a possible crisis situation, but will hamper deeper cooperation between the two powers in the field of international security, especially where joint military actions (such as counterproliferation) or joint military-technological programs (for instance, joint missile launch warning systems or BMD systems) are involved.

On the issue of the limitation and reduction of nuclear weapons, Russia presently holds a more traditional position than the United States, especially against that of the current Republican administration. After ratifying the START II Treaty in 2000, Moscow advocated for the conclusion of a START III Treaty and for an agreement on delineation of strategic and tactical anti-missile defenses. It also opposed the United States withdrawal from the ABM Treaty or proposals on its revision. It also advocated much deeper strategic nuclear reductions under the 2002 Moscow SORT (down to 1,500 or even 1,000 warheads) without treating the operationally deployed weapons and warheads in storage as separate categories. Moscow ratified the Comprehensive (Nuclear) Test Ban Treaty in 2000 and supports its entry into force as soon as possible.

3.2. United States of America


The nuclear policy of the United States has been essentially outlined in the Nuclear Posture Review and the National Strategy to Combat Weapons of Mass Destruction.

⁹ Here SS-N-18 SLBMs on Delta III SSBNs are counted as having 3 warheads each and 5 remaining Typhoon boats are discounted altogether since their missiles have been removed from launchers due to obsolescence.

The quadrennial review of the new nuclear doctrine sent to the Congress at the end of 2001 shifted reliance in planning the United States strategic forces from the Cold War threat-based approaches to new principles based on the so-called concept of “possibility of possibilities.”

Judging from the language, the new nuclear policy differs from Presidential Directive 60 signed by President Clinton in November 1997. The latter focused on deterring the use of nuclear weapons and ruled out a Reagan-era recommendation that the US Armed Forces should be ready to wage a prolonged nuclear war and win it. The new policy also reiterated the provision set forth in the Nuclear Posture Review (1994) that the basic targets of the United States nuclear weapons are the opponents’ nuclear arms and associated infrastructure, rather than cities and industrial centers.

One of the conceptual premises of the new nuclear policy is that the Cold War approach towards deterrence is no longer appropriate, above all in the relations with Russia which were formerly built around mutual deterrence through a threat of assured destruction. This provision might be interpreted as refuting an allegation that Pentagon has no strategic plans of using nuclear weapons against Russia, China and some other states (SIOP). Defense Minister Sergei Ivanov’s comment on the point was, however, quite skeptical: “As a head of the military agency I am well aware that the Ministry of Defense should foresee any scenario, including the worst cases. No planning is a surprise for me.”¹⁰ On the other hand, are there any more tangible indicators of a real nuclear policy, other than the operational plans, lists of targets and strategy of developing the nuclear forces and weapons, than the fluctuating and politically motivated rhetoric?

The new version of the national nuclear posture elaborates for the first time a concept of the follow-up stage in the military foundation of the United States national security — a transition to a new triad. Unlike the old triad, involving ICBMs, SLBMs, and heavy bombers, the new triad comprises an offensive component, including non-nuclear strategic options; active and passive defense components, including the anti-ballistic missile defense; a developed defense industrial infrastructure, and up-to-date command and control assets, to which the above components as well as the old-type nuclear triad are linked. Apparently, the new concept formulates a long-term objective — to reduce the United States dependence on the nuclear weapons and enhance the capabilities of containing new threats in the environment of proliferating WMD. At the same time, since a threat of escalation is no longer treated as critical, as it was in the Cold War era, the new strategy boldly wipes out the borderline between the use of nuclear weapons and that of conventional weapons against potential adversaries. 

Thus, it is postulated that the offensive nuclear forces alone cannot deter aggression in the 21st century, as demonstrated by September 11, 2001 events. At the same time, active and passive defenses are also far from being perfect, but while allowing no limited attacks or reducing their efficiency, the defenses will be able to develop some new capabilities for active operations in settlement of critical situations, containment of threats and conduct of military operations.

The established parameters of the strategic nuclear component for a mid- to long-term period (2020 onwards) confirm the continuity and stability of the nuclear policy in terms of the structure and composition of the old triad. Presently (as of 2005), the United States has in its SNF 1225 delivery vehicles and 5960 warheads. In the land-based leg there are 550

¹⁰ Delovaya sverka chasov (Business Watch Check). *Nezavisimaya Gazeta*, March 21, 2002.

ICBMs and 1700 warheads (500 Minuteman-3 and 50 Peacekeeper MX missiles). In sea-based forces there are 18 submarines with 432 missiles and 3168 warheads (including 144 Trident-1 and 288 Trident-2 SLBMs). The air leg consists of 81 B-1, 20 B-2 and 142 B-52 bombers – altogether 243 airplanes and 1098 warheads.

Apparently, the forces planned for 2012 comprise 14 strategic submarines (“boomers”) carrying Trident-2 type SLBMs, 500 Minuteman-3 ICBMs, 76 B-52H and 20 B-2 heavy bombers. Minuteman-3 upgrade programs are currently under way, which means that they will be in use at least as long as 2020. The US Navy made a decision to extend the service life of SSBNs carrying Trident-2 missiles for another 42 to 44-year period. SLBM modernization is also planned so that their service lives match those of SSBNs. The timing of SSBN and SLBM introduction permits the US Navy to maintain the capability of the planned sea-based component for as long as 2040.

The US Air Force is now upgrading strategic bombers, which implies that their current complement may technically be maintained through 2035 to 2045. The research and development of the next generation of heavy bombers is expected to start at the end of the next decade.

More evidence to the effect that the United States is consistently carrying out its traditional nuclear policy is invariably steady funding, beginning from 1996 FY onward, of effective programs of modernization and extension of service lives of basic types of ICBMs, SLBMs, long-range cruise missiles, and nuclear bombs, as well as modernization of the warheads.

In accordance with the current United States approach, the nuclear stockpile falls into four categories. The first two categories make up the so-called “active” arsenal. The first one includes warheads assigned to active delivery systems, and the second to those retrieved from the delivery vehicles, but kept ready for redeployment. This category also comprises the W78 and W88 nuclear warheads retrieved from Minuteman-3 and Trident-2 missiles respectively, as well as the W87 warheads from Peacekeeper MX missiles to be disassembled. The third and fourth categories form an “inactive” stockpile. The third category includes inactive reserve warheads that are not ready for deployment, but can be used to replace the warheads belonging to the active stockpile. It is considered that redeployment of the warheads would require months. The fourth category is the retired warheads awaiting dismantlement.

According to Defense Secretary D. Rumsfeld, the reason for non-destruction of some warheads removed from service is “their retention in case there arise some problems relating to the safety and reliability of our stored arsenal. Since we have no more operating production lines, it would be simply unreasonable for the United States to discard all these warheads and put them out of the reserve.”¹¹

In the goals for reduction set forth in the Strategic Offensive Reduction Treaty, it was stated that each party should determine the number of warheads left each year based on the results of their own periodic, full assessments of military-political and technological situations in the context of national security. One of such three or four intermediate landmarks in this area for the United States will be the end of 2007 when the limit of 3,800 operationally deployed warheads is expected to be achieved.

¹¹ Nuclear Posture Review Report. January 8, 2002.
<http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm> (visited 14 September 2005).

In December 2003, US President Bush signed the FY2004 National Budget Act and approved the proposal made by the Republican majority of the United States Congress to cancel the 1993 act called “Ban on Research and Development of Low-Yield Nuclear Weapons,” with regard to conceptual research of low-yield nuclear weapons. The president’s act also authorized initial funding in FY 2004 for research to develop new penetration-type modifications of operational nuclear weapons (the existing B61 or B83 nuclear bombs) designed to hit hardened underground targets.

In February 2003, Bush sent to Congress a letter to cover the administration-built FY 2004 budget request for defense needs of the Department of Defense and the Department of Energy, and specified the following four initiatives relating to nuclear weapons:

- To repeal the Congressionally imposed ban on research and development of low-yield nuclear weapons (under five kilotons);
- To allocate six million dollars for the Advanced Concepts Initiative so that the United States could begin research on weapon systems and, in particular, low-yield earth-penetrating nuclear weapons;
- To allocate 15 million dollars for continued work on developing a robust nuclear earth penetrator (RNEP program) derived from existing types of nuclear bombs and used to hit hard and deeply buried targets (HDBT);
- To allocate 25 million dollars for continued work toward an 18 month readiness posture for the Nevada Test Site in case of a need to resuming nuclear tests. The president issued a decree to this effect, overriding the 36 month period set for this purpose shortly after the Cold War ended.

The above initiatives provoked heated discussion, although in a very closed community of politicians and experts. Those in favor of the initiatives maintained that the first three initiatives added up to deterrence and thereby reduced the risk of war. As a result, they could lead to new types of nuclear weapons that would allow the United States to hit key targets in hostile countries without negatively affecting the environment, population, or friendly and allied contingents. In March 2000, Sandia Laboratory Director P. Robinson said, “The yield of the nuclear weapons retained since the Cold War era is too great against the deterrence requirements typical of the multipolar world where proliferation processes are on the increase.”¹²

The problems of producing a low-yield nuclear penetrator; delivering it to a preset depth of a hard target; and developing the latest systems of intelligence communications and target designation are extremely challenging. The penetrating weapon cannot break through the obstacle deep enough that the nuclear burst could be contained. In any case, it will result in radioactive contamination. As demonstrated by calculations, a one-kiloton ground-penetrating nuclear warhead used on urbanized terrain brings about a lethal dose of radioactive contamination over an area of a few squared kilometers, thereby killing thousands of noncombatants. Outside the urban terrain, the contamination effect will depend on the direction of the wind, but it can hardly be expected that in selecting a location of the

¹² The Bulletin of the Atomic Scientists. 1995. Vol.51. No 4, pp. 77-79; AECH. 1997. Vol. 43, No 4, p 3.; <http://armedservices.housecommittee.votus.gov>).

underground installation to be attacked, the enemy would take into account the American idea of enhanced selectivity of a nuclear attack.

Democratic senators E. Kennedy and D. Feinstein, the most active opponents of the current administration's initiatives, assert that the United States is adopting "a new and dangerous plan of developing and making the next-generation nuclear weapons. How can we request Iran or Northern Korea to abandon their nuclear programs, if we have started to develop, manufacture and test our own new nuclear weapons?" And further, "The new initiatives of the Bush Administration pursued in the area of nuclear weapons ... threaten to blow up the entire architecture of verification over the nuclear weapons, which we took pains to set up over the past fifty years. We are well aware of the threats that we face in the contemporary world. It would be incorrect to add another one, treating the nuclear weapons as simply one more type of weapons in our arsenal."¹³

There is no consensus among high-ranking US military officers as to whether it is necessary or not to use nuclear weapons to destroy deeply buried targets. For instance, Admiral J. Ellis, commander of the United States Strategic Command, told during the hearing of the United States Senate Committee on Armed Services that the US should reduce its dependence on nuclear weapons and use precision-guided conventional weapons instead to hit deeply buried hard targets. On May 20, 2003, Defense Secretary D. Rumsfeld officially confirmed in congressional hearings that the United States intends only to study the capabilities of the new weapon, but "not develop, adopt it for use or employ."¹⁴

On the whole, it is believed that the decisions on conducting research of low-yield penetrating charges, which are intended to support the view that the existing nuclear stockpiles are poorly suited to the new threats because of their excessive yield and insufficient accuracy and to revive the allegedly obsolete R&D and industrial nuclear infrastructure, give grounds to suspect US policy of reducing the threshold for use of nuclear weapons and being in conflict with the nonproliferation policy.

In this context, it was surprising that in November 2004, the United States Congress passed a resolution, initiated by Republican D. Hobson, to exclude from a bill on expenditures for the next fiscal year the funds designed to research the low-yield penetrating charges. There is, however, no guarantee that the Pentagon will not force Congress into reversing the resolution and funding the program. If so, as was the case with US withdrawal from the 1972 ABM Treaty, and the commenced deployment of the strategic ABM defense, the development of a new type of nuclear warhead will also be seen by the Russian strategic community as designed to threaten Russia itself.¹⁵ In particular, since the rationale of using such systems against terrorists and rogue countries is unconvincing because there are alternative weapons and techniques for those purposes, one might think that these weapons could be used to launch highly selective nuclear strikes against the Russian hardened command centers, as well as the ICBM silos which could accommodate the bulk of Russia's nuclear forces in the future.

¹³ *The Washington Post*, 04.05.2003.

¹⁴ Arbatov, A. and Dvorkin, V., 'Nuclear deterrence and non-proliferation'. Carnegie Moscow Center. Moscow. 2005, p. 34.

¹⁵ Rossiyskie strategicheskie rakety perekhvatyat nad Plesetskom (Russian strategic missiles intercepted over Plesetsk). *Nezavisimoye voennoye obozrenie*. No 40, October 22, 2004.

Such projection is absolutely inevitable, given the fact that in spite of all declarative statements made by politicians, the relations of mutual nuclear deterrence still exist between the United States and Russia in strategic, operational, and technical terms, with the imbalance between the parties growing stronger. Whatever the American politicians and the military tell their Russian counterparts about a certain “possibility of possibilities” and impertinence of Cold War mutual deterrence under the new conditions, Russian specialists are well aware that Washington’s reluctance to reduce the below the limit of 2,200 warheads (plus approximately 1,500 warheads in the reserve) cannot be explained by any strategic objectives other than retention of nuclear deterrence against Russia. The grounds for sharing such a point of view are that such a large number of potential targets for the United States are absent elsewhere in the world and, besides, there are sufficient US highly mobile tactical nuclear weapons for any hypothetical local scenarios, rogue states, and terrorists.

There can be no other explanation for the continued US structural policy of the strategic triad, with the new triad added, which does not fit into the limit of 1000-1500 warheads, other than continuation of the nuclear deterrence strategy applied to Russia. The same is true of the United States plans to re-equip the Minuteman-3 missiles with the W87 warheads retrieved from Peacekeeper ICBMs, as well as to continue to retain aboard Trident-2 SLBMs the W88 warheads which are designed exclusively for fast, short-warning kill of hardened targets, such as silo-based ICBM launchers, underground command centers, and mobile ICBMs dispersed throughout an area of routine deployment. Only Russia possesses weapons of this kind in sufficiently great numbers.

References to an indeterminate future sound like slim excuses. In any case, the United States missile and nuclear complex surpasses the rest of the world many times in terms of the rate and scale of a possible build-up of nuclear weapons in an emergency.

The above aspects of the real military policy of the United States seem to be especially suspicious given its efforts to dismantle the regime of nuclear arms control through withdrawing from the ABM Treaty, its reluctance to make a new large-scale treaty on strategic forces reductions, its refusal to ratify the CTBT, the lessening of interest in the treaty on cut-off of production of fissile materials for military purposes, its skepticism about the Non-Proliferation Treaty and the IAEA, and its unilateral shift, instead, to a policy of “selective” nonproliferation and counterproliferation.

Thus, counter to Article VI of the Non-Proliferation Treaty, the long-term nuclear policy of the United States does not seriously consider any prospect of nuclear disarmament in either military or legal aspects. What is much worse, while reducing the redundant nuclear weapons of the Cold War era, the United States displays no interest in either the material transformation of the relations of nuclear deterrence with Russia, or a deepening of the agreed-upon measures of reductions and limitations of nuclear forces. Since previously seen interest was primarily due to an apprehension of the Soviet strategic capabilities, the present indifferent attitude of Washington to the issue cannot but be explained by the decision of Moscow to curtail its own strategic potential, and, above all, its ground-based component.

Nevertheless, the United States position cannot be justified, for after the Cold War ended, it was the powerful United States with a huge nuclear and conventional military “margin of safety” that could have started to radically rebuild its strategic relations with the Russian Federation, with due regard to the new risks and security challenges. This would also have influenced the policy of China and other current and potential nuclear states.

3.3. Great Britain

In pursuing its defense policy, London plans on retaining its nuclear weapons, namely the sea-based strategic nuclear forces, as a basis for national nuclear deterrence not only of traditional opponents, but also of some new nuclear-weapon and threshold states.

The British nuclear forces are based around four modern, nuclear-powered submarines of an indigenous design, which have become operational in the past 10 years. The first boat, designated Vanguard, went to sea in December 1994; the second, Victorious, in December 1995; the third, Vigilant, in autumn 1998; and the fourth, Vengeance, in February 2001. Each submarine carries 16 ballistic missile launchers. The SSBNs are based in Clyde, Scotland, 32 kilometers from Glasgow.¹⁶

Historically, Britain's nuclear policy has been linked at many levels to that of the United States. London traditionally placed its stake on very close cooperation with the United States, starting as long ago as WWII, and is still relying on the US missile early warning system. The British missiles are integrated into the United States system of nuclear operational planning (SIOP). In October 2003, the United States SSBNs carrying Trident-2 started to be refitted with a new missile retargeting system in accordance with the Nuclear Posture Review, the latest United States doctrine of strategic nuclear planning. This will probably affect British strategic force targeting and operational planning as well.

Three-stage solid-propellant SLBMs of Trident-2 type are leased from the United States and, prior to commissioning, were loaded into submarines at Kings Bay Nuclear Submarine Base in Georgia. Each missile is fitted with a reentry vehicle housing up to eight individually targeted warheads and ABM penetration aids. If the latter are removed, the number of warheads can be increased to 14. The missile is accurate and delivers warheads to targets as far as 7,400 km (the range of a single warhead Trident-2 missile is up to 12,000 km). The circular error probable is estimated to be 120 meters, which seems to be somewhat exaggerated.

With 58 SLBMs carrying eight re-entry vehicles each, the number of warheads aboard four submarines could total 464. In July 1998, however, London declared that it did not intend to have more than 200 operationally deployed warheads, thereby cutting its maximum operationally deployed stockpile by half. The Cabinet announced that it planned to keep only one SSBN carrying 48 warheads on alert status. Therefore, each submarine carries 12 to 16 missiles and 40 warheads on average.

The thermonuclear warheads of home assembly have a design and safety system similar to the American W76 warheads with a variable range of yields (1, 10, or 100 kilotons). The warhead is placed into an RV of the same or similar design as the US Mk-4 RVs. In supporting nuclear stockpiles and dealing with Trident missiles, the United Kingdom's AWE Laboratory carries out close technical cooperation with the United States nuclear laboratories.

Great Britain plans to use its nuclear weapons in two modes: (1) when all the combat-ready submarines are expected to launch a pre-emptive attack, most likely jointly with the United States, and (2) when an on-duty (at sea) groups of one or two submarines

¹⁶ Kristensen, Hans M., Kyle Shannon N. *Yadernye sily v mirovom masshtabe (Worldwide Nuclear Forces)*. SIPRI Yearbook 2003. Vooruzhenia, razoruzhenie i mezhdunarodnaya bezopasnost. Moscow, Nauka, 2004, pp. 738-741.

independently launches a retaliatory attack while cruising in the patrol area in the northeastern Atlantic. Until recently, according to the SIOP plan, up to 90 percent of the British nuclear weapons were targeted primarily at opponents' military and economic targets. After Trident-2 SLBMs were adopted for use with the Royal Navy, the British could, for the first time, effectively hit strategic, hardened, fixed installations like Russian ICBM silos and command bunkers.¹⁷

While following the United States' policy of deliberate ambiguity, the Labor Government said that it did not rule out the first use of nuclear weapons to deter threats of use of biological or chemical weapons.¹⁸ According to the Foreign Office, Britain, like the United States, is ready to reconsider the existing instruments of countering the WMD proliferation. On March 20, 2002, the defense minister said, "Britain is ready to use the nuclear weapons to defend friendly forces against the WMD."

The Defense White Paper 2003, called "Delivering Security in a Changing World,"¹⁹ crossed all t's and dotted all i's: the minimal nuclear deterrence by means of Trident missiles will remain to be an essential element of Britain's security until 2028. Given a high risk of WMD proliferation, it asserted, the existing nuclear weapons should be retained.

Still, in terms of its policy of nuclear weapon sufficiency, its attitude to the disarmament treaties, including the NPT, its constructive approach towards the IAEA guarantees at British facilities, and its strict position on export control, Great Britain should serve a useful example for the other nuclear powers. This would be particularly true if some proposals of the anti-nuclear opposition were at some time to become a part of the official policy. The relatively constrained nuclear policy pursued by Britain, as compared to the other states in the nuclear club, can be regarded largely as a result of the continuous pressure on the part of the anti-nuclear movement in Great Britain. No other NWS, whether official by NPT terms or de-facto, presently has any serious opposition to government nuclear policy.

3.4. France

Nuclear deterrence continues to play a key role in the French defense strategy. Retention of maximum freedom of choice in the deployment and use of nuclear weapons is one of the fundamental provisions of the French nuclear doctrine. The 1994 Defense White Paper, the document that is still in effect, says that in some cases France does not rule out implementing pre-emptive nuclear strikes. However, unlike in the past years, it seems that no strikes are currently planned against opponent's cities.²⁰

¹⁷ Ponomarev, S.A. Evolyutsia voyennoy doktriny: NATO posle okonchania kholodnoy voyny (Evolution of NATO military doctrine after the Cold War). *Strategicheskaya stabilnost*. 2000. No 2, pp. 9–23.

¹⁸ Butler N., Chamberlain N. UK nuclear collaboration with the United States // BASIC report. – March 2004. – №85. <http://www.basicint.org/pubs/BReports/br85-fin.pdf> (visited on December 30, 2004).

¹⁹ Delivering Security in a Changing World: Defence White Paper 2003. <http://www.mod.uk/publications/whitepaper2003/index.html> (visited on December 30, 2004).

²⁰ Faure G. Projet de loi de finances pour 2004, adopté par l'Assemblée Nationale – Tome IV: Défense – Nucléaire, espace et services communs. 2003.

French military doctrine is based around the intimidation and containment strategy, according to which strategic nuclear forces are an essential element of the national armed forces. The air-based nuclear forces are regarded as a means of the ‘last warning’ sent to an adversary about France’s readiness to launch a nuclear attack.

The likely adversaries to be targeted by the French nuclear weapons are potential nuclear powers, which “are capable of using their nuclear weapons against France.” Another important novelty is the official recognition to the effect that the French nuclear component can be integrated into the European Security and Defense Policy.²¹

According to Paris, nuclear deterrence is the best response to a likely failure of the non-proliferation policy. France’s president says that French nuclear forces could cause an unacceptable amount of damage in any state that threatens France’s vital national interests in any case, from wherever the threat emanates and whatever nature it may have.²²

The French commonly suppose that nuclear deterrence should be maintained by sea (they prefer to call it ocean-based) and air-based strategic nuclear forces. The ocean-based strategic nuclear forces are responsible for continuity of the deterrence and, if necessary, for inflicting pre-planned damage on the major enemy. The force includes two Redoutable-class SSBNs (S-613 Indomptable and S-615 Inflexible) and two Triomphant-class SSBNs (S-615 Triomphant and S-617 Téméraire). Each submarine has 16 launchers designed to fire ICBMs of M48 type (Redoutable) and M45 (the remaining submarines). The solid-propellant missiles are fitted with up to six multiple warheads and a set of penetration aids.

Only one submarine is on alert (two in the case of an emergency), two are stationed at the base, and one is in repair. The estimated operationally deployed ammunition of the force carried aboard four missile-firing submarines is 48 SLBMs (16 M4B plus 32 M45) and 288 warheads (96 TN71 and 192 TN75). The reserve warheads account for 10 percent of their estimated number, for example 317 weapons with an aggregate yield of $(107 \times 0.15) + (211 \times 0.1) = 37.15$ megatons. After a 5 to 6 year period of operation, the submarine is laid up for a year-long repair of the hull and after 10 to 12 years, for a two-year overhaul. It cruises for a maximum of 73 to 90 days at a time.

Modernization plans are made for as far into the future as 2015. In November 2004, France commissioned a third new SSBN, S-618 Le Vigilant, armed with M45 missiles to replace the Indomitable submarine. The aggregate estimated potential yield, including a reserve of 29 warheads, is 31.7 megatons.

In 2008, the last SSBN of the old Inflexible-class will be decommissioned. The introduction of a new SSBN, S-619 Terrible, which was originally planned for 2008, has been shifted to July 2010. The delay is due to the development of a new M51 SLBM that is expected to equip all Triomphant-class submarines. As a result, within almost three years (2008 to 10), the French force will consist of three missile-capable ships. After 2010, it will include four Triomphant-class SSBNs fitted with M45 and M51 missiles.

²¹ Tetrais B. Nuclear policy: France stands alone // *Bulletin of the Atomic Scientists*. – 2004. – V. 60, № 4. – P. 48–55.

²² Faure G. Projet de loi de finances pour 2004, adopté par l'Assemblée Nationale – Tome IV: Défense – Nucléaire, espace et services communs. – 2003.

Air-based strategic nuclear forces supplement the sea-based component. A variety of ABM penetration aids add to the deterrence, and adaptive flexibility to meet emerging threats gives the national leaders new instruments of response. High maneuverability of the aircraft makes them demonstrative and deployable worldwide. In addition, the aircraft are dual capable, which results in fewer costs to procure and maintain the Air Force aircraft.

All airborne delivery vehicles are organized into two units of ground and sea-basing. Reporting directly to the strategic air force headquarters are three squadrons of ground-based combat aircraft, a tanker squadron, a reconnaissance aircraft squadron and the Training Center. Nuclear missions are assigned to 60 Mirage-2000N fighter-bombers. When refueled in the air, the aircraft can fly as far as 2,750 km.

Ship-based aircraft capable of carrying nuclear weapons are the 24 Super Etendard fighter-bombers (2 squadrons) with a range of 650 km. There is only one nuclear propulsion aircraft carrier, the Charles de Gaulle, that was commissioned in 2000. Another carrier (diesel-powered) designed by the French is to be built at British shipyards and is expected to be commissioned by 2015 when the Charles de Gaulle ship is laid up for a total overhaul.

Starting in 2007, the existing aircraft will be replaced with new multipurpose Rafale fighter-bombers of ground (one squadron of 20 aircraft in 2006) and sea-basing (two squadrons in 2015 to 2017), ASMP-A missiles (in 2007 to 11) with a range of 500 km and target accuracy up to 10 meters, and a new, 300-kiloton TNA charge (from 2007 on). There is information about plans to make as many as 47 charges of this type. As a result, the number of nuclear weapons will go down from 60 to 47 by 2017. At the same time, the focus will be shifted from ground-based to carrier-based aircraft. There will be 20 aircraft in the ground-based component, instead of the existing 45 aircraft. Each of the two squadrons of carrier-borne aircraft will be based at its home ship, which will help increase the number of aircraft from 24 to 40.

France has developed nuclear weapons for penetration of opponents' BMD defense based on the use of antimissiles carrying nuclear warheads. France's efforts to have specific warheads and BMD penetration tactics as part of its future nuclear stockpile show that it is ready for a potential change in the military-political situation, specifically in Russia, that has a limited BMD defense employing antimissiles with nuclear warheads. Since there are no other states within SLBM range that may have BMD in the future, this clearly indicates that France is planning to maintain nuclear deterrence primarily against the RF for the foreseeable future despite the end of Cold War, American nuclear commitments, and the unprecedented security that has blessed Europe for the last 15 years — at least as far as traditional threats are concerned.

In June 2001, French President J. Chirac said that the national forces stationed outside the country should be protected from tactical missiles. Currently, France, together with Italy, is developing, within the framework of the EUROSAM project, a theater air defense system designed to intercept short-range ballistic missiles, cruise missiles, and aircraft. In addition, at the summit of NATO leaders held in Prague in November 2002, Paris confirmed participation in the R&D program aimed at developing a European air defense system.

In order to implement the program of re-equipping nuclear forces, France has a well-developed industry, skilled personnel and a consensus of all political parties and population.

In case the world military-political situation is destabilized, the French program and installations used to develop the nuclear weapons can be brought back to life in a short time,

including the full-scale nuclear tests.²³ In the foreseeable future, Paris seeks to pursue an active nuclear policy and to maintain the leading role of nuclear weapons in its national military doctrine.

3.5. People's Republic of China (PRC)

The nuclear policy of the PRC, which has undertaken a no-first-use commitment, is expressed in its concept of “a limited retaliatory nuclear attack.” This means that the country plans to build retaliation nuclear forces of a limited structure that can make a potential enemy abandon the use of nuclear weapons against the PRC through the threat of reciprocal attack. Such an approach places no import on achieving nuclear parity with developed countries, and looks quite rational in terms of material and financial resources.

The present Chinese SNF have a low state of readiness, and, unless additional and apparently conspicuous steps are taken, the SNF cannot be prepared to launch a surprise first nuclear strike. This matches the PRC's no-first-use concept, at least for technical reasons. Moreover, the PRC does not have the capacity to launch even a partially disarming strike against any NWS except India, which is usually associated with the first-use strategy. At the same time, if Chinese SNF were brought to a higher status of readiness in case of a crisis, the PRC would have no other alternative but a first-strike or preemptive attack because of their low survivability, vulnerable command and control system, and weak warning system — a course of action which would be suicidal if employed against Russia or the United States. It is precisely for this reason that the Chinese SNF have an unstable character, which pushes them to a first strike and provokes a hostile preemptive attack in case of a crisis, despite the PRC's declared rejection of the first-strike option.

The paradox of China's nuclear posture is that in a day-to-day de-alerted state, its SNF are not capable of launching either a first or a second retaliatory strike against the United States or Russia. In a hypothetical crisis situation, if its forces were brought to high alert status, Beijing would be able to deliver only a first or preemptive strike, suicidal as that would be. Available weapons, command-control systems, early warning systems, and the military balance with potential opponents, reinforce this logic. Similarly, official declarations, motivated by ideological or political considerations, cannot change this state of affairs. It is all the more so in a country where public discussion or independent assessment of strategic matters is virtually zero (in this sense, the difference between Russia and China is probably as big as the corresponding difference between the US and Russia).

There is no reason to consider China's top military leaders stupid or unprofessional and unable to comprehend the obvious non-ideological strategic logic of its SNF employment option — especially in a country famous for thousands of years of strategic thinking. In this sense, China's nuclear non-first-use pledge is politically reasonable in avoiding the provocation of other great powers, but at the same time is totally empty of strategic substance. Since China's generals must understand their first-strike predicament, as well as its suicidal consequences, there are serious reasons to expect a major modernization program of China's SNF as soon as technical and financial conditions are right. It would be aimed at

²³ Brezkun, S.T. Kritichesky analiz pozitsii Frantsii po voprosu otkaza ot yadernykh ispytany (Critical analysis of France's position on the problem of nuclear test refUSI). *Strategicheskaya stabilnost'* [Strategic Stability]. – 2002, No 3, pp. 8 – 12.

achieving a robust second strike capability against any opponent and possibly a counterforce capability if the opportunity presents itself.

In a sense, China's current strategic posture and capabilities are quite similar to those of the Soviet Union in the early 1960s. But at that time, the Cold War was in full swing (reaching its culmination in the Cuban Missile Crisis in October 1962), and the strategic forces of the United States were also much weaker in both relative and absolute terms than the current forces of either country today. Hence, Moscow's official declarations emphasized "the peace-loving Soviet foreign policy" at the same time that its military doctrine allowed for the possibility of Soviet first nuclear strike "if the imperialists unleash a new world war." It was apparently assumed that an armed conflict would start in Europe and that Soviet strategic forces would be brought to top readiness and launched after NATO tactical nuclear forces were used. The Cuban Missile Crisis was totally different from the accepted strategic contingency planning and caught all sides by surprise, making them improvise and taking them to the brink of a nuclear catastrophe.

One lesson of that crisis for Moscow, besides the desirability of lowering tensions with Washington and agreeing on some disarmament steps, was the urgent necessity of a robust nuclear deterrent capability and parity with the US. This led to a crash missile build-ups of the 1960s, 1970s, and 1980s in the determination to keep up with US force development.

It is hard to imagine that Chinese leaders discount the possibilities of acute crisis with other great powers (around Taiwan or other issues), in which case Beijing would find itself in the situation of Moscow in October 1962. Conducting more and more assertive foreign policy and aiming at a global political role, China's pragmatic rulers would be light-headed to count only on its growing economic power and artful diplomacy. At the same time, they are wise and cautious enough to avoid frightening or provoking other nations or making rushed decisions or bombastic declarations regarding their nuclear force development and deployment.

China's strategic nuclear forces are variously estimated to include ground, air, and sea components, and to total 252 delivery vehicles and 300 to 400 nuclear warheads. Their base is the Strategic Missile Forces, which are equipped with 120 ground-based ballistic missile launchers. The Strategic Air Force numbers 120 obsolete H-6 (Tu-16) aircraft; their production was terminated in 1994. The sea-based component is a single nuclear-propulsion Xia class submarine carrying 12 launchers for Julang-1 missiles which was launched in 1981 and sometimes is described as experimental. The sub-strategic nuclear forces total 150 delivery vehicles, including 30 Jian-5 tactical fighters, artillery projectiles and 120 short-range rockets.

At present, China's SNF are incomparably inferior to the Russian and US forces both in quantitative and qualitative terms. They also lag behind the British and French forces in a qualitative sense. Their range is restricted to the Asia-Pacific region, except for 20 Dong Feng-5A ICBMs with a range of 13,000 km. The latter can reach the territory of the United States and the European part of Russia. The in-service ground-based missiles are fitted with a single RV and placed in fixed sites, such as silos and tunnels. They burn liquid fuel and take a lot of time to prepare for a launch. There is information that the nuclear RVs are stored separately from missiles of an old type to prevent an unauthorized launch.

China has started to deploy its first ground-mobile solid-propellant medium-range missile DF-21A. It is expected that within the next 10 to 15 years, the country will improve

its nuclear arsenal qualitatively along the following lines: development of solid-propellant ground-mobile Dong Feng DF-31 (with a range of 8,000 km) and DF-41 missiles (with ranges of 11,000 to 12,000 km), as well as new-generation Project 094 SSBNs, presumably equipped with 16 launchers for a Julang-2 missile (range of 8,000 km), a modernized derivative of the DF-31 missile. The new weapons should replace obsolete missiles DF-3A (range of 2,800 km), DF-4 (range of 5,500 km), DF-5A (range of 13,000 km) and Julang-1 (range of 1,700 km). Early in 2002, series production of the DF-31 missile started at a secret plant in the province of Sichuan. Its operational deployment has presumably begun already.

In 10 to 15 years, the Chinese arsenal might total 100 to 150 ground-based ICBMs, featuring high readiness, technical reliability and survivability, as well as three or four SSBNs. In 1981, China launched three earth satellites into orbit by means of a single missile, which demonstrates the ability of the Chinese military industrial complex to fit ICBMs with multiple, rather than single, RVs and BMD penetration aids.

Given the complete secrecy of the Chinese NW program, many foreign experts involuntarily find themselves dependent on Beijing's allaying declarations, which are similar to those made by Soviet leaders in the early 1980s — the most intense years of the arms race. Besides, China's plans are compared with the past, rather than the future programs of other great powers. It is concluded from here that "China's participation in the nuclear race is most unlikely," and, given the fact that China currently pays great attention to economic construction and the solutions to growing socio-economic problems, "the scale and character of the military development in China will, in the near future, be consistent with the principle of defensive sufficiency, which implies development of limited size nuclear deterrent forces."²⁴

Some American experts consider Chinese nuclear levels to be quite low, and the pace of modernization to be quite slow, which might imply a deliberate choice in favor of existential, rather than full-scale and versatile nuclear deterrent capability.²⁵ This assessment has merits and is confirmed by some factual data, although China keeps all information regarding its forces and programs in total secrecy, much like the USSR in the 1960s before its crash build-up. However, even if the possibility of a similar Chinese massive force deployment in the foreseeable future looks unlikely, the authors of this study do not agree with the other extreme — a fully complacent view of Beijing's intentions and plans.

A closer analysis reveals, for instance, that the planned "moderate" programs of the Chinese are larger than those of any other great power. Even if China deployed only 100 to 150 ICBMs within the next 10 to 15 years, it would mean a rate of around 10 missiles per year, apart from the sea-based systems. It is also quite probable that the mere extrapolation of the current rates of military development is a mistake. Possibly the PRC, taking into consideration the mistakes and excessive expenditures made by the Soviet Union and the United States during the Cold War era, has simply decided to skip a few stages of major deployment of intermediate generation systems and is now waiting until an efficient land-mobile MIRVed ICBM system is developed, comparable to Russian Topol-M (SS-27) missiles, before proceeding to their mass production. Beijing may make the reasonable decision to terminate development of its sea-based force — purely prestigious systems that cannot be used effectively to deter Russia and are too vulnerable to the US-Japanese

²⁴ Arbatov, A. and Dvorkin, V., 'Nuclear deterrence and non-proliferation'. Carnegie Moscow Center.- Moscow Moscow. 2005, pp. 48-54.

²⁵ Lewis, J. Bulletin of the Atomic Scientists. May/June, 2005.

antisubmarine defense to be used as a weapon against the United States. (Incidentally China may learn from Russia's current mistakes in pursuing sea-based strategic force modernization). Then, having saved a lot of money, 10 to 15 years from now China would be able to acquire 200 to 300 mobile and silo-based ICBMs of the same type. If fitted with MIRVs, they would be capable of delivering 500 to 900 nuclear warheads along all azimuths.

Thus, progressing from a "low start," China may in the foreseeable future be able to seize the ripe opportunity to outrun all great powers except the United States in the leading-edge SNF systems and become the number two nuclear "superpower," taking the niche of the former USSR.

This fully agrees with the general framework of China's current plans of national development, playing a much bigger role in the world, resolving the Taiwan and Tibet problems, and "shifting the strategic borders beyond the national territory." It is by 2019 that Chinese leaders plan to secure for China the status of "first-rate great world power," and, according to the information on a 1993 secret doctrine of the Communist Party of China, to overrun "three norths within the four seas," the three norths being Russia, NATO and the United States. The fourth sea, in addition to the Yellow Sea, East-China Sea, and the South-China Sea, is the Sea of Japan, to which access is to be gained through the Tumangan River. This doctrine may be interpreted as matching or outrunning Russia and the West in economic and military power on a global scale, while acquiring a secure perimeter and military dominance over the western Pacific rim of China, directly overhanging Japan, Taiwan, the Philippines, Indochina, and Indonesia.

There is an informed opinion in the United States which is quite complacent towards China's prospects of economic, political, and military (including nuclear force) development during the next 10 to 15 years. It is based on the concept of China's fast economic and gradual political modernization and its integration into the world (foremost Western) economic, political, and security system along the models of Japan and South Korea after 1945. This benign view has its merits and should be taken into serious account.

However, a different scenario is also possible, which is shared by the authors of this paper, if only as a hedge against unexpected dangerous developments. One of recent reflections of this school of thought was presented in a *Washington Post* article by R. Kagan, a researcher from Carnegie Endowment for International Peace.²⁶ In particular, Kagan claims that an illusion of being able to manage and integrate a rising power characterized the European attitude towards Germany after its unification under Bismarck in 1870, as well as US policy towards Japan during Meiji modernization after 1868. Both miscalculations eventually led to world wars in the 20th century. The author of the article casts doubt on the illusion that contemporary proponents of a policy of "managing China" among politicians and experts are more wise and skillful than their predecessors of the 19th and 20th centuries.

According to Kagan, the idea that China may be integrated into the East Asian security structures and the "liberal world order" overlooks the possibility that China does not intend to be integrated into a system which it did not participate in creating, which runs contrary to its traditional values and ambitions, and with which China associates heavy historic grievances. Likewise, the condescending Western assessment that China is only striving towards economic growth and would not sacrifice economic ties with the West (including Japan) for political and military gains may be an underestimation. Perhaps China's desire to become rich does not come from wanting to enter the world economic system, but

²⁶ R.Kagan, "The Illusion of 'Managing China'," *The Washington Post*, May 15, 2005.

like Japan of the 20th century, from wanting to change it and adjust it to China's own interests and rules. The symptoms of such inclinations are clear to those who are ready to see them: the rise of China's nationalism and self-assertiveness, and its growing assuredness in its economic and military power.

Besides, if domestic policies are any indication of the true values and possibilities of using power pressure and violence abroad, then many politicians and experts in the West seem to be too eager to close their eyes to the revelations of such policies in China (like the Tiananmen massacre of 1989, the bloody repression in Tibet ever since, and the suppression of any democratic developments outside of the Communist Party elite). Incidentally, such factors are not lost on the West with respect to Russia's domestic policies: the war in Chechnya, curtailment of democratic norms and institutions, the Khodorkovskiy trial, and so on. These generate growing suspicions and conservatism in Western relations with Moscow, despite infinite foreign policy concessions by President Putin (a few examples are the ABM Treaty, SORT, the war in Iraq, NATO and EU expansion, and elections in Georgia and Ukraine).

Indeed, in China there is no rush or crash build-up, but rather a stable and consistent defense modernization across the board of the whole spectrum of conventional and nuclear forces and weapons systems. Meanwhile, these modernizations are covered by a dense cloud of official peaceful and defensive rhetoric, appealing to foreign strategic logical constructions and the desire for self-deception. One example is a recent dialogue between one of the authors of this study and a well-versed Chinese general, who claimed that China did not possess tactical nuclear weapons, since in any war, China allegedly would only defend its territory and would not use such weapons at home. The fact that NATO and the Warsaw Pact claimed the same defensive doctrines during the Cold War, but deployed thousands of tactical nuclear weapons, did not make any impression.

As for Chinese strategic nuclear forces, if they are not limited by agreements with the United States or with the United States and Russia together, the military plans and foreign policy of China will be backed up by powerful missile-nuclear potential. In addition to the high rate of the country's economic growth, another factor which is expected to substantially influence the direction of China's course is the balance of forces among Russia, the United States, China, and the rest of the Asia-Pacific region.

The long-term prospects of relations between the first two great neighbors cause significant, although concealed, concern in Moscow. It is quite possible that in 10 to 15 years, relations between Russia and China may reach a low point in their traditional cycle at exactly the same time that China enjoys maximum military superiority across the eastern Russian border, and in the world as well (in certain respects). In particular, given the above-mentioned intensive variant of developing its strategic forces, China would, for the first time, be able not only to launch a massive nuclear attack on the European part of Russia, but also to acquire considerable potential for a counterforce strike against Russian SNF. As a result, this could reduce Russia's capability of relying on tactical nuclear weapons in seeking to make up for the relative weakness of the general-purpose forces in the East, even for purely defensive missions.

As for relations with another great nuclear power, China is concerned about the United States' plans to set up a theater antimissile defense in Northeast Asia, as well as the prospects of the US providing support to Taiwan in this field. As long as the United States maintains large naval forces and support bases around the perimeter of the Asia-Pacific

region, the security of their interests in the region is guaranteed, considering also the military contributions made by Japan, South Korea and Taiwan. Even a supposed fast build-up of China's SNF would affect the United States to a far smaller degree than Russia, although the novelty of such a vulnerable situation would certainly be felt acutely in Washington. If the United States BMD defense does not meet the expectations of its advocates, then with an expected potential of a retaliatory strike against the United States, China would rule out US use of the "nuclear option" in operations against China, even if the latter posed a real threat to United States interests, troops, and allies in the Asia-Pacific region.

4. Nuclear Deterrence and Arms Control After the Cold War

As described above, there is still a mutual nuclear deterrence relationship between the United States and Russia, despite their declared advance towards a "strategic partnership" in the face of the new threats and challenges. Such a situation is senseless in terms of the national security of both powers, because, in contrast to the decades of the Cold War, it is absurd to anticipate any armed conflict, to say nothing of a deliberate nuclear war, between the two countries. Yet mutual deterrence remains in organizational and technical terms as a burdensome heritage left from a lengthy period of nuclear arms race, global rivalry, and perpetuates the existence of huge nuclear stockpiles.

4.1. Self-Generating Dynamics of the Nuclear Equation

The 2002 SORT has in no way influenced the state and dynamics of mutual deterrence, which first of all should be obvious from the continued existence of strategic nuclear weapons in the available numbers and in their permanent combat-ready status. They have not been designed and deployed for any other condition than that. Besides, it is precisely in this condition that nuclear weapons are continuously monitored in terms of their technical state and are most properly maintained in terms of nuclear safety.

Second, the parties involved are sure to have plans for the use of their combat-ready SNF, including first-strike, launch-on-warning, and retaliatory attacks against specific targets. The number of preplanned targets is approximately of the same order of magnitude as that of the warheads. Given the present number of warheads available to the US and the RF, as well as the numbers of weapons to be reduced by 2012 pursuant to the SORT, there is no doubt that most of the targets of each of the two strategic forces are in the territory of the other country, because the majority of the targets are the other state's strategic forces and other military forces' sites and deployment areas.

At least during the next 10 to 15 years, there will be no place in the whole world, besides US and Russian territories, where sufficient numbers of targets worth attacking with SNF could be found to accommodate thousands of warheads on long-range missiles and bombers. The non-targeting commitment of the mid-1990s is being implemented, but is totally unverifiable, is rapidly and unnoticeably reversible, and thus is not a serious factor of nuclear postures or war planning. In short, the very numbers of strategic weapons, maintained by the US and the RF presently, as well as planned throughout next 10 to 15 years, inevitably and greatly contribute to reinforcing mutual nuclear deterrence.

Third, it usually takes more than a decade to develop any strategic system, from elaboration of a concept and weapon design specifications to full deployment. Then, the strategic system stays in service for one or two years, or sometimes for many decades. At the same time, experience suggests that at any historical stage, political relations between two countries that are not bound together by formal military alliance, joint defense arrangements and systems, and common enemies may sharply change within a few months or weeks. In this sense, strategic planning by necessity is largely detached from current political relations as long as it is not legally constrained by international agreements on future levels, structure, deployment, combat readiness, and forms of employment of forces.

Another important factor contributing to the organizational and technical resilience of the mutual nuclear deterrence situation is the gigantic nuclear infrastructure that has been developed in the United States and Russia over the past few decades, and that is continuing to develop. This nuclear infrastructure cannot be isolated from the on-going scientific progress and technological development. This is due not only to the recognized need for preserving nuclear deterrence. Theoretically, in terms of classic deterrence, the parties might decide to refrain from introducing new types of nuclear arms, but development of new technologies, information and command systems and the need for enhancing nuclear safety and replacing fuel, guidance, navigation, and control systems constantly lead to upgrading the weapons. Also, the nuclear laboratories and research centers would degenerate and deteriorate, unless engaged in upgrading and improving weapon systems and employment concepts.

Last but not the least, the strategic nuclear balance is not hanging in a vacuum — it is affected by nuclear and missile proliferation, development of strategic defense systems, tactical nuclear weapons, changes in conventional arms and forces, and the emergence of new enemies and threats. As was mentioned above, even when genuinely reacting to these “external” factors, the central nuclear balance cannot but affect, often in a destabilizing way, the strategic relationship between the leading powers, at least as long as their relationship is based on mutual nuclear deterrence.

This is why there is no such a thing as just “maintaining” nuclear capabilities — maintenance is accompanied by a constant search for new technologies and force employment concepts. These lead to alterations in weapon systems, command-control capabilities, strategic concepts and operational plans, which then affect force levels and structure due to resource availability. The changes impinge on the bilateral and multilateral nuclear balance and its stability quite apart from the evolution of political relationship between states.

Foreign and domestic political considerations may influence the nuclear balance superficially (and with long lead time) through allocation of more or less funding, and sometimes in the US (but up to now never in the USSR/Russia), via direct decisions on weapon systems, operational plans, or targeting concepts. The only way to do this is through arms control treaties, which directly affect force levels and structure, and indirectly affect their employment strategy.

4.2. Is Arms Control Relevant Anymore?

The above-mentioned quasi-autonomous dynamics of mutual nuclear deterrence became more pronounced in the late 1990s, and intensified further during the current decade

as the START II and START III framework agreements have become deadlocked in Russian and US domestic and international controversies. It has been all the more so because the United States and Russian political quarters have been paying less and less attention to these issues in the new post-Cold War military-political environment, compared to in the past when these matters used to occupy the central place in the relations between the two nuclear superpowers.

Attempts to change radically the nature of strategic relations between Moscow and Washington simply by “assuming away” the implications of their technical and intellectual foundations did not work during the 1990s, and have been even less effective afterwards. In the year 2000, initial information came from sources close to the team of US presidential nominee George Bush that the future administration intended to reject any strategic offensive arms treaty on the grounds that the era of confrontation was over and the two countries were moving towards strategic partnership. Each country was supposed to independently shape its own nuclear policy and program of nuclear force development, proceeding from its own conceptions of national security.

In Russia, this information was perceived with suspicion and displeasure. It was concluded that Washington, being aware of the critical condition of the Russian defense complex and its inability to sustain nuclear forces not only at the level of START I, but also the START II Treaty, had decided to decisively tip the strategic nuclear balance between Russia and the United States. In this way, the US would become the only nuclear superpower that would be beyond the reach for any other country of the world.

At the same time, the process of agreeing upon a new format of the strategic relations between the two countries was hampered by a lack of clear logic in Russia’s nuclear policy, implemented in the SNF development program. Actually, why should there be any pragmatic motive for Washington to talk seriously with Russia about strategic arms if Moscow time and again issued statements to the effect that it could not and needed not maintain nuclear parity with the United States? If the parties had switched places, Russia would probably have done the same; it would have lost interest in seriously negotiated trade-offs and solutions. An alternative approach would have required a much higher level of statesmanship in both capitals, than was, and is, available.

Still, one of the serious flaws in the new American position was the risk of falling into a legal vacuum. Certainly, it would be too much to agree on a new comprehensive treaty, like the START I, under the fully changed conditions, but a radical shift to a complete lack of nuclear arms control regime would have brought about many unpredictable consequences, especially after the United States withdrew from the 1972 ABM Treaty. Recognition of this reality on the US side, and Russia’s interest in having some arms control framework against the background of a new spirit of cooperation in the aftermath of the tragedy of “9-11,” ultimately led the parties to sign the Treaty on Strategic Offensive Reductions in May 2002.

The basic feature of the new treaty was that it fully accommodated the previously approved US and Russian plans of development of SNF based on their own assumptions of the military requirements and economic constraints. Thus, in contrast to START I and START II, neither of the countries was obliged to make concessions and look for compromises that could make them adjust their plans of SNF development. Issues under discussion were only procedures and techniques for weapons reductions, counting rules, and an associated problem of the so-called reconstitution potential.

The Treaty was later criticized for including no verification measures. This is not quite justified, since the START I-defined systems of verification and confidence-building measures would be in effect until 2009 when the duration time of START I Treaty is over. Ideally, the provisions of the verification and confidence-building measures would be prolonged after 2009. Moreover, as currently assumed, the verification system pursuant to the START I Treaty provisions in many ways reflects the mutual mistrust of the Cold War period, including a number of redundant types of monitoring. It might be simplified without reducing the actual level of transparency. Using START I, the parties would have comprehensive information about each other's forces and programs. But without warhead counting rules and procedures for weapon dismantling as applied to the provisions of the SORT, this information cannot be used for verification of implementation of the new treaty.

Possibly in view of a deeply flawed Russian strategic program of 2000 to 2001, its weak Russian diplomacy, and against the background of the conservative political beliefs of the Republican administration after the elections of 2000, SORT was the best achievable option. Still, the fact that the new treaty doesn't limit any party is hardly an advantage — at least as long as the two states continue planning deployment and employment of their forces largely against each other, rather than to oppose other threats separately or jointly. Profound changes in their political relations may slow down nuclear modernization programs, and encourage unilateral reductions of excessive force levels — but in and of themselves, they cannot change the nature of their strategic relationship. Such a change requires a sustained and deeply thought through effort on both sides with respect to military programs and negotiated agreements. The goal of this effort is to transform the nature of strategic relations so that it is in line with new political relations. Otherwise, the old military relations would come into growing contradiction with political cooperation and may hamper or even undercut it altogether.

To do away with mutual nuclear deterrence, it is not enough just to stop being enemies. If the states retain considerable nuclear forces within range of each other, it is necessary to become full-scale military allies to achieve this goal. In this sense, the end of Cold War in no way removed the need for new arms control agreements, but provided an opportunity for much more radical solutions with greater degrees of transparency and predictability, and with simpler and cheaper verification regimes. The new stage of arms control should have a new goal: rather than limiting weapon numbers and stabilizing nuclear deterrence, the new goal should be to change profoundly the very basis of the strategic relationship, liberating the maintenance of the national security of the two powers from reliance on the capability to inflict nuclear devastation on each other.

Up to now, this opportunity has been largely missed in US-Russian relations after the signing of START II and START III framework treaties. The Moscow 2002 SORT has not tangibly improved the situation and looks more like lip service to nuclear disarmament than a genuine new stage of strategic arms control (it is surely a coincidence that in Russian the abbreviation SOR means “trash”).

4.3. Global Partnership and Nuclear Deadlock

The program of Global Partnership against the proliferation of weapons of mass destruction, which had its beginnings at the G-8 summit in Kananaskis in June, 2002, may be seen as a successfully continuing program for the elimination of WMD and nuclear materials,

and the increased security of storage in Russia and some other countries. The United States and its allies (European countries and Japan) have committed themselves to providing Russia and other post-Soviet states with 20 billion dollars during next ten years for this purpose.

During the preceding decade, impressive progress was made in this field, foremost through the well-known Nunn-Lugar CTR program, which had about 6 billion dollars in funding. Aside from the elimination of strategic offensive weapons along the guidelines of START I, security has been enhanced in the storage and transportation of nuclear materials and warheads — financial support has been given to 40,000 scientists and specialists in nuclear, chemical, biological, and missile weapons with the goal of retraining them; a large plutonium storage facility was built in Russia; a number of strategic nuclear submarines were safely dismantled, and so on. Additionally, 200 tons of weapons-grade uranium have been utilized through the HEU-LEU project and burned in US commercial nuclear power stations.

This was really a qualitatively new type of relationship, implying cooperation in eliminating WMD and associated equipment, transcending traditional frameworks of arms control and disarmament, enhancing strategic stability at reduced levels of nuclear balance, encouraging confidence-building, and creating transparency. In a sense, this new type of cooperation was perceived as analagous to a married couple jointly cleaning the room of broken dishes upon making peace after a violent family quarrel. Such cooperation implied openness with regards to the most sensitive military-technical systems, various cooperative industrial projects, activities on each other's territories, mutual adaptation of parts of legal systems, and massive financial transactions within the domain of defense and internal security. In the beginning, it was highly asymmetric by necessity. Russia and other post-Soviet states were in a phase of deep transition and reform after the collapse of the Soviet Empire and were severely short of financial and technical resources. These countries needed foreign aid, and were unable to provide it to other countries. The Russian public and political elite, however believed in the early and mid 1990s that such a situation was temporary and that in the future, Russia would be able and entitled to a much more equal partnership with the West.

Besides profoundly transforming the political and strategic relations of nuclear powers, the program was obviously very important for environmental safety and the clean-up of contaminated areas. Many enterprises, whole branches of defense industries, and science centers were converted from manufacturing weapons to their elimination and disposal. Last but certainly not least, securing storage and transportation, as well as providing for the safe elimination of weapons and weapon-grade materials, were essential for nonproliferation of WMD and for preventing terrorists from gaining access to such weapons and materials.

Despite the great success of the CTR program in the 1990s, some major problems remain unresolved. About half of the nuclear weapons-grade material in Russia is still not under sufficiently reliable protection, and the safety and protection equipment of many centralized nuclear weapons storage places are still in need of modernization. Many dozens of strategic and attack nuclear submarines, withdrawn from service in the Northern and Pacific fleets, still await dismantling and remain "floating Chernobyls." Large land areas need nuclear decontamination and rehabilitation, and "nuclear cities" have not found a model of efficient economic conversion.

The Global Partnership program allows the entire set of cooperative endeavors in the non-proliferation field to be greatly expanded and sped up over the next decade. To facilitate this process, Russia has decided to enhance its financial contributions to the Global

Partnership projects. In 2003 and 2004, 300 million dollars were allocated to it in each year's budgets. Specific projects were developed, which were proposed to all foreign partners. Unfortunately, the total amount of declared funding up to the present day within the Global Partnership (now embracing 22 countries) has not reached the 20 billion dollar level established in Kananaskis. There is a significant disparity between the funds that were promised and that were actually received by Russia for the projects. Russian experts point to the need to perfect the mechanisms for spending money in Russia and in the donor countries. It would also be beneficial to increase the role of audits, to evaluate the effectiveness of money spent, to use independent expertise, and to enlist Russian business to fund socially oriented projects within the framework of the Global Partnership. It is also noted that Russia must demonstrate an ability to perform its own tasks by itself under the Global Partnership, increasing its contribution to the funding of the projects of WMD non-proliferation and fighting international terrorism.

The lack of funding is not the only obstacle to the increasing level of international cooperation. Other key problems include questions of secrecy, bureaucracy, political restrictions and other discrepancies between the US and Russia. Moscow concentrated its efforts on settling questions of taxation, foreign access to secret nuclear sites, transparency, and liability for damage. Some of these problems were resolved in the agreement on multilateral nuclear and ecological programs in the Russian Federation (MNEPR), signed on May 21, 2003 and ratified by the Russian parliament later in that year.

But even the MNEPR is not addressing the main, fundamental problem of cooperation in this area. This problem was hidden behind legal, financial, and technical details during the 1990s and the early part of the current decade. It came out into the open only in March 2005 before the US-Russian summit in Bratislava. It was vividly reflected in the heated discussion in the Russian State Duma and mass media of the alleged "secret agreement" between Washington and Moscow on allowing for the establishment of American control over Russian "nuclear sites and forces."²⁷ Simultaneously, the case of E. Adamov, former Russian minister of atomic energy (from 1997 to 2001), poured more fuel into the fire. Adamov was arrested in Switzerland at the request of the US for presumably stealing US financial aid provided through Nunn-Lugar program in mid-1990s. It was widely assumed in Russia that the US request for the extradition of Adamov to the United States was motivated by the desire to "milk" him for the most delicate secrets of Russian nuclear weapons design.²⁸

In the United States, the Adamov case stirred up opposition in Congress and the mass media against providing Russia with ever-increasing volume of financial aid for elimination of nuclear and chemical weapons. Behind simple accusations of misuse of money, there was a more sophisticated and serious argument against helping Russia. Moscow openly declared its nuclear forces to be the mainstay of its security, foremost through nuclear deterrence of the United States, including new strategic missiles purchased from Ukraine, produced by Russia or developed for the purpose of overcoming a potential American BMD system. The logical question for the United States, then, regards the wisdom of helping Russia deal with

²⁷ Amerikansky zont nad Rossiya (The American umbrella over Russia). *The Support Fund for Media* // <http://www.fondpressa.ru/press-service/analytics/detail.php?ID=9020> (visited 15 September 2005).

²⁸ Adamov should be extradited to Russia// ITAR-TASS.- 7, September 2005/ <http://www.tass.ru/txt/eng/level2.html?NewsID=2391110&PageNum=0> (visited 15 September 2005).

its old WMD, thereby alleviating its financial burden and facilitating allocation of larger financial resources for new weapons against the US.²⁹

On the other hand, Russia must continue with modernization of its SNF to keep at the SORT ceilings (1700 to 2200 warheads), since maintaining some strategic balance is considered essential for national security. This is all the more so, since the United States refused to go for lower numbers and demonstrated clear reluctance to having a new full-scale arms reduction treaty in place of START I and START II/III. Huge projected US offensive counterforce weapons (carried by Trident-2 SLBMs and Minuteman-3 ICBMs with powerful W-87 warheads refitted from dismantled Peacekeeper MX missiles) in combination with a strategic ballistic missile defense system is commonly perceived as a technical (if not strategic) threat to Russian nuclear deterrence capability. Being obliged to accept aid from the West through CTR in the past and Global Partnership in the future, Russia is at the same time not willing to lose its deterrence and concede to the US clear-cut nuclear superiority, which Washington had failed to retain during several decades and four big rounds of the massive Cold War nuclear arms race (1950s to the 1980s).

The above dichotomy of simultaneous nuclear confrontation and nuclear cooperation was for some time unavoidable, and did not cause any serious concern in the 1990s. Consciously or subconsciously, there were hopes for removing this contradiction by enhancing cooperation while downgrading confrontation, and finally doing away with confrontation, bringing strategic nuclear relationship in line with a political and economic partnership with the prospect of eventual full-scale alliance. It did not, however, work out like this. Mutual nuclear deterrence survived and now is being projected for the foreseeable future, due to US reluctance and Russian inability to seriously and consistently address the problems of deterrence. Instead the problems were just moved to the background of the relationship and of the current official rhetoric of both countries. This left the military and defense industrial institutions to operate unilaterally with very little control by the political leadership or public of either country.

These problems in some senses became worse through the neglect shown by state leaders, although this is not so obvious in the day to day political relationship between the two nations. These problems resurface repeatedly and persist in spoiling cooperation in other areas, in particular in the complex issues covered by CTR and Global Partnership. The more ambitious the cooperative projects, the more tangible the detrimental impact of nuclear deterrence, which has come into the open through recent episodes with US “access to nuclear sites” and the “Adamov case,” as well as growing criticism in the United States of Russia’s nuclear practices.

It is the strong belief of the authors of this study, that from now on, Global Partnership will be encountering not the technical, but growing systemic obstacles of the continued dichotomy of the nuclear relationship of Russia and the West. To promote cooperative nuclear (and chemical) weapon elimination projects, the United States and Russia should profoundly change their present “ostrich” attitude to nuclear deterrence. The main task here would be to elaborate and make serious steps to further reduce and stabilize the nuclear balance, and eventually, by a combination of unilateral measures and bi- and multilateral agreements, to transform it into cooperative mode in line with the concepts of cooperation of the CTR and Global partnership.

²⁹ Kommersant, July 5, 2005. <http://www.securities.com/doc.html> (visited 14 September 2005).

4.4. Unlocking the Trap of Nuclear Deterrence

Attempts to change the principles of Cold War era mutual nuclear deterrence between the United States and the Soviet Union (Russia) go back to the mid-1980s. However, all these efforts to transform the principles might be considered failures. The same is also true of the frequent proposals to assume that the post-Cold War nuclear deterrence is to be considered not as deterrence against deliberate aggression, but rather as deterrence “against a return to confrontation and the arms race.” Whatever considerations may be proposed by politicians and scholars, the material basis of nuclear deterrence exists in weapons hardware and operational planning which implies its own logic of development, deployment, and employment of nuclear forces.

It is hard to understand what role nuclear deterrence between the United States and Russia actually plays as an instrument of their military security against the background of their developing relations of partnership and cooperation (even in most sensitive areas, such as nuclear weapons safety and dismantlement). It is absolutely absurd to assume the possibility of an exchange of even single nuclear warhead attacks, to say nothing of massive nuclear strikes. Nevertheless, the deterrence can still be maintained virtually indefinitely for the above reasons unless a set of consistent, well-thought-through and goal-oriented measures is taken.

The remaining situation of mutual nuclear deterrence between the two powers is subject to sharp criticism from various sides. It is in striking conflict not only with the proclaimed idea of a partnership, but also with that of international security, non-proliferation, and counterproliferation policies. Whatever huge efforts are mounted at the top political level to break away from the Cold War, the situation of mutual nuclear deterrence as materialized in the military stockpiles can theoretically lead at any point to an entire set of the confrontation-type relations between the two powers.

Measures of a phased retreat from the mutual nuclear deterrence stance have been developed for a long time. Among other things, they include the mid-1990s agreements on non-targeting of strategic missiles against each other’s territories, procedures for lowering the missiles’ alert status and changing submarine and bomber patrol patterns, and so on. These remain either symbolic or hard-to-implement measures because of the existing high quantitative levels and some qualitative characteristics of the SNF of the two powers, as well as the deep-rooted plans of their combat employment which in material terms, invariably doom them to oppose each other.

To overcome this “syndrome,” Moscow and Washington should, as an immediate objective, turn the Moscow 2002 SORT “agreement on intentions” into a full-scale arms reduction treaty. They should agree upon the stages in the weapons reductions pursuant to the SORT and on the warhead counting rule. They should settle issues of removing the secondary limitations of the START I Treaty that make Russia and the US allocate extra funds. They should start discussing verification of the stored warheads and their disposal (with due regard for the existing experience of liquidation of warhead bodies under the Intermediate Range and Shorter Range Missile Treaty), and hold consultations on further enhancing the transparency of the strategic nuclear weapons and their operational deployment. Beyond these measures, the duration term of START I should be extended until 2012, so as not to leave an arms control and verification gap between 2009 (when START I is to end), and SORT (which should be implemented by 2012). If the legal and substantive points of SORT are fixed soon, START I extension would be needed for the sake of transparency. Finally, the

duration of SORT should be extended until 2015 to avoid having the treaty expire simultaneously with the final implementation of SNF reductions under SORT.

All this would not, in and of itself, change the nature of US-Russian strategic relations, but it would profoundly stabilize them and thus provide the necessary starting point, framework, and momentum for further steps, which would deal directly with the fundamentals of mutual nuclear deterrence.

Some may object that this would represent a return to classic Cold War arms control, allegedly irrelevant in the new environment. This criticism doesn't hold water. The experience of the last decade has shown that abandoning any serious arms control effort as an anachronism of the Cold War does not remove the problems of continuous mutual nuclear deterrence, but rather leaves them uncontrolled and free to impose their self-generated effects and complications on the military and eventually political relationships between states. In the absence of a full-scale SORT, the US and Russia will have to live under the still more outdated START I Treaty. Real SORT is needed to make up for the lost time and provide the legal bridge to a different arms control, which corresponds better with new military and political relations between the two leading nuclear powers.

At the next stage, it might be appropriate to conclude another SORT (SORT II), which could, for instance, provide for the reduction by 2017 of the operationally deployed warheads down to the limit of around 1,000 to 1,200 warheads, provided the parties agree upon the appropriate definitions, counting rules, and verification.

This level is not just another lower ceiling for the same mutual deterrence potential. It is of special significance, because it is seemingly the lowest limit which the two powers could set on their SNF while leaving out of the account the nuclear forces of the three other nuclear weapon states of the Big Five, as well as ignoring the counterforce potential of long-range precision-guided conventional weapons and BMD/AAD defensive systems.

It is even more important that somewhere near this limit, the SNF of the two biggest powers cease to be targeted predominantly against each other's forces and urban-industrial sites. Taking into account the part of SNF which is not routinely operationally deployed, not on patrol or at high alert status, or is in overhaul or retrofit procedures — the combat ready forces would then be apportioned in much more balanced ways to target each other's territories, other nuclear weapon states or rouge states, conventional and other targets in other countries. Technology for quick retargeting would help to assign SNF not simply to multiple attack options against each other, but multiple war scenarios against various sets of opponents. In some of those scenarios, US and Russian forces might stay neutral to each other or even act like allied forces. The nuclear balance would then be turning from predominantly bilateral to increasingly multilateral, which would start the process of unlocking US and Russian SNF from their traditional mutual nuclear deterrence dynamics and predicament. Besides, such reduction would most probably make the two sides shift from triads to dyads, thus doing away with one of the most absurd legacies of Cold War: the "nuclear overkill" mentality.

5. Transforming the US-Russian Deterrence Relationship

Reductions beyond 1000 warheads do not seem attractive unless combined with stringent stability measures, which have always been controversial in view of the different geostrategic situations, force structures, and operational concepts of the sides. At very low levels these differences would become much more conspicuous and harder to resolve. Besides, just further linear reductions — down to 700, 500, or 300 warheads — would involve numerous external issues (taking account of TNW, third nuclear states, defensive systems, conventional forces and systems, and so on). Also, if implemented within the traditional mutual deterrence paradigm, it could destabilize strategic balance by making forces more vulnerable and increasing the effect of counterforce strikes. Even if not, the inexorable logic of most efficient targeting of smaller forces would put the highest price tag on hitting the small number of vulnerable C³I facilities (decapitation strikes). This would be still more destabilizing. And last but not least, within a mutual deterrence model, getting down to very low weapons numbers would revive the dilemma of making nuclear war less unthinkable, and deterrence less credible.

There is a frequent argument that the very process of reducing NW down to a few hundred or dozen warheads would imply such an improvement of political relations between the parties that the above deficiencies and concerns would become irrelevant. This might be so, but it is not self-evident and there is no hard proof of such an assumption. And since there may be various factors outside the strategic balance that worsen political relations, the optimistic assumption should not be taken for granted. The authors of this paper believe that improvements of political relations between or among nuclear powers should not be relied upon to make up for the deficiencies in their strategic relationship. Rather, political ties should be fortified by the appropriate changes in strategic relations in specific ways and forms pertinent to this subject matter.

Reducing US and Russian operationally deployed forces to around 1000 warheads would avoid these negative consequences, and at the same time, open the door to genuinely new steps for revising the US-Russian mutual deterrence paradigm. Those may start with a mutual US-Russian ban on launch-on-warning operational concepts, followed with qualitatively new arms control agreements on de-alerting strategic offensive forces by technical measures and changes in their operational deployment practices.

5.1. Verifiable Ban on Launch-On-Warning Concepts

Although nuclear deterrence does not require the concept of launch-on-warning attacks that has been adopted by both the United States and USSR/Russia, this concept certainly implies deterrence in its most dangerous and politically least controlled form. In order to take a decision on the launch of missiles on the basis of information from early-warning systems, the national leaders have only a few minutes at their disposal — therefore, there is always a risk of a miscalculation or technical malfunction, leading to accidental or inadvertent nuclear war.

Moreover, the continued practice of planning launch-on-warning attacks once again underlines that the unchanged principles of nuclear deterrence are in outrageous conflict with the partnership relations between Russia and the United States. It refers precisely to their bilateral mutual deterrence paradigm, since only Russia and the United States have their own

missile early-warning systems and missiles capable of launch-on-warning strikes. This concept has nothing to do with China's nuclear forces, for its forces are not expected to have a noticeable counterforce capability in the near future. Even in the case of a hypothetical Chinese missile strike, there is no urgent incentive to launch a counterattack. The same is true of Russia's LOW operation in response to British or French hypothetical nuclear strike, until their SLBM forces acquire counterforce capability and (or) deliver a strike in coordination with a massive US missile attack. Of course, there is always the problem of the vulnerability of US and Russian C³I systems to even a limited surprise nuclear strike, but it is generally believed that a large survivable part of strategic force command and control could be reconstituted sooner or later and devastating retaliation would be inflicted on the aggressor.

At first sight, the rejection of the LOW concepts might seem to be a purely declarative measure, with no verification provisions as a back-up. Yet, the rejection of launch-on-warning attack plans can be confirmed with sufficient reliability by verifiable technical means of lowering the alert status of any component of the nuclear triad, and especially the one intended primarily for missile launches based on information from warning systems.

The authors of the present study and experts of the Academy of Military Sciences of the RF have jointly developed a draft "Executive Agreement between the Presidents of the Russian Federation and the United States of America on Urgent Measures to Exclude the Possibility of Strategic Missile Launches on False Alarm."³⁰

According to this document, Russia and the United States would renounce plans to use strategic offensive forces in response only to information from their missile early warning systems. The form of the agreement is such that it should not be necessarily approved by legislative bodies of the United States and Russia and can come into force upon the date of signature. The Executive Agreement provides for agreed-upon verifiable procedures for lowering the alert status of missiles.

Sometimes proposals are made by some experts to immediately start lowering the readiness status of the missiles that are expected to be reduced by 2012 down to the warhead levels (1700 to 2200) set forth by the SORT. In the view of the authors of the present study, this might destabilize the strategic balance because current modernization of the ground and sea-based components of Russian SNF is not close to being completed.

In particular, by 2012 under the SORT, a predominant part of the currently deployed SS-18 and SS-19 MIRVed ICBMs, SS-25 ground-mobile missiles, and all but one Typhoon and six Delta-4 SSBNs, would be decommissioned. Taking them off alert right away would leave Russia with a very vulnerable force of a few dozen silo-based SS-27 and SS-19 ICBMs, 100 to 150 SS-25 mobile missiles, and seven submarines with only one to two at sea from time to time. The number of warheads on alert missiles would go down much lower than the SORT ceilings require. Deployment of the main force of silo-based and mobile SS-27 missiles, several SSBNs of a new class and a new SLBM system will take many years. During this time, the existing sea and land-based missiles at normal alert status will be providing for more force survivability, rough numerical parity, and greater stability of the strategic balance with the United States.

³⁰ Arbatov, A. and Dvorkin, V., 'Nuclear deterrence and non-proliferation'. - Carnegie Moscow Center. - Moscow. - 2005, p.60.

Since US forces are sufficiently modern and efficient, and are not dependent on a big modernization program to stay near the 1700 to 2200 SORT ceiling seven years from now, they do not face the same problem as Russia in the case of immediate large-scale de-alerting.

The abandonment of plans to launch missiles based on the information from early warning systems does not remove the role of these very systems. They would no longer be important for urgent retaliation by the two nuclear powers against each other, but would still remain essential as long as a delayed second strike response remains a mainstay of bilateral strategic stability (providing reliable information on the origin and scale of a hypothetical attack).

Simultaneously and increasingly important will be their role oriented “outwards” of the bilateral nuclear balance. The Executive Agreement assigns a special role to the Moscow-based Joint Data Exchange Center (JDEC) for the exchange of information derived from each party’s warning systems that is based on efficient operations of the parties’ early warning radars, early warning and reconnaissance satellites. They would play an increasing role as a means of monitoring proliferation of missiles and missile technologies, and warning of a hypothetical missile strike of a third party. Such early warning systems are sure to play still greater roles if the early warning systems of the two countries are eventually integrated.

With this purpose in mind, the agreed-upon functions of the center should be expanded, in addition to the expansion of its information exchange process.

Another point is of some importance. It is obvious that fully or partially reduced SNF alert status can best be maintained first and foremost under conditions of profound relaxation of political and military relations with expanding element of cooperation. If tensions escalate in Russian-American relations, the parties would most likely transfer their missiles back from a low readiness to a full alert status, which could add to the level of tension, since operational and technical preparations for a first and second strike are indistinguishable. Hence, a reduced alert status per se can be considered to be an additional factor of restraint from any escalation of political or military tension between the two nuclear superpowers.

While the abandonment of LOW concepts may be verified in a highly reliable way by technical and operational de-alerting of SNF, before this happens, certain steps to substantiate such an agreement are necessary. One is an agreement to invite representatives of the other side to all large-scale SNF exercises to prove that LOW is not the task of training. Another, more far-reaching step is to agree to place permanent liaison officers at SNF command centers (at the US’s Offut, and at Russia’s Vlasikha) as well as at US NORAD and RF Missile-Space Defense command centers (analogous with Russian-NATO missions, but with the permanent on-duty presence of foreign officers at the sites).

5.2. Verifiable De-Alerting of Strategic Forces³¹

Organizational and technical measures to reduce the high-alert status of strategic forces may include the following:

³¹ This section borrows from the report: Dvorkin, V., ‘Development of administrative and technical methods to prevent launching of strategic missiles by mistake (accident) upon information of early warning systems and to prolong decision-making time on retaliatory action’. Strategic Nuclear Forces Center. Academy of Military Sciences. Moscow. October 2004.

- Agreement on a set of measures that confirms the commitments of the parties to rule out the likelihood of using the SNF based on information from missile attack warning systems.
- Agreement on the stages in the process aimed at consistent reduction in the technical readiness of SNF for launches of ballistic missiles of various basing modes.
- Implementation of the organizational and technical measures that confirm the commitments of the parties to rule out the likelihood of employing the SNF on the information from missile attack warning systems.
- Demonstration of reliability of the organizational and technical measures that confirm the commitments of the parties to rule out the likelihood of using the SNF on the information from missile attack warning systems, and define a minimal period needed to restore the SNF high readiness status.
- Demonstration of feasibility of verifying the reliability of the organizational and technical measures.
- Development of agreed-upon common and individual verifiable organizational and structural-technical measures confirming that missiles cannot be launched on warning from their missile warning systems.

A major portion of the set of the organizational and technical measures aimed at lowering the combat readiness has already been studied by experts in the context of practical implementation of the START II Treaty, which provided for “deactivation” of the delivery vehicles subject to destruction under the aforementioned treaty. In doing so, they interpreted the term “deactivation” to mean that elements of the missile systems of each party should be put into a state that makes the missile launch impossible without putting them back into the initial state.

Russian specialists have developed a number of alternative procedures for reducing and restoring the missile launch alert status, as well as systems of inspection and notification on a changed level of combat readiness that are considered to be acceptable for the Russian SNF. Most of them can also be applied to the US SNF, but they should be assessed in full detail and agreed upon by US specialists.

The following methods of ICBM deactivation are feasible:

- Removal of a re-entry vehicle (RV);
- Dismantlement of an on-board power supply unit;
- Dismantlement of gas generators which open the roof of a silo launcher; and
- Mechanical dissection of a pneumohydraulic system of ICBM pre-launch operation and launching.

The techniques of SLBM deactivation should be applied only to the SSBNs deployed at their bases. Peculiar features of the SLBM deactivation are due to some individual operational and technical differences in missile launches in Russia and the United States. It is believed that unlike US SLBMs, Russian missiles can be launched from surfaced submarines

at their bases. That is why in principle they might escape an attack through launch-on-warning if the bases are attacked by an opponent's ICBMs or SLBMs.

The following techniques of reducing SLBM readiness for an immediate launch can be considered:

- Obstruction of the opening of a SLBM launcher hatch through a welding operation;
- Removal of re-entry vehicles from SLBMs; and
- Retrieval of SLBM from SSBN launcher and its placement in base storage.

In terms of economy, preference should be given to the measures of reducing readiness that can be implemented at the least cost and are at the same time verifiable at a level of reliability that is found acceptable by the other party.

5.3. Deactivation Techniques

RV removal. In deactivating a missile through removal of a re-entry vehicle, continuing combat duty and monitoring of the missile state can be carried out only through installation of the RV electronic substitutes (imitation devices). Removed re-entry vehicles should be packed, moved to, and stored inside special containers at storage facilities located at ICBM bases or at centralized depots.

It takes at least 20 to 30 hours to put a RV-free missile back on high alert in the case of a fixed ICBM (re-emplacment of an RV) and over 30 hours in the case of a mobile ICBM. Once a RV is stored at a centralized storage facility, the replacement time is much longer (days or weeks), since special transportation vehicles are used to take the warheads to an ICBM base.

The actions to downgrade missile high alert status through separation of a re-entry vehicle of a fixed ICBM include opening the silo protective roof, removing a missile nose-cone, separation of an RV, moving the RV to a storage site, emplacing an RV mock-up and closing the silo roof. To restore the high alert status of a fixed ICBM, it is necessary to move the RV from a storage facility to a silo, open the silo protective roof (five to seven hours), remove an RV mock-up (up to three hours), install the RV (up to three hours), install the nose-cone, close the silo protective roof, and carry out electronic tests (10 to 15 hours).

In reducing the missile readiness through separation of a re-entry vehicle of a rail-mobile ICBM, it is necessary to move an ICBM-carrying rail mobile launcher to a maintenance facility of the ICBM base, open the roof of the rail-mobile missile launcher (RMML) car, hoist an ICBM container, remove the nose-cone, separate the RV, move the RV to the maintenance facility of the missile base for its subsequent storage there, install an RV mock-up, put the container with the missile down, and close the roof of the RMML railcar.

The procedure for restoring the high readiness of a rail-mobile ICBM consists of moving the rail mobile launcher together with a missile to a maintenance facility at an ICBM base, moving the RV from a storage facility to a rail mobile launcher, opening the roof of an RMML railcar and hoisting of the container with an ICBM (up to 10 hours), separation of the RV mock-up (up to five hours), re-installation of the RV (five to six hours), installation of the

nose-cone, putting the container with the missile down into the RMML railcar, closing the roof of the railcar, and electronic tests (up to 20 hours).

To lower high alert status of a road-mobile ICBM through RV separation and restore it again, it is necessary to move the road mobile launcher and a missile to a maintenance facility at an ICBM base, separate the RV, move the RV to a maintenance facility at the missile base for storage, and install an RV mock-up. The procedure for restoring the readiness of an ICBM in a road-mobile launcher (RML) includes moving the RML together with a missile to a maintenance facility at the ICBM base, moving the RV from a storage facility to the road-mobile launcher, dismantling the RV mock-up (up to five hours), coupling the RV (up to five hours), and electronic tests (up to 10 hours).

Dismantling of an onboard power supply unit (OPSU). The OPSU is used only during the initial operations, and while in flight. That is why dismantlement of the unit does not affect the technical state of a missile when stored and remotely tested. Outside verification is exercised in the process of RV separation. When an OPSU is dismantled, it is necessary to separate an RV and place appropriate end caps. It takes around 30 to 50 hours to restore the high readiness status of a single fixed missile, and more than 50 hours in the case of a mobile ICBM.

Reduction of the fixed missile readiness through the dismantlement of an OPSU includes a number of procedures, such as opening of the protective roof of the silo missile launcher, separation of an RV, dismantling the OPSU, installation of an OPSU mock-up, installation of the RV, and closing the roof of the launcher.

In order to restore its readiness, it is necessary to open the roof of the silo-based launcher (five to seven hours), separate the RV (three to five hours), dismantle the OPSU mock-up and install an OPSU (at least two to three hours), install the RV (up to three hours), close the roof of the silo-based launcher, and carry out electronic tests (10 to 15 hours).

Measures used to lower the readiness level of a rail-mobile ICBM through dismantling an OPSU and its restoration include the following steps: moving the rail mobile launcher together with a missile to a maintenance facility at an ICBM base, opening the roof of a RMML railcar, hoisting of the container with an ICBM, separating the RV, dismantling the OPSU, installation of an OPSU mock-up, installation of the RV, putting the container with a missile into the railcar, and closing the roof of the launcher railcar.

The procedure for restoring the high alert status of an RMML-based missile includes the following: moving the rail mobile launcher together with a missile to a maintenance facility at an ICBM base, opening the roof of a RMML railcar and hoisting the container with an ICBM (up to 10 hours), separation of the RV (up to five hours), dismantling the OPSU mock-up and re-installation of an OPSU (two to three hours), re-installation of the RV (five to six hours), putting down the container holding the ICBM, closing the railcar roof, and electric tests (up to 30 hours).

Measures used to reduce the readiness of a land-based mobile ICBM through dismantling an OPSU include the following operations: transportation of the road-mobile launcher together with a missile to a maintenance facility at an ICBM base, separation of the RV, dismantling of the OPSU, installation of an OPSU mock-up and re-installation of the RV. In order to restore the readiness of an ICBM in the RML, it is necessary to move the launcher together with a missile to a maintenance facility at an ICBM base, separate the RV

(up to five hours), dismantle the OPSU mock-up and re-install an OPSU (two to three hours) and re-install the RV (up to five hours).

Dismantling of gas generators used to lift the protective roof. Implementation of the deactivation method requires that some additional methods of verification be worked out and that the inspection procedure be revised, so that the inspection team is allowed wider access to the facility to be inspected. It takes 10 to 20 hours to restore the readiness of a single ICBM.

To reduce the fixed ICBM alert status through dismantling of gas generators used to lift the protective roof, it is necessary to carry out the following operations: entering the silo launcher, opening the launcher protective roof, dismantling the gas generator, moving the gas generator to a maintenance facility for storage at an ICBM base, and closing the protective roof of the launcher.

To restore the alert status of the ICBM it is necessary to bring the gas generator back from the storage facility to the silo launcher, reduce its combat readiness, enter the launcher and open the protective roof of the launcher (up to five hours), re-install the gas generator (one hour), close the protective roof of the launcher, and carry out electric tests (five to 10 hours).

Mechanical dissection of a pneumohydraulic system of missile pre-launch activity and launching as an ICBM deactivation method. An ICBM can be deactivated through dismantling pipelines (junctions) of the pneumohydraulic system of the missile pre-launch operation and launching.

As with the previous deactivation methods, it requires that some additional methods of verification be worked out and that the procedure for inspections be revised, so that the inspection team is allowed a wider access to the installation.

It takes 20 to 30 hours to restore the readiness of a single ICBM.

Blocking the opening of a SLBM launcher hatch by means of welding as a technique of SLBM deactivation. Blocking the opening of a SLBM launcher hatch by means of welding requires that welding operations be conducted in each SLBM launcher, so that its hatch cannot be opened without restoration works. It takes around two hours to restore the original combat-ready status of the launcher. This means that it will take at least 25 hours to restore each SSBN depending on the number of SLBM launchers and number of welding operations to be carried out. It is noteworthy that the launchers themselves might be either empty or accommodate deployed SLBMs, together with an RV or without it. Therefore, the time it takes to activate an SLBM can vary widely.

Deactivation of a SLBM through removal of RVs. Removal of RVs of SLBMs at submarines in bases as a method of reducing missile readiness requires storage facilities be available for removed RVs. It does not, however, demand that additional funds be allocated to keep SLBMs operational.

It takes at least three hours to replace RVs in SLBMs. Accordingly, it will take 48 to 72 hours to replace RVs in all SLBMs depending on the number of SLBM launchers aboard the SBNN.

In these time calculations, it was assumed that all RVs of SLBMs were located at an SSBN base. The time required to take them to the SSBN base when stationed elsewhere was not taken in account.

Deactivation of SLBMs through their removal from SSBN launchers. Such a technique of lowering the alert status of missiles and their subsequent placement in storage facilities is the lengthiest in terms of the time necessary to bring them back to the required level of readiness. However, the United States has adopted the practice of keeping some SLBMs in loading tubes, which allows them to load into SSBN launchers within a very short time. It takes just two to four hours to load one tube-housed SLBM into a launcher, with the time necessary for loading all the launchers of Ohio-class SSBN totaling 48 to 96 hours. It goes without saying that a SSBN can be loaded to the full only if all the SLBMs scheduled to be installed in launchers are pre-placed in loading tubes.

The technology of placing SLBMs into loading canisters is very labor-intensive and time consuming. It normally includes testing each separate stage of a missile, including fuel quality; monitoring stages assembled in a missile; monitoring working efficiency of the missile, including the guidance unit and RV; and loading a missile into a canister at a vertical assembly shop. All the procedures together might take around 100 hours for each missile.

Even if operations to prepare an SLBM for canister loading run parallel to one another, it would take a lot of time to load SLBMs into all SSBN launchers, given the limited number of personnel authorized to conduct such work. One proposal is to limit personnel, but this way does not seem very promising due to verification problems. It might be easier to limit the number of canisters at each base.

In the case of a full deactivation of the launcher of an SSBN and disassembly of all SLBMs into stages, it would take around 30 days to bring to readiness a single SSBN, given a sufficient amount of canisters.

The aforementioned methods allow for complete monitoring of the technical state of nuclear safety at alert status, remote electrical tests, scheduled maintenance and technical repairs. Missile launches cannot be conducted unless restoration operations are carried out because the countdown graph is blocked automatically.

Reduction of bomber readiness. The air leg of the nuclear triad is not usually associated with the launch-on-warning concept. In case of crises, bombers may be put on 15-minute alert or ordered to take off in anticipation of attack and to stay on air patrol for many hours.

If, however, de-alerting is applied in a more general mode, bombers should also be subject to such measures. The greatest asymmetry between the US and Russia is in the air component, and Moscow would not agree to leave it out. This is all the more so because reconstitution time to return missiles back to high alert status, as was shown above, may require many hours or days, and this time is in many cases shorter than the bomber flight time between the US and RF.

The simplest and most easily verifiable procedure for de-alerting bombers was invented in START I with respect to converting nuclear capable bombers for non-nuclear missions. It consists of placing bomber nuclear weapons (ALCMs and gravity bombs) in storage facilities not closer than 100 km from a bomber deployment base and prohibiting mixed basing of nuclear capable and converted bombers.

This method looks best for de-alerting bombers in the context of general readiness reduction. One additional measure may be recommended: prohibiting mixed basing of de-alerted heavy bombers with medium-range bombers and dual-purpose tactical strike aircraft. This would remove the need to store nuclear weapons of medium and tactical strike aircraft at the bases of de-alerted heavy bombers, thus compromising their de-alerting, since some weapons may be used by heavy bombers, or medium and tactical airplanes.

In contrast to missiles, bombers may fly to other airfields where nuclear weapons are stored and may be quickly armed to be put on high alert or take-off for a nuclear strike. If this possibility is taken seriously, more complicated and expensive technical measures may be required to de-alert bombers by removing their ability to quickly take off or to carry nuclear weapons. Here, the procedures elaborated under START I for converting heavy bombers for non-nuclear missions (with functionally related observable differences incorporated) might be most appropriate. Another possibility could be to put permanent inspectors of one country and the other country's heavy bombers airbases.

5.4. Inspection Procedures for Different Techniques of Deactivation

Verification of the removal of RVs. Procedures for inspecting RVs of deployed ICBMs are described in the START I Inspection Protocol. Section 6, Article XI of the treaty specifies a quota of 10 inspections per year. These procedures have been conducted more than once in practice and do not need any clarification.

Verifying the dismantling of the on-board power supply unit. In deactivating the ICBM through dismantling an on-board power supply unit, the fact of deactivation can be confirmed during the quota inspections conducted in conformance with Paragraph 6, Article XI of the START Treaty (10 inspections per year). Procedures for conducting inspections should be worked out in practice during their early exhibition and be agreed upon by the parties. During the early exhibition of ICBM deactivation, the following measures may be proposed:

- Carry out inspection procedures with respect to the RVs of deployed ICBMs for silo launchers, rail mobile launchers, and road mobile launchers up to the moment when the RV is separated, and an ICBM and a launcher are prepared for visual examination (see Annex 3, Inspection Protocol);
- After two inspectors have made certain within one minute that the RV has been separated, prepare the on-board power supply unit for a display, with some components of silo launchers, rail mobile launchers, road mobile launchers, and their ICBMs camouflaged;
- Exhibit to the inspection teams for 15 minutes, from a place indicated by the in-country escort, the upper part of the self-contained dispensing mechanism (SDM) with an OPSU and have it photographed by the escort members using the photographic equipment of the inspected party;
- Dismantle the OPSU from the ICBM; and

- Demonstrate to the inspection team for 15 minutes, from a place indicated by the in-country escort, that there is no OPSU aboard the ICBM and shoot a photograph of the upper part of the SDM less the OPSU.

While a silo launcher, rail mobile launcher, or road mobile launcher, and their ICBMs are being prepared for demonstration, the inspection team is in a place or places that have been indicated by the escort, at a distance not more than 50 meters from the silo launcher, rail mobile launcher, or road mobile launcher, where they can visually and continuously observe the rail mobile launchers (the upper part of the silo launchers).

Procedures for RV inspections. During the post-inspection procedures, it is necessary to draw up and sign an inspection report that records the fact of ICBM deactivation and includes photographs of the ICBM with an OPSU applied, and without it applied. The procedure of the follow-up inspections can be as follows:

- Inspectors arrive at a silo launcher, rail mobile launcher, or RML that they have designated;
- Inspectors compare the geographical coordinates of the silo launcher;
- From a place that has been indicated by the inspected party, inspectors watch as the protective roof of a silo launcher (the roof of a rail mobile launcher) is opened and the RV is separated;
- Inspectors confirm that the RV has been separated in full;
- Once the ICBM is ready for exhibition, the inspection team examines visually the upper part of the SDM for 1.5 minutes, and confirms through comparison with the photographs taken during the early exhibition that there is no OPSU there.

The above method of ICBM deactivation allows the inspecting party to monitor restoration of the missile readiness by its national technical means of verification.

Verifying the dismantlement of a gas generator used to lift the protective roof (PR). In deactivating an ICBM through dismantlement of the PR lift gas generator, the fact that the missile cannot be launched can be confirmed during quota inspections conducted pursuant to Paragraph 6, Article XI of the START Treaty (10 inspections a year). Procedures for conducting inspections should be tried out during early exhibitions and agreed upon by the parties.

During the early exhibition of measures to make sure that the ICBM cannot be launched, we propose the following:

- Exhibit to the inspection team for 15 minutes, from a place indicated by the in-country escort, where the gas generator is located and have it photographed by escort members using the photographic equipment of the inspected party;
- Dismantle the gas generator; and
- Demonstrate to the inspection team for 15 minutes, from a place indicated by the in-country escort, that there is no gas generator there, and have the place of the installment photographed.

While the launcher is being prepared for an exhibition, the inspection team is in the place or places indicated by the escort.

During the post-inspection procedures, it is necessary to draw up and sign an inspection report confirming that the ICBM cannot be launched and including the annexed photographs.

The procedure of the follow-up inspections might be as follows:

- Inspectors arrive at the launcher that they have pointed out;
- They check the geographical coordinates of the silo launcher;
- They observe opening of the launcher protective roof from the place indicated by the inspected party; and
- The inspection team examines visually the upper part of the silo launcher for 15 minutes and makes sure through comparing it with the photographs taken during the early exhibition that there is no gas generator there.

Verifying the mechanical dissection of the pneumohydraulic system of ICBM pre-launch operation and launching. In deactivating the ICBM through mechanical dissection of the pneumohydraulic system of the pre-launch operation and launching, the fact that the missile cannot be launched might be confirmed during the quota inspections that are conducted pursuant to Paragraph 6, Article XI of the START Treaty (10 inspections a year). Procedures for conducting inspections should be tried out during an early exhibition and agreed upon by the two parties.

According to this method, inspectors should be allowed access to the apparatus section of the silo launcher and inside the launcher space as deep as about 6 meters and informed about the procedure of launcher operation during a launch of the missile. In addition, restoration of the silo launcher and ICBM readiness can be implemented covertly, without opening the launcher protective roof. This rules out the use of the national technical means of verification.

Verifying SLBM deactivation. The above variants of SLBM deactivation can be verified during inspections carried out under the START I Treaty in line with verification of the updated data, such as blocking the opening of the SLBM launcher hatch by means of welding and removing SLBMs from SSBN launchers, as well as blocking the opening of a SLBM launcher hatch by means of welding and removal of RVs from the deployed SLBMs during inspections of the warheads on SLBMs. It is noteworthy that no additional measures of verification are to be agreed upon.

Demonstration of the organizational and technical measures under way. The party that chooses a particular technique of reducing the missile alert status may, as a way of enhancing credibility, conduct a demonstration of the operations used to restore the missile readiness, with chronological parameters of the restoration procedures fixed, and the number of items of the used special equipment listed. If the measures taken are not convincing enough, the above demonstration is obligatory. Since the special equipment is normally located at facilities in support of the ICBM bases, its verification can be carried out during inspections on verifying updated data pursuant to START I Treaty. Information from national space systems offers additional assurance in implementing specific measures of lowering the alert status.

Information exchange. For the above options of reducing the readiness status, the information exchange implies that the following types of basic notifications should be provided:

- Notifications concerning plans to carry out specific procedures for lowering the missile readiness, with the first one provided no later than three months before the demonstration procedures;
- A notification concerning the date and place of exhibitions to be conducted, including a description of the procedures aimed at lowering the readiness level; and
- Notifications concerning the numbers of strategic offensive weapons and which measures aimed at lowering the alert status have been implemented as applied to each ICBM base or SLBM, with information about specific types of measures for the given base (no less than once every three months). As soon as the inspection team arrives at an inspected facility, inspectors are given a diagram indicating the specifics of the measures taken.

5.5. Possible Phases of Reducing Readiness Level

Pursuant to the Strategic Offensive Reductions Treaty, each party determines for itself the structure of the forces subject to reductions. It is expedient to agree upon the phases of the strategic offensive reductions to be implemented under the treaty, and, on this basis, to work out measures aimed at reducing readiness of the strategic nuclear forces that are to be reduced at each of the phases.

Further measures intended to reduce the readiness level may be as follows: within a reasonable amount of time before the beginning of each phase, the parties exchange information concerning the composition of the forces to be reduced at a given phase. During the first three months, starting from the beginning of the new phase of reductions, the parties implement deactivation of all strategic delivery vehicles subject to reductions at this phase through any of the agreed-upon techniques providing for a lengthy restoration of readiness, and at the last phase — only through removal of re-entry vehicles.

As a result, less than two years before the expiration date of the SORT, the parties can reach the treaty-defined limits. During the remaining period, the parties can take an inventory of their nuclear arsenals and count the number of their deployed strategic nuclear warheads and those in the reserve.

Thereafter, the parties might reach agreement that no later than December 31, 2012, each party would have no more than 500 nuclear warheads on the deployed ICBMs and SLBMs at high alert state (phase I). The next step (phase II) would be to go down to 200 warheads on alert by December 31, 2015. In the next few years the number of warheads that are ready for short-notice launches can be reduced down to 100 to 150 warheads, and eventually down to around 60 to 80 for each party. This limit, however, will largely depend on the scale and characteristics of the BMD defense, and still more on the profile of cooperative BMD projects, as well as on the state of nuclear stockpiles of other countries.

The main problems, if the concept of de-alerting is accepted by the United States and Russia, would be to elaborate technical ways to ensure approximate equality between the two

powers (1) as to the force numbers left on high alert at each stage and (2) as to equality in reconstitution time of each party's SNF. Yet another serious problem (3) is to make sure that in the course of de-alerting the first strike, counterforce capability is being downgraded more than second strike, retaliatory capability.

It should be taken into consideration, however, that each of the three legs of strategic triads can perform all three principle missions: first strike, launch-on-warning, and second strike — but with different levels of efficiency. Silo-based ICBMs are the best in conducting first strike and LOW, but poor in a second strike (US ICBMs may become relatively more efficient for a second strike in the future in view of the degradation of Russia's counterforce capability through the withdrawal of SS-24, SS-18 and SS-19 missiles). Mobile ICBMs are the best in second strike and LOW when in their protective shelters or at field launch positions, but not so good in a first strike (in a decade all remaining Russian systems will be single-warhead or carry just a few warheads). US Trident-2 SLBMs are no good for LOW, but quite effective in a first strike and perfect for a second strike missions. Russian present and projected SLBMs on Delta-4 and new "Dolgorukiy" class SSBNs will be quite limited in a first strike and LOW missions, while moderately good for a second strike. Heavy bombers are no good either in a first strike (because of long flight time) or in a second strike (due to vulnerability at the airfields), but rather (and only) efficient for LOW if put at a high take-off readiness or on air patrol. It is true that in the case of a false alarm, bombers, unlike missiles, may be recalled. However, this theoretical possibility may not work in a real crisis and, what's more, massive take-off of strategic bombers may be perceived by the other side as the beginning of a nuclear war, and trigger the launch of its missiles (this threat may be exacerbated by the degradation of Russia's air defense system).

Hence, it is possible to suggest in a general way that the first candidates for deactivation should be silo-based ICBMs. Primary systems might be MIRVed ICBMs, but single-warhead silo-based missiles should be included too, in particular US Minuteman-3 with counterforce W-87 warheads refitted from Peacekeeper missiles, since they would present a large "silo-busting" capability against Russian 250 fixed ICBMs. Also, since land-based missiles constitute a much greater proportion of Russian SNF by warhead number, their large-scale deactivation should be accompanied by severe reduction of the portion of SSBNs on sea-patrol and by deactivation of all or most SLBMs at bases (to prevent the quick increase of submarines on sea patrol or launching SLBMs from bases, which has been an accepted practice of the USSR/RF, and might be adopted in future by the US). Bombers should be the next priority for de-alerting, as a weapon totally dependent on LOW and highly provocative in such a mission. Finally, mobile single-warhead ICBMs and SLBMs with low counterforce capability should be the last to join the deactivation procedure.

One additional consideration is of great importance. De-alerting strategic missiles as a way of abandoning launch-on-warning, as important as it is, should be implemented only as the first step in transformation of mutual nuclear deterrence relations. This is because even without LOW concepts and LOW-suitable weapons, mutual nuclear deterrence may stay forever on the foundation of mutual delayed second-strike capabilities. Compared to Cold War years and the present situation, this would be a much more stable relationship — it was the goal of arms control from the 1970s to the 1990s. Still, it would retain nuclear confrontation as its base with all corresponding strategic, economic, and political implications, controversies, and the potential for destabilization. Second-strike SNF postures would imply fully alert weapons, even though *less* capable of counterforce missions or of LOW. Hence, further SNF reduction plus deep de-alerting should be viewed as an instrument of much more profound relaxation and transformation of mutual deterrence — eventually

moving away from mutual locked-up second-strike relationship as well, actually leaving the US and the RF with minimal alert SNF force with multiple targeting plans and variable target lists across all azimuths as “a hedge against any uncertainty.”

Accordingly, partial verifiable downloading of MIRVed strategic missiles (removing some of the warheads in the nose cones) would be an accepted stabilizing way of reducing SNF levels (as is envisioned under START I and apparently under SORT). This method with appropriate counting rules and verification could be used to reduce SNF down to proposed 1000 to 1200 warhead ceiling. However, de-alerting should at some point start on a parallel track, and it must deal with warheads, delivery vehicles, and launchers as a whole. For instance, it should not be possible for Russia to reach the level of 500 alert warheads by preserving 200 SS-18 and SS-19 ICBMs downgraded to one warhead each, plus 300 single warhead SS-25 and SS-27 missiles, while de-alerting all SLBMs and aircraft. Likewise, the US, it should be prohibited from reaching the 500 limit by keeping all 14 Trident SSBNs with 336 missiles downgraded to one warhead each, plus 164 Minuteman-3 ICBMs, while de-alerting 336 Minuteman-3 missiles and bombers.

Perhaps, ideally, the last remaining US 200 warheads on alert would all be on two Trident submarines at sea (each SLBM downgraded to four warheads) or on one Trident at sea and 100 Minuteman-3 ICBMs (alternatively — at 50 ICBMs and four B-2 bombers). For Russia such a force could comprise one “Dolgorukiy” or Delta-4 class SSBN at sea, 30 SS-27 “Topol-M” in silos, and 100 mobile missiles of this type (an alternative posture could be a mix of 200 silo-based and ground-mobile SS-27 ICBMs, with all SLBMs de-alerted and one to two SSBNs with verifiable mock-up or de-activated missiles operated for training purposes).

Since sea-based forces cannot be deactivated and de-alerted while on sea patrol, relatively deep de-alerting of SNF (for example down to 500 combat ready warheads) would lead to radical reduction of the number of US Trident SSBNs at sea; from the present eight to 10 down to four to five “boomers,” and at a later phase, down to one to two boats. This would be a stabilizing change due to Trident-2 missiles counterforce and counter-command-control strike capability. This may also induce abandoning the traditional “two-crew” operational concept, even if some SSBNs would go to sea for exercises without SLBMs or with mock-up or deactivated missiles. Russia (and in future other NWS) will not be affected so much, since it will not maintain more than one or two boats at sea anyway. Its practice of maintaining some of its SLBM force combat ready in bases would, however, have to be stopped as well. Reduction of SSBNs patrol rate in addition might be fixed by an agreement or through the regular exchange of data.

Ground-mobile missiles will present problems only for Russia (and in the future, possibly for China). As with SLBMs, there is not much sense in deploying mobile ICBMs “in the field” if they are deactivated. On the other hand, in their light shelters (“Krona”) they are capable only of a first or launch-on-warning strike in a combat-ready state (although their counterforce capability without MIRVs is quite limited). Hence, unlike US SSBNs, at the first phase of de-alerting, a reduction of the number of Russian mobile ICBMs on patrol would be destabilizing and justifiable only by verification considerations. All declared deactivated missiles should be permanently in their shelters (having no first or LOW strike capability), which may also be formalized by an agreement.

Calculating and equating reconstitution time for the two sides is a complex, but solvable problem. Below, an example is provided for ICBMs as an illustration at the present Russian SNF levels (detailed descriptions of the technical assumptions of the modeling are provided in Appendix 1).

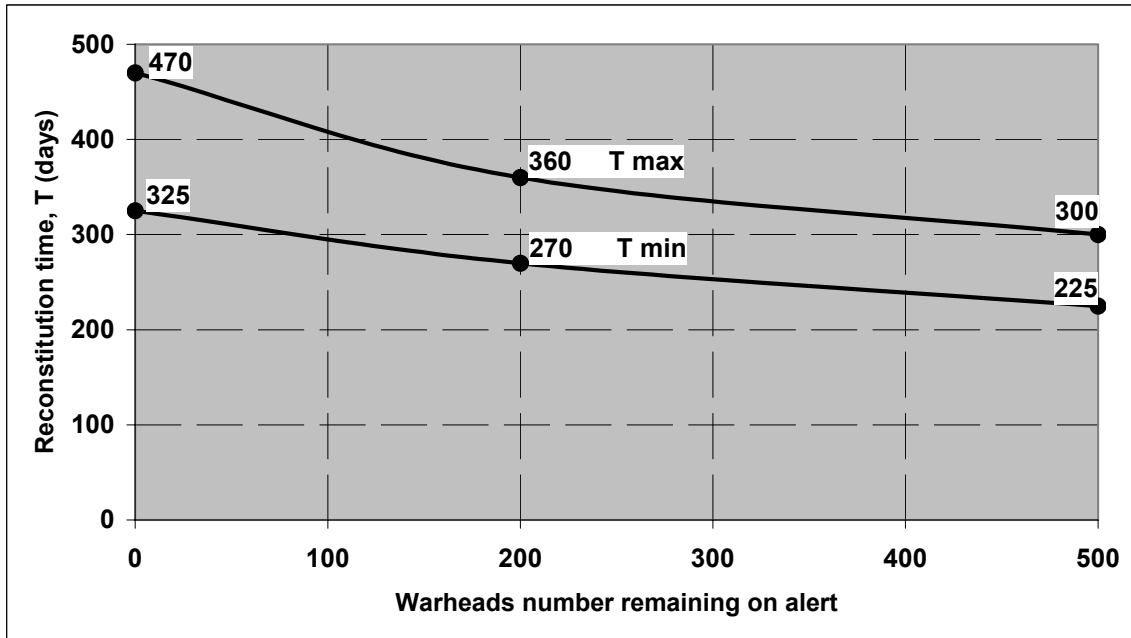


Figure 6. Reconstitution time of de-alerting ICBMs (present Russian force level)

As follows from the above model, depending on the methods of de-alerting and the number of missiles remaining on full alert, the reconstitution time with three shifts of support personnel (without weekends) is from 225 to 470 days. With two shifts, the reconstitution time is about 30 percent longer.

Further SNF reductions would make reconstitution time shorter due to the lower overall ICBM number. In Figure 7, the model demonstrates reconstitution time dependence on the residual alert warheads number and de-activation methods for an SNF level of about 2000 warheads, projected by the year 2012 under the 2002 SORT.

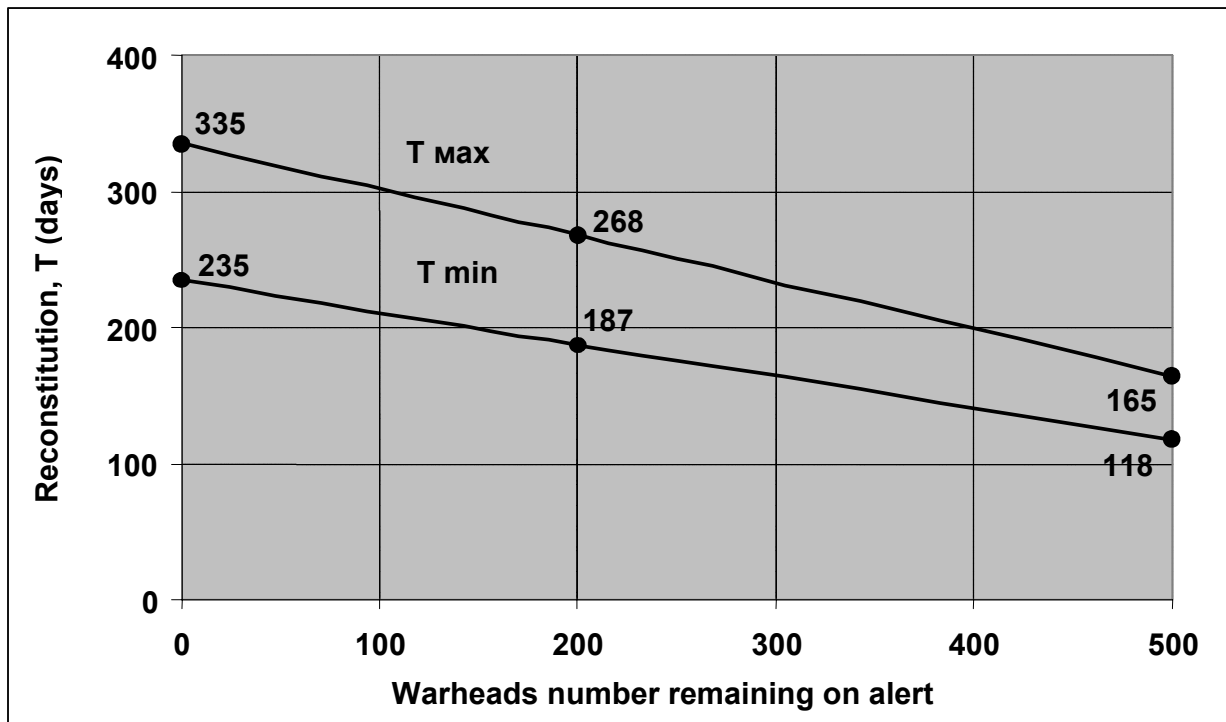


Figure 7. Reconstitution time for de-alerted ICBMs (Russian SNF in 2012 under SORT level)

Still further reduction of SNF, as proposed in the present study: down to 1000 to 1200 warheads under SORT II by the year 2017 would logically imply even shorter reconstitution time, as demonstrated in Figure 8.

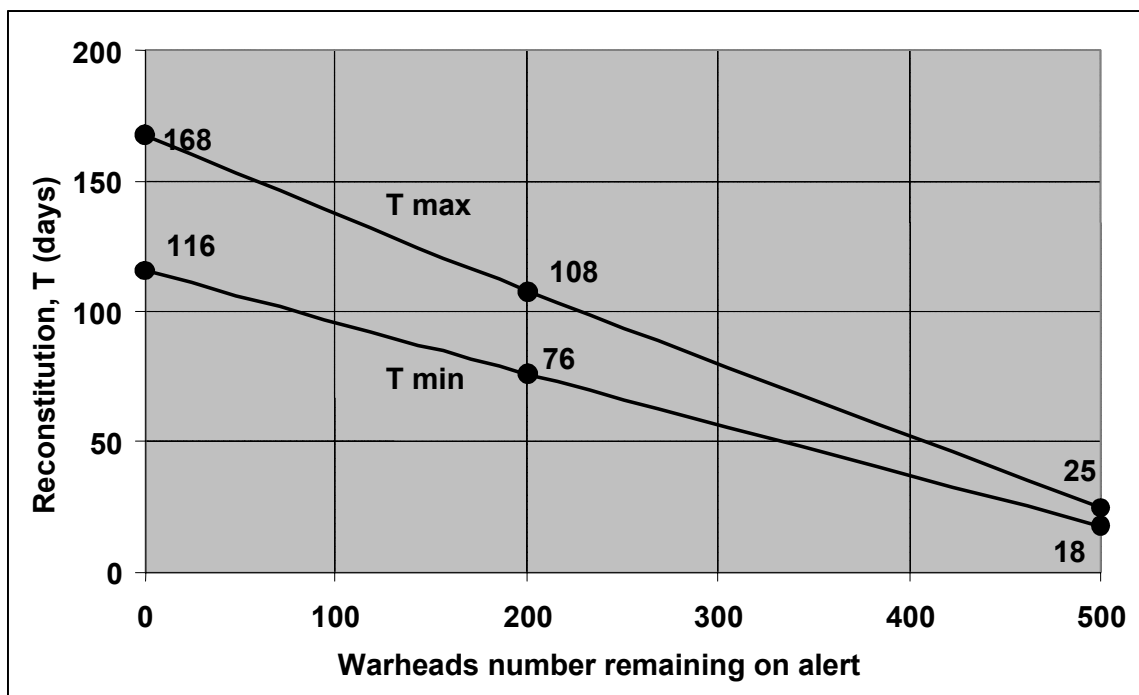


Figure 8. Reconstitution time for ICBMs (Russian SNF in 2017 under proposed SORT II level)

This does not mean that SNF reductions should not be implemented in order to make de-alerting less reversible. Present SNF numbers are just too high, which would make de-

alerting at the existing levels too expensive, long, and technically complicated, and hence, politically more controversial. De-alerting from SORT levels (1700 to 2200 warheads) would be much simpler in all respects, while reconstitution time would still be quite long. This would be also conducive to further SNF reductions down to 1000 to 1200 warheads, just by way of dismantling part of the de-alerted portion of strategic forces. Shorter ICBM alert reconstitution time should be made up for by de-alerting a major part of SLBMs and heavy bombers (or conversion of the latter to non-nuclear missions).

Most importantly, by that time, as suggested in the present study, SNF reduction/de-alerting should be supplemented by integration of early-warning and command-control systems, and later, by development of joint BMD systems. This would make transformation of mutual nuclear deterrence practically irreversible.

Survivability of command-control and early-warning systems adds another complicated dimension to the task of moving away from launch-on-warning. Insuring its performance for a second strike would demand a set of special arrangements, limitations, and commitments on both sides: for example non-interference with early warning satellites and banning high orbit ASAT systems, banning deployment of SSBNs and SSNs with cruise missiles on sea patrol closer than 2,000 to 3,000 km from each other's territories, and so on.

Accomplishing all of this would be a formidable challenge indeed. Different force structures, deployment practices, and employment plans imply different deactivation techniques which may affect in asymmetric ways major parts of the SNF of each side. Besides, these very techniques vary in implementation costs and time, as well as in the resulting reconstitution time, cost, and visibility.

In the view of this study's authors, with sufficient goodwill, such obstacles may be overcome after the end of Cold War at no greater effort than the effort required to reach SALT II and START I during the Cold War. True, both nations would eventually retain a few hundred or several dozen nuclear warheads, which might be targeted at each other and at third NWS. Still, the magnitude of de-alerting and deactivation and the scale of the regime of transparency, monitoring, and limitation of operational policies, would profoundly transform the mutual deterrence relationship into some new type of strategic interaction. Cooperative endeavors in early warning and defensive systems would then finish the job.

Country	The number of strategic nuclear warheads on ICBMs and SLBMs that are ready for an immediate launch as of the end of each phase				
	Dec 31, 2005	Dec 31, 2007	Dec 31, 2010	Dec 31, 2012	Dec 31, 2015
Russia	2800	1500	500 – 1000	200 – 500	0 – 200
USA	2800	1500	500 – 1000	200 – 500	0 – 200

Table 1. Phases of reducing combat readiness of strategic nuclear forces³²

In implementing phased de-alerting of SNF, the US and Russia would eventually encounter the problem of third nuclear weapons states and tactical nuclear forces. At sufficiently low levels of forces remaining in combat readiness and with long reconstitution time of the rest of the forces, the two powers may become concerned, if only theoretically,

³² The proposed numbers of nuclear warheads that are ready for launch are tentative and should be agreed by the Parties. It is probable that their number can be brought to naught by common agreement.

about possibility of a surprise attack of other nuclear states and in case of Russia, about a strike of US forward-based tactical nuclear weapons.

This problem can be addressed by an agreement with Britain, France, and China on the expansion of de-alerting procedure to their forces. For instance, equal ceilings may be set for the combat ready forces of all five nuclear weapon states at a level of zero to 200 warheads. Incidentally, this solution would bypass the touchy question of equality between the two bigger and three smaller nuclear forces. The US and RF would retain their superiority in view of their large de-alerted forces, while the other three powers would enjoy a long-sought legalized equality with the big two in combat ready forces. Other NWS would legally be free to expand de-alerted forces too, which they would hardly do for practical reasons, except for China, which would probably eventually build larger overall SNF (including medium range missiles, which the two leading powers destroyed through the INF-SNF Treaty of 1987). However, de-alerting procedures would make it a less important problem. Of course, such an agreement would be easier to achieve in an overall context of confidence-building measures, which are addressed in the next section.

With respect to TNW, de-alerting would not be applicable, since these weapons are delivered by dual-purpose systems. Hence, the solution may be an agreement to relocate all TNW to central storage places, including withdrawal of US weapons to the continental United States. Such an agreement would not be difficult to verify through transparency measures and, if need be, permanent monitoring of the central storage places. Presently, Russia keeps TNW only at air and naval bases, ready for employment, and routinely deploys them on attack submarines and surface ships at sea. All other TNW types are at central storage places anyway.

Since Russia is planning to rely heavily on TNW in view of the weakness of its conventional forces facing NATO and China, such a deal on tactical weapons would still affect Russia more than other NWS. Implementation of the Conventional Armed Forces in Europe (CFE) Adaptation Treaty by all member-states would help alleviate Moscow's concerns in the west. (Presently only Russia and Belarussia have ratified it.) An even greater positive effect could be achieved by going for a new CFE agreement, further reducing (at least by 50 percent) conventional weapon systems national and territorial allocations under the CFE Adaptation. Integrating NATO-Russian Air Defense systems and creating a joint interoperable rapid reaction force for peace-enforcing, peace-keeping, antiterrorist, and other new missions in Europe and elsewhere, would go a long way to removing the need for deployed TNW to make up for allegedly inadequate Russian conventional forces capabilities. The option of keeping TNW in central storage places instead of eliminating them would probably be more acceptable for Moscow as a hedge against a worst case contingency in Europe or in the East. Besides, the withdrawal of US TNW from Europe would be a strong incentive for Russia, and a great symbol of NATO abandoning its traditional nature as a military alliance against Russia.

De-alerting would indirectly lead to curtailment of the modernization programs of both SNF and TNW, since the deployment of new systems in large numbers to be kept mostly at a de-alerted state would hardly make much practical sense. Quite probably, with a very limited modernization rate and an expanding de-alerted portion of the forces, the numbers of US and RF SNF would gradually decline in a "natural" way without the need for further arms reduction treaties beyond the above-proposed 1000 warhead ceiling of SORT II. Obsolete weapons would be withdrawn without substitute at the discretion of each side.

The sheer numbers in the reductions of overall force levels and of the de-alerted portion of SNF may not convey the sense a qualitative change. The magnitude of the transformation of the US-Russian strategic relationship within the realm of offensive strategic nuclear forces, proposed by the authors of this study is demonstrated graphically by Figure 9.

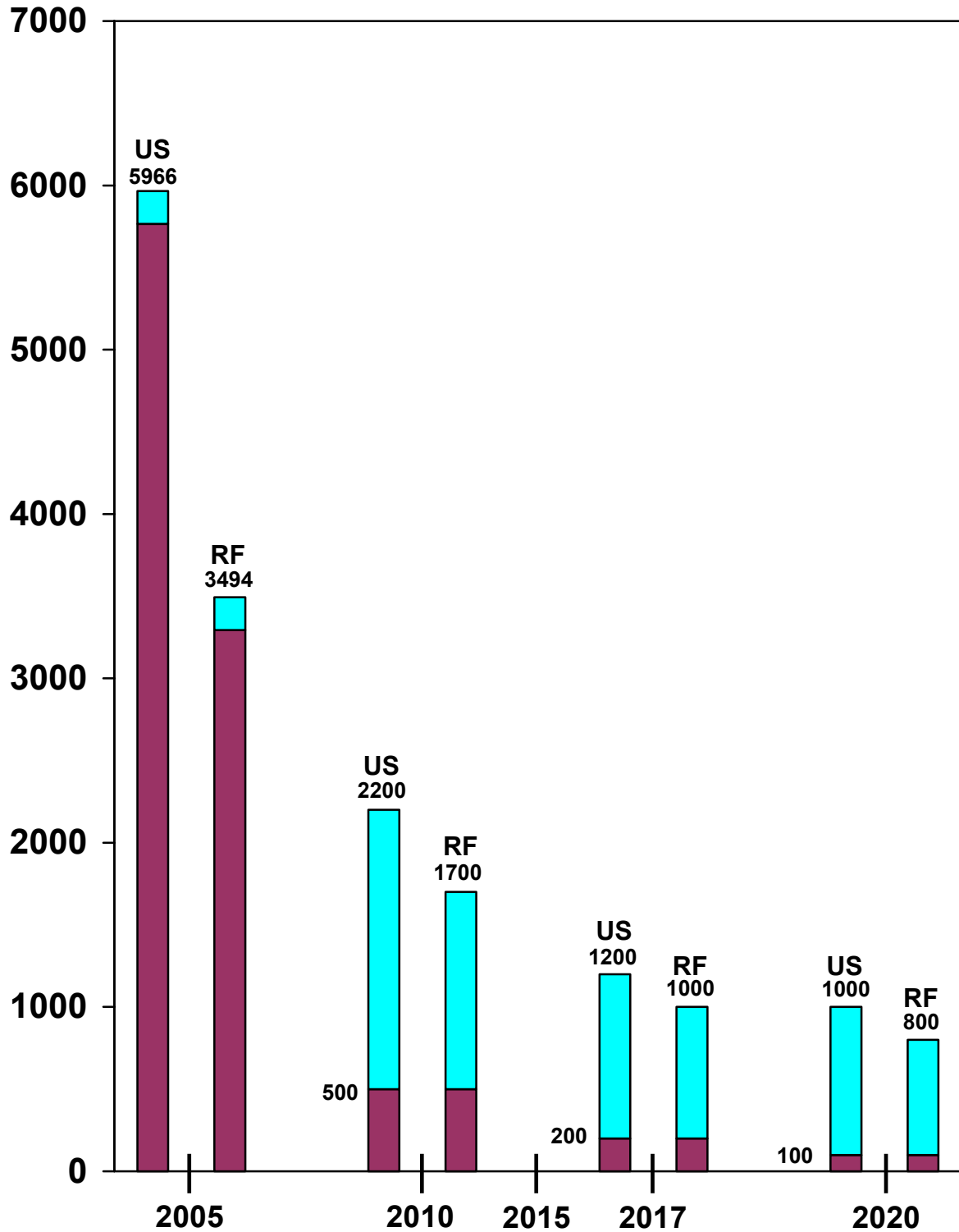


Figure 9. US and Russian SNF reduction and de-alerting

6. Doing Away with Nuclear Deterrence

Further reduction and balanced deactivation of US and Russian SNF would go far beyond the task of stabilization of the nuclear balance on the principle of mutual assured second strike retaliation, which was the core of strategic arms control in the 1970s through the 1990s (ABM Treaty, SALT I/II, INF Treaty, and START I/II/III). Besides the deep relaxation of the military tensions of the US-Russian strategic balance (embodied in the abandonment of LOW operational concepts and the comprehensive transparency of forces, postures and programs), deactivation would affect operational policies of deployment and employment of SNF, thus putting the US and RF in a state in which they would not be able to conduct massive and coordinated nuclear strikes against each other.

Such a state would also tangibly limit their nuclear options against third NWS or even non-nuclear opponents (all the more so if TNW are also subject to de-alerting). It goes without saying that deep deactivation would imply profound revision of operational deployment policies, severely reducing SSBN patrol rates, mobile ICBM routine dispersal practices, heavy bombers' basing infrastructure and flight exercises. Changing these new features of the maintenance of SNF without proper notification and explanation of reasons, would be equated to preparation for an act of aggression, and thus strongly deterred.

Nonetheless, even the most radical methods of de-alerting through deactivation, as much as they would move the two parties away from a combat-ready mutual deterrence relationship, would not do away with it completely. The reason is that such steps would remain reversible — even if with long lead time and huge expenditures of economic and organizational resources.

To make the changes irreversible, additional measures would be needed outside the realm of offensive nuclear forces. These other aspects are early warning and defensive systems. Gradual integration of such systems would finally and irreversibly do away with mutual nuclear deterrence, since nations having common early warning and missile and air defense systems technically cannot fight each other and have no reason, even theoretically, to deter each other.

Initially, nuclear and missile proliferation created the perception of a major, common, new threat, and it seemed that there would be joint interest to cope with it between the United States, USSR/Russia, and eventually among all great powers. This gave birth to the NPT and its mechanisms, and to the Missile Technology Control Regime (MTCR). Dialectically, after the end of Cold War, the expanding cooperation among great powers in fighting against proliferation has raised the question of creating cooperative early warning and surveillance, as well as missile defense systems, which would require doing away with mutual nuclear deterrence. For reasons addressed above, though, the United States and Russia, as well as the other NWS, retained mutual nuclear deterrence as a basis of their national security strategies and as the primary mode of strategic relationships. As a result, the integration of early warning and defense systems, having barely started, gradually came to a dead end, undercutting (together with some other factors) the great powers' cooperation on non-proliferation.

To facilitate the much needed great powers' post-Cold War cooperation in fighting new security threats, an aggressive fresh start is required in integrating early warning and defense systems. Together with the above discussed measures of reducing and de-alerting

SNF, this would finally do away with mutual nuclear deterrence and open the door to a genuine joint strategy for meeting the new security challenges of the 21st century.

6.1. Integrating Early Warning and Surveillance Systems

The best quality information about the proliferation of missiles and missile technologies can be obtained through an integrated effort of Russian and US information and intelligence-gathering systems. As far as this mission is concerned, however, the policies of both former and present administrations of the United States and Russia can be characterized by a high degree of passivity and inconsistency. Apart from bureaucratic red tape and technical and political complexities, the major obstacle is not only the long-term incompatibility of such integration with the state of mutual nuclear deterrence between US and Russian SNF, but also the extreme lack of recognition of such incompatibility by politicians and the militaries of both nations.

As far back as 1998, presidents Yeltsin and Clinton took an important decision in Moscow to set up a joint center for the exchange of data from early warning systems. On June 4, 2000, a respective memorandum was signed concerning the establishment of the Joint Data Exchange Center (JDEC). This document entered into force upon the date of signature and remains to be effective for a 10-year period, until July 4, 2010.

The Center is designed not only to avoid inadvertent nuclear war in case of the parties' accidental launch of missiles, but also to detect missile launches from the territories of any country and water areas of seas and oceans. This function is based on early warning and reconnaissance systems, and it allows for an objective verification of missile programs of other nations — above all in the unstable regions.

The site of the Center has been chosen, and the table of organization, personnel functional duties, and a list of equipment have been determined. And still, the Center does not yet function. On the surface, the reasons are that the issues of taxes and damage liability have not been resolved. The problem of liability is a major part of joint US-Russian nuclear threat reduction and nonproliferation projects, but this is also an obstacle on the way towards launching the operation of the Center. Should there develop a mutual political will between the two parties, this obstacle can easily be overcome without setting a precedent for other programs, for with JDEC, associated possible damage is negligible, compared to elimination of nuclear and chemical weapons and materials.

Operations of the center could furnish objective displays of information about the proliferation of missiles and missile technologies. Russian missile early warning radars (EWR) based near Moscow and in the South of the former USSR provide operational information about missile launches in regions of instability (North Africa, the Middle East, South Asia) that cannot be reached by the United States early warning radars.

The basic agreed missions assigned to the JDEC are:

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

- Fast resolution in the Joint Commission of possible ambiguous situations associated with information from early warning systems; and
- Preparation and servicing of a unified data base for a multilateral regime of exchange of notifications concerning launches of ballistic missiles and SLV.

Information should be exchanged on the launches of Russian and US ballistic missiles and space launch vehicles detected by early warning systems, as well as on ballistic missile launches of third states that might pose a direct threat to Russia and the United States or might bring about an ambiguous situation and lead to its possible incorrect interpretation.

Direct transmission of data on the missile launches detected by Russian and US missile early warning systems to the BMD systems is not provided for in the agreement. Information for JDEC should be provided in a processed form, if possible, in near-real time.

The information should be exchanged in accordance with the following formats:

- In detecting a missile launch: the time of launch, generic missile class, geographical area of the launch, geographical area of payload impact, estimated time of payload impact and launch azimuth; and
- In detecting a launch of a space launch vehicle: time of the launch, a generic missile class, the geographical area of the launch, and launch azimuth.

Accordingly, the reports of ballistic missile and SLV launch detection should contain the following parameters:

- Launch time;
- Launch location;
- Generic missile type: ICBM, SLBM, intermediate-range ballistic missiles, medium-range ballistic missiles, short-range ballistic missiles or SLV;
- Launch azimuth;
- Impact area;
- Estimated time of payload impact; and
- Indication of a single or multiple launch.

The process of data exchange is to be implemented in the phases set forth below:

Phase I. At an initial phase of JDEC operation, information shall be provided on detected launches of ICBMs and SLBMs belonging to either party and, with rare exceptions, for detected launches of space launch vehicles also belonging to either party, including such launches of ICBMs, SLBMs, and SLV that are launched from territories of third states and such launches of ICBMs, SLBMs, and SLV that take place on the territory of either party.

Phase II. In this phase, it is assumed that Russia and the US shall provide the information on detected launches included in Phase I, as well as on detected launches of other

types of ballistic missiles belonging to either party with a range in excess of 1,500 kilometers or an apex altitude in excess of 500 kilometers.

Phase III. At the end of this phase, the parties shall exchange information on detected missile launches specified for the above two phases, as well as on launches of ballistic missiles of third states with a ranges in excess of 500 kilometers or an apex altitudes in excess of 500 kilometers, if part of the flight trajectory of the ballistic missile as calculated by the launch azimuth would take place over, or the impact area of its payload is projected to be within, either party's territory. Russia and the US shall also provide information on detected launches of SLV of third states, if projection of the initial launch azimuth would intersect the territory of either party within the first half-orbit of launch. At its discretion, a party may provide information on other detected launches of SLV of third states, regardless of launch azimuth.

Each party shall provide information on launches of third states that it believes could create an ambiguous situation for the warning system of the other party and lead to possible misinterpretation by the other party.

Upon successful demonstration of the operational capability and procedures associated with a current phase, the JDEC Heads shall jointly recommend to the Joint Commission the implementation of the next phase. Transition to the next phase shall be by direction of the Joint Commission.

During Phase II operations, the parties shall consider in the Joint Commission the possibility of and need for exchanging information on missiles that intercept objects not located on the earth's surface.

In the future, Russia and the United States shall examine in the Joint Commission expanded data-sharing on detected launches of ballistic missiles and space launch vehicles globally, taking into account changes of the strategic situation in the world and the development of a multilateral regime for the exchange of notifications of launches of ballistic missiles and space launch vehicles.

According to the JDEC agreements, the launch information should be provided only in a processed form in accordance with an agreed standard. A higher level of operational exchange might be achieved through a maximum automation of processing of baseline information, completion of agreed forms of data transfer, and presentation of the information to the JDEC. Automating the process would allow the parties present such information in as near real time as possible. With this goal in mind, it could be required that agreed algorithms of processing of the baseline information should be developed and joint databases that contain identification images of assumed targets should be set up. This would allow the center to provide the automatically processed information in near real time and have it confirmed subsequently by on-duty operators at command posts of the parties' warning systems.

The JDEC functions could be further expanded through a higher level of operational data exchange that would be the first step on the way towards permanent presence of Russian and US representatives at early warning central command posts of various levels. Cooperation on the development of BMD systems, addressed below, would naturally imply expanding the JDEC functions and interlinked early warning systems towards providing data to anti-missile defenses.

Capitalizing on these endeavors, the next and extremely important step in doing away with nuclear deterrence would be the establishment of interlinks between SNF command-control authorities at several levels. At first it would be appropriate to develop a mobile conference-communication terminal to keep the supreme leaders constantly in touch wherever they are (like “football cases” or “nuclear suitcases”). The hotline, being stationary, is no longer enough in view of a possibility of a third country attack, accidental launch or nuclear terror act.

Permanent direct communication links should also be established between top military authorities (ministers and secretaries of defense, the General Staff and Joint Chiefs of Staff) and between SNF commands (Vlasikha and Offut centers). This would be important in case top political leaders are inaccessible at the time of a crisis for some reason. Despite all the technical systems of political leaderships’ control over nuclear forces, which are sufficiently effective in peacetime, in a crisis situation (foremost in a nuclear crisis) Russian and US military top commanders still can find the way to authorize employment of NW even without political authorization if communication with presidents are lost. In such a situation, top Russian and US military leaders would greatly benefit from direct communication to avoid miscalculation. Subsequently, liaison officers of the other side might be permanently posted at these military offices (like the Russian-NATO model but with permanent presence duty).

The JDEC could subsequently be used as a basis for establishing a multilateral regime of notifications and data exchange. With this end in view, after the technological infrastructure and special software is developed and some technical issues are elaborated on a bilateral US-Russian basis, Russia and the United States might prepare a joint appeal to the other countries offering to let them join the regime.

A multilateral regime of missile launch notifications can be set up if all the concerned states participate on a voluntary basis.

In transitioning to the multilateral regime, Russia and the United States might consider placing the notification database under the supervision of an international organization such as the United Nations.

The electronic and communications architecture of the multilateral regime of missile launch notification may be based on Internet technologies, as well as equipment and software that offer rather wide access. In doing so, the parties should pay proper attention to information security, keeping in mind that information of this kind is of a confidential and sensitive character and should be properly protected.

The International Joint Data Exchange Center (IJDEC) may be assigned the following tasks:

- Implementation of an exchange of data on announced and unannounced launches of missiles detected by the parties’ warning systems;
- Efficient resolution of ambiguous situations related to information from warning systems of the parties;
- Maintenance of a unified database for notifications of missile launches; and

- Communication of missile and SDL launch notifications to participants in the multilateral notification regime.

Involvement of other states in the notification exchange regime is expected to expand the information base and contribute to the prevention of failures of operation of missile early warning systems.

The key principle underlying the establishment of a multilateral regime of notifications on missile launches is a stage-by-stage accession of other states. Inasmuch as such a multilateral system is designed against miscalculation or mistaken reaction to a third country missile launch, as well as provocative or accidental launches and to assist in monitoring missile proliferation, it does not imply political-military alliance among the parties. A major part of the technical resources would be provided by the United States and Russia, and later on possibly by the European Union, Japan, China and India. Other state-parties would primarily be recipients of missile launch information and provide notification of their own missile launches.

In the process of logical transition from mere exchange of information to technical integration of larger and larger portions of early warning systems and eventually to their joint development and deployment, US-Russian strategic relations cannot but be deeply affected and transform from mutual nuclear deterrence to a genuine strategic alliance (in the literal military meaning of the term “strategic”).

6.2. Cooperative Development and Deployment of Defensive Systems³³

A crucial and final step in departing from the mutual nuclear deterrence would be the transition from the joint theater BMD computer exercises of Russian and US military specialists (which have been practiced for many years) to full-scale cooperation between Russia and the United States in developing and deploying BMD systems to intercept all types of ballistic missiles. This grand endeavor was conceived in the US-Russian May 2002 official document, “On the foundations of strategic relations between the United States of America and the Russian Federation.” Indeed, powers that deploy and maintain a joint BMD system cannot, by definition, be opponents who deter each other with nuclear weapons. They must be full-scale military allies and be even closer than NATO or Warsaw Pact allies during Cold War times. This implies a much greater degree of commonality of foreign and security interests and policies than exists now between the United States and Russia or, for this matter, even between the US and its European NATO allies (with the possible exception of Britain).

Primarily because of the remaining mutual nuclear deterrence relations and growing political controversies, nothing serious has come up to now out of the BMD cooperation agreement of 2002. Nevertheless, taking into account new threats and challenges, this may be not a totally fantastic proposition over the long-term. The anti-missile system, which has been one of the major points of discord, mistrust, and hostility between Washington and Moscow in the past, might become a principle integrating and uniting factor in the future, fundamentally changing the political and military relationship of the two nations.

³³ This section borrows from: Dvorkin, V., ‘On Russian, US and European Cooperation on the Development of Missile Defense. Yaderny Control (Nuclear Control) No. 4 (74). PIR Center. 2004.

At present, the parties, alternatively in Colorado Springs and in Moscow, train compatibility and coordination of operations of information and weapon systems, such as the Russian S-300 SAM and the US Patriot, in repelling attacks of tactical ballistic missiles.

An analysis of the United States BMD systems presently under development shows that, although it is expected to take a rather long period to complete full-scale research and experimental development, the participation of Russian R&D organizations in these processes is, in fact, impossible. The technical reasons are that Russian sensor technologies, element bases, and homing systems would not be attractive to use for a non-nuclear intercept. It is already too late to make use of the leading-edge Russian experience and technologies of high-velocity booster stages of antimissiles, for the RF has already expended huge resources for implementing the developing designs. The lost opportunities can theoretically be discussed only as regards the booster stages of the GBI antimissile, for their development and tests are noticeably behind those of the kill vehicles interceptor proper, and, as is known, none of the launch vehicles have yet been tested even with a standard booster mockup. Even if a few years ago Russia had made such an offer, however, it would have been ignored by the Pentagon, for it would have been absolutely impossible for the United States to allow the former adversary to take part in the development of the core of this strategic system. Even US allies would not have been welcome to participate.

At the same time, the US-developed weapons to intercept ballistic missiles at the boost phase of their trajectory have many faults that impair their effectiveness, as was specified in the July 2003 report "Systems of Intercept at the Boost Phase of the Trajectory for the National ABM Defense," by the working group of the American Physical Society.³⁴ According to the analysts, the missiles can be intercepted if the speed of an interceptor is more than that of the missile moving at a booster phase, and the distance between the interceptor and the attacked liquid-fueled missile in no more than 500 km (and 300 km for a solid-propellant missile).

The mission is still more complicated in the case of an intercept of missiles launched from the hinterland of potential threat countries. In this respect, cooperation with Russia, whose research and design organizations have an approximate 10-year lead over the United States in technologies of high-speed interceptor missiles and solid-propellants, might be very efficient in developing a new generation of BMD weapons designed to kill all types of missiles at a boost phase.

Yet, this is not the only promising opportunity of cooperation between Russia and the United States. Successful intercept of missiles across the full spectrum of ranges and phases of their flight largely depends on the capabilities of ground, space, and sea-based information systems. Russian phased array missile attack early warning radar stations in Ukraine, Azerbaijan, and Kazakhstan can provide unique capabilities to track missile launches from the "belt of instability" extending from North Africa to the Middle East, the Persian Gulf and South Asia. Once agreements are reached on real, rather than declarative cooperation, their incorporation into the information-gathering framework of joint BMD systems seems to be quite realistic.

If integrated, the capabilities of the US and Russian nuclear attack warning systems would grow in terms of their efficiency. According to B. Blair, president of the Washington-based Center for Defense Information, the model of defense against launches of missiles

³⁴ 'Systems of Intercept at the Boost Phase of the Trajectory for the National ABM Defense', working group of the American Physical Society, July 2003.

from the Middle East showed that compared to the possibility of detecting missiles by means of US warning systems only, a joint US-Russian system would have 20 to 70 percent higher effectiveness.³⁵

A much deeper cooperation can be achieved through the deployment of a joint Space Tracking and Surveillance System (STSS). Spacecraft of the system weighing around 650 kg each and carrying infrared and visible light sensors are supposed to be launched into a circular orbit with a height of 1,350-1,400 km and inclination of 60-70 degrees. Converted-type heavy missiles developed under the joint Russian-Ukrainian "Dnieper" project would be used as space launch vehicles.

The vehicle with a launch weight of around 210 tons is a derivative of Russian SS-18 (RS-20 or RT-36) heavy ICBM. The first and second stages of the missile are the same as those of the SS-18 missile and have not been modified. The third booster stage is a modified bus vehicle. The missile has the world's highest power performance characteristics. Some vehicles of the type converted from SS-18 ICBMs, which have been phased out because of the expiration of their service life, have been successfully used in commercial projects for launches of foreign spacecraft and have proved highly reliable. A vehicle carrying a booster stage and re-startable engines is capable of placing into 1,400 km orbit of a required inclination two spacecraft of the STSS system in one launch. This would allow for a low-cost deployment of a constellation of low-orbit spacecraft for information support of a global BMD system.

Eventually through the expansion of the joint BMD with land, sea, air, and space-based detection, tracking and intercept systems, the two nations could make a great contribution to the regime of missile non-proliferation. Provided that MTCR sooner or later is based on a treaty or convention, and that it envisions obligatory notification of all missile launches, such a defense system would be able to enforce this obligation by intercepting all missiles launched without notification.

Further reduction and de-alerting of SNF should at some point be supplemented by the integration of early warning systems and eventually of BMD systems. The second and the third avenues of cooperation, initially aimed at countering missile proliferation or missile strike by a third party, would gradually envelope the major portion of the technical assets of the two nations, making a war between them operationally and technically impossible, and bringing them to a close strategic nuclear alliance.

Besides technical and strategic problems, this raises the touchy issue of third parties. The joint US-Russian project could not leave out the two countries' close and true allies. American NATO allies, Japan, and South Korea (or a unified Korea by that time), would naturally be entitled to participation and protection. Israel would certainly like to join and could also contribute quite a lot technically (since it has been already cooperating with the US in BMD development for some time). Russian post-Soviet partners would not be a problem either, if they are politically acceptable to the West (for example regimes in Belarussia or Uzbekistan).

The real problem would emerge regarding nations with ballistic missiles and (or) nuclear weapons, like China, India, Pakistan, Iran, North Korea (if still a rogue/failing state), Egypt, Libya, Syria, Saudi Arabia, Taiwan, Yemen, and Vietnam. If not party to a collective anti-missile regime, China, India, and Pakistan would certainly perceive a multilateral and

³⁵ US and Russia nukes: still on cold war, hair-trigger alert// *Christian Science Monitor*, 6 May 2004.

multilayered BMD system as designed to negate their nuclear deterrence and to undercut their security by making them vulnerable and unable to retaliate to a nuclear or conventional attack by the “members of the club.” Russia is putting a high value on its political, economic, and military relations (arms transfers) with some of the outsiders — China, India, Iran. The United States, meanwhile, has the same attitude towards Pakistan, Egypt, Saudi Arabia, and Taiwan.

It is possible to suggest that a multilateral BMD regime should be open to third parties in its protective guarantees, (although not necessarily in its development, deployment, and operational command), under certain conditions. They would need to do away with their deterrence posture through de-alerting, deactivation, arms reductions and limitations, and transparency. They would also need to join all regimes and mechanisms of the NPT, MTCR, JDEC, and future missile launch notification agreements. No doubt, doing away with nuclear deterrence, in particular if possessing relatively weak nuclear forces, would imply serious changes in their foreign and possibly domestic policies. However, it would be their choice — with the alternative being to staying out of the comprehensive framework of multilateral strategic cooperation.

6.3. Multilateral Control and Stabilization of Nuclear Arms

This section describes only one problem — the possible extension of US and Russian new strategic policies to other NWS. A detailed analysis of the problems involved, including the issue of European nuclear integration, trilateral nuclear balance in the Pacific, and regional non-proliferation options, is given in the project of the Carnegie Moscow Center (CMC), also run by the authors of this study.³⁶

The ideas occasionally put forward in the past and still in circulation of proliferating the current principles and negotiations on arms control developed between the United States and the Soviet Union/Russia to the strategic offensive arms of Great Britain, France, and China have always seemed to be rather slack and have never survived even initial scrutiny. During Cold War period, such proposals came first of all from Soviet state officials and military who quite reasonably assumed that in case of a global armed conflict, nuclear forces of the United States, Great Britain and France would operate under a single command and target the USSR — and thus should be taken into account under the ceilings and limits of nuclear arms treaties. Alternatively, the intention was to get additional concessions from the US to make up for the larger combined forces of the West.

The United States, Britain and France never accepted this argument. The main reason given by the British and French was that their nuclear forces were their independent deterrent, not an adjunct to US SNF. They also claimed that Britain and France could not join the talks before their nuclear forces became comparable to those of the Soviet Union/Russia and the United States. The last argument was, and is, put forward by China as well.

At present, if addressing the issue in a practical way, any attempt to mechanically include third NWS into strategic arms talks and treaties would be counterproductive. As pointed out in the present study, the US and Russia can safely go down to about 1000 SNF

³⁶ Arbatov, A. and Dvorkin, V., ‘Nuclear deterrence and non-proliferation’.- Carnegie Moscow Center.- Moscow.- 2005.

warheads without worrying about third NWS. However, reducing forces to lower levels or implementing deep de-alerting through deactivation (down to 500 or 200 combat ready warheads) would hardly be acceptable without limiting and putting under control the forces of the three smaller nuclear powers. This would be still more desirable if these nations were to eventually join multilateral early warning and anti-missile defense systems and regimes.

Provided that the US and Russia can lead the way in elaborating a new type of post-Cold War strategic arms control effort, as recommended in this study, it might be possible by the end of this decade, in connection with SORT II, to expand partial arms limitation provisions on the forces of Britain, France, and China. As described in more detail in the above-mentioned CMC study,³⁷ Anglo-French SLBM warheads could be limited to an equal ceiling with Russian sea-based forces in the Northern Fleet (while in a few years there will be no SSBNs in Russian Pacific Fleet), and China might agree to equal ICBM ceilings with both the US and the RF.

In the course of the deactivation and de-alerting of SNF, the United States and Russia might eventually involve third NWS in agreements on equal ceilings for the remaining combat-ready SNF warheads. As pointed out above, this would help to circumvent sensitive questions on the nuclear equality of the five nuclear powers.

Meanwhile, it would seem more appropriate and easier in the near term to initially reach agreements with Great Britain, France, and probably China, on a number of provisions of verification and confidence building measures elaborated in START I. True, it would be unlikely for these countries to agree to make full use of the Treaty-defined system of verification and confidence building measures. First, these measures are unprecedented as regards the two nuclear powers, which have reached a high level of transparency. Such a level of transparency is not characteristic of the relations even between the United States and its immediate allies. Second, many requirements of the Treaty-based verification and confidence building system are characteristic of the Cold War confrontation and currently seem redundant even as applied to US-Russian relations themselves.

Because of this, it seems reasonable to consider the entire system of verification and confidence building measures in terms of whether or not some of the provisions may be acceptable for other nuclear powers.

The START I verification system includes 16 types of inspections of baseline data relating to the numbers and technical characteristics of the weapons, new missiles, and launchers under test, challenge on-site inspections relating to possible violations of the Treaty, the number of warheads on deployed ICBMs and SLBMs, exhibitions of new weapons, and so on.

The confidence building measures fall into 10 groups which embrace a total of 152 types of notifications. The system of information exchange between Russia and the United States envisioned by the START I Treaty includes the following:

- Regular (once every six months) exchange of data on strategic offensive arms and associated facilities for all the categories of data contained in the Memorandum of Understanding on the Establishment of the Data Base;

³⁷ Arbatov, A. and Dvorkin, V., 'Nuclear deterrence and non-proliferation'. Carnegie Moscow Center. Moscow 2005.

- Broadcasting all the telemetric information obtained in the course of flight and training tests of missiles, provision of tapes that contain a recording of such telemetric information, as well as data associated with its analysis, pursuant to the Protocol on Telemetric Information; and
- Provision of notifications that contain the current information on the strategic offensive arms and facilities relating to them.

The goal of the Treaty-defined exhibitions is to allow the other party to confirm the declared technical characteristics of the strategic nuclear arms.

Each party must conduct exhibitions to confirm:

- Technical characteristics of each type and each variant of ICBM and SLBM;
- Technical characteristics of all types of mobile ICBM launchers and variants of each type;
- Technical characteristics of each type and each variant of existing heavy bombers and former heavy bombers; and
- Technical characteristics of each type and each variant of nuclear air-launched cruise missiles.

The information provided pursuant to the memorandum contains the following:

- Quantitative data for the SNF also designating their locations at bases;
- Technical characteristics of the SNF;
- Site diagrams of the basing locations and their support facilities; and
- Photographs of missiles, launchers, transporter-loaders, heavy bombers, and submarines.

After each test, the party conducting the flight tests of missiles provides to the other party the following:

- Tapes that contain recordings of all telemetric information that is broadcast during the flight test;
- Tapes that contain recordings of all encapsulated telemetric information, if such tapes survive; and
- A short description applied of each tape.

Additionally, after each launch, the party conducting the flight tests of missiles shall provide to the other party data associated with the analysis (description of a format of the telemetry frame and techniques of encryption applied to the entire broadcast telemetric information, except for the information developed inside the warhead).

As far as the third NWS are concerned, all the above cooperative verification methods are certainly not possible, and neither are they needed. Of all inspection-based verification methods, it is possible to recommend at least two operations as universal ones: (1) on-site visits by foreign observers, rather than inspectors, of the exhibition of new missiles and launchers under test, and (2) a display of the number of warheads attributed to the deployed ICBMs and SLBMs.

A list of possible confidence building measures is much wider and might include the following:

- Regular (one or two times a year) exchange of data concerning the quantitative characteristics of nuclear arms and associated facilities;
- Provision of notifications containing the current information on nuclear arms;
- Advance notifications concerning test and training launches of missiles, coordinates of launch sites, and areas of re-entry vehicle impact;
- Provision of information concerning the new types (classes) of nuclear arms;
- Provision of notifications concerning phasing-in and phasing-out of nuclear arms; and
- Provision of information concerning the dual-use delivery vehicles.

To confirm the provided information, it might be possible to agree upon the facilities and sites for an exhibition of sample nuclear weapons.

Thus, as a possible initial surrogate of multilateral nuclear arms control embracing the five great powers, it is possible to suggest an agreement or memorandum, in which the nuclear arms of Great Britain, France, and China are a subject of a system of nuclear weapon transparency and confidence building measures.

A much more complicated problem would occur when trying to involve Israel, India, and Pakistan into an expanded multilateral verification system, although the reasons for that are different.

As is known, Israel neither acknowledges nor denies the availability of nuclear weapons. The nuclear stockpiles of Israel are estimated to vary within a wide range of 50 to 200 warheads. If this is so, the maximum that can be expected is that Tel Aviv would acknowledge its possession of nuclear weapons and make a non-build-up commitment. A much more difficult problem would be seeking the prospect of Israeli nuclear disarmament in exchange for US or NATO legal security guarantees. A precondition of such agreement would be a guaranteed and verifiable rejection of any military or dual-purpose nuclear programs by Iran and all other states of the "Large Middle East" (including dismantlement and prohibition of any uranium enrichment or plutonium reprocessing facilities).

After India and Pakistan declared themselves to be nuclear states, some in the expert community thought that this would contribute to a higher level of stability in the region because of mutual nuclear deterrence. However, the relation between India and Pakistan can be interpreted as an extremely unstable mutual nuclear deterrence, and the instability is chiefly due to the composition and structure of their nuclear forces. The present estimate and

mid-term forecast (2010 to 2015) is that India might have around 100 warheads in its nuclear forces, whereas Pakistan has roughly half that number. The results of modeling show that India can theoretically launch a disarming attack through the use of nuclear and non-nuclear weapons which might reduce a Pakistani retaliatory strike potential to an acceptable minimum. Pakistan cannot launch a disarming attack effective enough to evade destruction of the country by Indian retaliation.

Other reasons for the instability in South Asia, as pointed out above, are the imperfect or non-existent negative control, early warning, and reconnaissance systems, and the availability of missiles capable of carrying both nuclear and conventional warheads, which might provoke a nuclear conflict through the use of non-nuclear missiles.

Under these circumstances, the Big Five and the United Nations can be expected to take certain precautions and start initiatives aimed at forming a multistage program of stabilizing the relations between India and Pakistan. These initiatives should contain measures of phased reduction of tension and confidence building, including those in regard to the nuclear programs, missile tests, some recommendations on such structuring of the nuclear forces that would ensure their survivability, and so on. In the end, this could lead to agreed limits on Indian and Pakistani nuclear weapons.

All of this does not mean that Israel, India and Pakistan should be directly included in the above system of multilateral nuclear arms control, or that they should be recognized as de-jure NPT-defined nuclear weapon states. These measures, along with the multilateral control within the Nuclear Five, would, however, contribute to strengthening the Non-Proliferation Treaty, and global and regional stability. Besides, the above three nations should be integrated into the regime through the CTBT (which should be ratified by the US and China right away), the Fissile Material Cut-Off Treaty, the nuclear export control regimes of Nuclear Suppliers Group (NSG), an acceptance of the IAEA guarantees on declared peaceful nuclear sites, the IAEA 1997 Additional Protocol, and the missile technology control regime.

It should be emphasized once more that the above joint US and Russian initiatives to move away from mutual nuclear deterrence could become a good demonstration of their commitment under NPT Article VI, and could serve as a powerful lever to impose much more stringent non-proliferation regimes on third NWS, non-NPT nuclear states and nuclear threshold states.

7. Conclusion

Once nuclear weapons were invented and their horrific destructive power was demonstrated in Hiroshima and Nagasaki in 1945, the least harmful elaborated way of using them has been through the doctrine and strategy of nuclear deterrence. As is well known this implies the indirect use of such weapons by threatening their use in order to contain an enemy's nuclear aggression or large-scale conventional attack.

On the one hand, as long as nuclear weapons exist, their use cannot be fully eliminated, but it is better to keep this as a theoretical rather than a practical option through the doctrine of nuclear deterrence.

On the other hand, having allegedly proved its utility for national security and foreign policy, nuclear deterrence could not but give birth to nuclear proliferation, since more and

more states developed an interest and technical-economic capacity to join the elite “nuclear club.”

Thirteen countries (counting the DPRK) have acquired nuclear weapons since 1945. Four later relinquished them (South Africa, Belarussia, Ukraine, and Kazakhstan). About a dozen more have pursued military nuclear programs in the past or are suspected of doing so now. A dialectic continuation of this process in an era of globalization and the information revolution eventually leads to sub-state entities, foremost terrorist organizations, gaining access to nuclear weapons, and using them to blackmail or destroy the contemporary civilized world.

The technological revolution, with its development of low-yield and selective-effect nuclear munitions, dual purpose delivery vehicles, anti-missile defense systems and, space-based and precision-guided conventional weapons, has resulted in the erosion of nuclear deterrence from the other end, blurring the “nuclear threshold.”

As nuclear deterrence and its means become more multilateral, uneven in technical foundations, and eventually available to sub-state entities, nuclear deterrence will become more and more dubious. It will serve as a potentially explosive foundation for the security and foreign policy of the great powers.

In this sense, nuclear deterrence — as a strategy of avoiding nuclear war while possessing many nuclear arms — bears the seeds of its own eventual failure through the eruption of actual nuclear warfare, and the question is not “whether?,” but rather “when and how?”

What is most amazing is that all of these dangerous political and technical transformations are happening (or are forecasted to happen) after the end of Cold War, which has been directly associated with nuclear deterrence and perceptions of the highest threat of actual nuclear war. The end of the Cold War, in a sense, played a bad joke on the anti-nuclear aspirations of mankind: no longer terrified by the prospect of the escalation of some conflicts to nuclear holocaust, the leading nuclear powers now emphasize actual nuclear warfare instead of deterrence. They plan for preemptive nuclear strikes and combined operations of nuclear and conventional systems in both offensive and defensive missions. In response to this, or using this as a convenient pretext, some third NWS and “threshold” regimes treat nuclear weapons as the only means of deterring the great powers. And these aspirations open more channels for terrorists to gain access to nuclear explosives.

New security challenges and problems of the 21st century are piling up: nuclear arms and other WMD and missile proliferation, international terrorism, ethnic and religious conflicts with trans-border repercussions, the subversive roles of “rogue” and “failed states,” the nuclear legacy of Cold War which has to be safely disposed of, and so on.

There is no doubt that these problems can be addressed only on the basis of broad and genuine cooperation between the great powers and other economically and politically successful nations.

It is, however, the firm belief of the authors of this study, that neither the United States and Russia, nor all five great powers together, will be able to effectively and consistently cooperate in the area of security as long as they retain and refine the thousands of nuclear weapons assigned for mutual destruction that are the material foundation of mutual nuclear deterrence.

It is now an established fact of life, demonstrated by the recent 15-year “natural experiment,” that without a well-conceived, long-term, and persistent joint effort that combines diplomacy, finances, technology, and politics in a new type of arms control endeavor, mutual nuclear deterrence will not take care of itself and fade away — even though political and ideological foundations of deterrence have become history together with the Cold War.

As long as nuclear weapons exist, nuclear deterrence will remain a possibility and even the actual use of such weapons cannot be discounted. Only a full elimination of nuclear weapons, “final and complete nuclear disarmament,” might provide a guarantee against this eventuality. However, first of all, it is not at all clear what the strategic and technical meaning of the term “nuclear disarmament” is. Secondly, nuclear disarmament could have the unfortunate effects of making the world “safe” for large-scale conventional wars, or for the use of other WMD or new classes of weapons. Hence, the very threat of force and use of force, as one primary instrument of international relations for thousands of years, will have to be fully revised — leading to some kind of the world supra-national government (besides the creation of an international nuclear energy complex or world energy corporation). Such a project is not easy now to contemplate theoretically, to say nothing of its practical implementation. And it goes far beyond the scope of this study.

As for the present paper, in its focal point (or “ground zero”) is the fundamental dilemma for the present time and the foreseeable future: is it possible, first of all, for the US and the RF to do away with mutual nuclear deterrence while: (1) retaining thousands or hundreds of nuclear weapons and (2) lacking “a clear and present” common enemy strong enough for the two nations to unite against and combine their enormous nuclear arsenals?

Based on the above analysis, the authors of this study think that it is possible, provided that sufficient political will, intellectual resources, and administrative efforts are applied to this goal by the United States, Russia, and later by other great powers.

By way of reservation, it is necessary to point out that since many nuclear weapons would regardless remain in service and storage, even if the recommendations of this paper were turned into reality, nuclear deterrence will still remain a remote and virtual possibility among the states that implement such proposals. Also in a more practical operational and technical form, nuclear deterrence would be preserved for the states that do not join a regime of a new type of nuclear non-deterrence relationship.

What is most important, however,, is that mutual nuclear deterrence would be effectively removed: (1) as a foundation of US-Russian (Russian-Western or great powers’) operational strategic relationship, (2) as a material embodiment of their confrontational military relations, (3) as an impediment to their security and political cooperation against new threats, and (4) as a huge drain on their financial resources and scientific-technological innovations.

The steps to be taken in a bilateral format are as follows in the tentative sequence of their practical implementation (see Appendix 2):

- The US and Russia, in line with their legal commitment, should agree by mid-2006 on the counting rules in implementing the 2002 SORT, a schedule of the arms reduction and modified verification and confidence building measures. The duration of the START I with its system of verification and confidence building measures should be

extended until 2012, and that of the SORT until 2015, so that the term of the implementation of arms reductions under the treaty is not the same as that of its duration;

- The exchange of full lists of data should be arranged concerning the missile threats from other countries, the Joint Data Exchange Center in Moscow should be unfrozen in 2006, and the functions of this center should be expanded;
- Immediately upon finalizing work on SORT, the US and Russia should start SORT II negotiations with the purpose of reducing the strategic nuclear arms down to roughly 1,000 to 1,200 warheads by 2017;
- Russia and the US in 2006 should begin talks on limiting and reducing their tactical nuclear weapons (TNW), including their non-deployment in Central and Eastern Europe, a subsequent full withdrawal of US and Russian TNW from Europe (the CFE Treaty zone), and their relocation to centralized storage facilities under mutual monitoring by 2012;
- Transition to a phased termination of the status of mutual nuclear deterrence between Russia and the United States should begin, starting by abandoning the operational concept of launch-on-warning strike in 2006;
- Corresponding with the implementation of the SORT, the talks on the SORT II negotiations should start on a joint de-alerting of SNF through deactivation aiming to reach an agreement by 2008 to de-alert in a verifiable way all forces except 500 combat ready warheads by 2012 (phase I), then go down to 200 warheads by 2015 (phase II), followed by de-alerting 90 to 95 percent of SNF by 2020;
- Corresponding to de-alerting methods — there should be an agreement (joint understanding) on the limitation of the number of SSBNs on patrol at sea (primarily the US ones), on basing of strategic bombers separately from nuclear bombs and air-launched cruise missiles, and on limiting the share of mobile ICBMs in land patrol areas (primarily Russian ones);
- Organizational and technical integration of US and Russian missile early warning and reconnaissance systems should happen by the year 2012, and interfacing of command-control systems of the parties by the year 2017; and
- A full-scale treaty between Russia and the United States on cooperation in development and deployment of the BMD system should be concluded in 2007, leading to its joint operational commissioning by the year 2020.

In a multilateral format, the following steps should be taken, relating in time to bilateral US-Russian agreements (see Appendix 2):

- A commitment by the US and Russia in 2006, followed by the rest of P-5, on non-first-use of nuclear weapons against any NPT-member state and non-first use of WMD against any state (including Israel, India, and Pakistan, provided that they also adopt nuclear or WMD non-first-use doctrines);
- Ratification of the CTBT by all states (foremost the US and China) and its entry into force by the year 2007;

- Accelerated negotiations for the conclusion of the weapons-grade fissile materials cut-off treaty (FMCT) with due verification provisions, with the first phase dealing with uranium enrichment, by the year 2008;
- Conclusion of full-scale fissile materials treaty (FMT) by the year 2010 (including separation of plutonium), full verifiable accounting of all stocks of weapons-grade fissile materials, their use for peaceful and legitimate military purposes;
- A multilateral dialogue should be started in 2007 to involve Great Britain, France and China in a regime of verification and confidence-building measures, and eventually into agreements on limitations of nuclear arms;
- Conceptual reduction from 2007 to 2012 of reliance on nuclear deterrence in the national security strategies of the United States, Russia, Great Britain, France, and China in their respective basic doctrinal document and arms programs;
- Involvement of third NWS in de-alerting and deactivation procedures after 2012;
- Expansion after 2015 of the cooperative missile early warning and monitoring regime to third NWS which have joined de-alerting regime, and to all states which join missile launch notification regime; and
- Expansion of the cooperative BMD system protection after the year 2020 to all states, having joined nuclear arms de-alerting agreements, cooperative missile early-warning/monitoring, and launch notification mechanisms, as well as the NPT, NSG, CTBT, MTCR and FMCT regimes.

The above proposals at first glance may look more like a wish list than a realistic program of action. It is true that the present policies of the US and Russian governments, as well as those of the rest of P-5, do not seem very encouraging. Besides, political tensions between Moscow and Washington, between Russia and the West, as well as between China and the West are rising on a number of international and domestic political issues.

No doubt, a unique opportunity for such steps was missed during the mid to the late 1990s. This was a blunder of historic scale, and its consequences are currently noticeable in the political and strategic relations of the great powers. If, however, the presently growing strategic and political tensions draw attention back to nuclear weapons and nuclear deterrence, and provide incentives for taking realistic steps to deal with the problems, then there is still time to solve them, as long as Cold War remains something of the past.

As experience has demonstrated, neither high political tensions, like those during the Cold War, nor too deep a relaxation of political tensions, as during the 1990s, are conducive to taking serious steps to do away with mutual nuclear deterrence. Hence, if it is at all feasible, now may be exactly the right time, if the political elites of the leading nations realize the need and understand the methods to achieve this objective.

After all, there are no insurmountable technical, economic, or strategic obstacles to doing away with mutual nuclear deterrence. The main barriers are in the minds of politicians, military leaders, weapons designers, and weapons producers. Changing the minds of as many of these people as possible, as well as the opinions of the general public and their political representatives, may provide yet another opportunity for doing the job.

8. Appendix 1: Assumptions in the Model Demonstrated by Figures 6, 7, and 8

The full time that it takes to reconstitute de-alerted missiles depends on: the total number of SNF weapons at the given moment; the number of missiles and warheads remaining on full alert in each leg of the triad; and the methods of de-alerting, determining the technical process of reconstitution.

Land-based ICBMs have the greatest launch-on-warning capabilities, and are the primary candidates in the SNF weapon system for de-alerting. This is why in Figures 6, 7, and 8, the model of de-alerting is illustrated by ICBM reconstitution time.

However, inasmuch as de-alerting is designed to achieve a much greater relaxation of SNF postures and go much farther in the transformation of mutual nuclear deterrence relationships, abandoning LOW in favor of deep second-strike retaliation, SLBM, and heavy bomber de-alerting would also be necessary. This is all the more so since with ever-fewer numbers of ICBMs remaining on alert, land-based missiles may become increasingly vulnerable to SLBM attack if the latter are not de-alerted as well. This indirectly implies a considerable reduction in the number of SSBNs on sea-patrol, since SLBMs de-alerting is feasible only in bases. Simultaneously, this would reduce the number of SLBMs that may be launched from bases in a first strike of LOW, which is an accepted practice in Russia (at least theoretically) and could be adopted in the future by the US as well.

SLBM reconstitution time varies broadly, depending on the de-alerting method: from few hours for each submarine in case of launch tube hatch welding to 30 days in case of the removal of SLBMs from launch tubes. Nonetheless, even with limited number of installation and loading technical complexes at each base, SLBM reconstitution time (a maximum of 100 of 180 days for 12 SSBNs) is covered by a significantly longer ICBM reconstitution process. Most probably the same is true for heavy bombers, even if their de-alerting is implemented through functionally related observable differences (FROD).

The full time of reconstitution of all ICBM force readiness for launch depends on (1) the overall number of ICBM warheads in a de-alerted state, (2) the distribution of these warheads at missile bases and separate missile regiments (divisions), (3) the distances from the central base to launchers, (4) the capabilities of transportation and support technical personnel, and some other factors.

In **Figure 6**, the modeling of the procedures of reconstitution of ICBM readiness for launch is done for Russia's ICBM force level in 2005. It is based on the assumption of ICBM deployment at 13 missile bases (divisions), four of which contain silo launchers with SS-18 ICBMs (85 missiles and 850 warheads), SS-19 ICBMs (129 missiles and 774 warheads) and SS-27 "Topol-M" ICBMs (40 missiles and 40 warheads). In addition, it is assumed that there are 9 divisions of ground-mobile SS-25 "Topol" ICBMs (291 missiles and 291 warheads). Altogether, the numbers are 560 missiles and 1970 warheads (the data corresponds to mid-2005 and is based on the START I data exchange memorandum).

Under the limit of 500 combat-ready warheads, it is assumed that at each missile base of fixed silo-launched ICBMs, there are about 5 to 10 missiles on full alert, and at each ground-mobile missile base there are 18 ICBMs on full alert. In a crisis, the reconstitution of combat readiness of 360 ICBMs is assumed.

Under the limit of 200 combat ready warheads, it is assumed that at each missile base of fixed silo-launched ICBMs there are about two to four missiles on full alert, and at each ground-mobile missile base there are nine ICBMs on full alert. In a crisis, the reconstitution of combat readiness of 430 ICBMs is assumed.

If the whole ICBM force is de-alerted, it is assumed that reconstitution of full readiness for launch would include 560 missiles.

The dynamic model of the reconstitution of the full readiness is taking into account the time of moving transportation-maintenance equipment from one launcher to another and the number of support personnel shifts. The maximum reconstitution time (T_{max}) is associated with the methods of de-alerting through the removal of warheads, dismantling of onboard power supply units and dissection of the pneumohydraulic system of the launch preparation and initiation. The minimal reconstitution time (T_{min}) is associated with the dismantling of gas generators lifting (shifting) the protective roof of the missile silo. The functioning of the support personnel is assumed to consist of three shifts with simultaneous work to restore combat readiness proceeding at two launchers.

In **Figure 7**, the model is based on the same general assumptions for the reduced SNF levels by the year 2012, when both sides would have about 2000 warheads under SORT. Allegedly, Russia would have by that time around 1000 warheads on 400 fixed and mobile ICBMs. The results of this model demonstrate reconstitution times of 118 to 335 days with the work of three shifts, and 30 percent more with two shifts.

In **Figure 7**, the model of re-constitution is based on the SNF force level of about 1000 warheads proposed by the authors of this study by the year 2017. Russian forces are assumed to include 600 ICBM warheads on 200 missiles, half of which would be ground-mobile. The model demonstrates that with 200 warheads remaining on alert, reconstitution time would be 76 to 108 days, depending on the method of de-alerting. Obviously, at such low levels of overall SNF, and in particular of the forces staying on alert, SLBM and bomber de-alerting procedures and reconstitution time would be of much greater importance.

9. Appendix 2: A Tentative Sequence of Practical Bilateral and Multilateral Steps in Revising Nuclear Deterrence

Multilateral NWS Steps	Year	Bilateral US-RF Steps
NFU	2006	SORT Finalized SORT Extension to 2015 START I Extension to 2012 Banning LOW Launching JDEC
CTBT 3 ^D NWS join arms control	2007	Common BMD Treaty
FMCT	2008	
	2009	
FMT	2010	
	2011	
3 ^D NWS join de-alerting	2012	Integration of BMEWS De-alerting to 500 WH TNW withdrawal to central storages
	2013	
	2014	
3 ^D NWS join common BMEWS	2015	De-alerting to 200 WH
	2016	
	2017	Interfacing C3 systems SORT II (reduction to 1000 – 1200 WH)
	2018	
	2019	
NWS join common BMD	2020	De-alerting to 100 WH Deployment of common BMD