

**International Security  
Nonproliferation  
Arms Control**

*Digest of the Russian Journal*

# **YADERNY KONTROL**

*(nuclear control)*

**Volume 8, № 1–2**

**Winter/Spring 2003**

*Publisher: PIR Center for Policy Studies  
in Russia*

**Moscow, 2003**

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It is all about a new occurrence – mega-terrorism.

The threat of nuclear terrorism has attracted the attention of researchers for a long time and humanity has found ways to deal with this threat. Both international and national law have taken this danger into account.

A group of authors, including leading experts from the Ministry of Foreign Affairs, the Federal Security Service, the Foreign Intelligence Service, the Security Council of the Russian Federation. Ambassador extraordinary and plenipotentiary Alexander **Zmeevsky** from the Department of New Challenges of the Ministry of Foreign Affairs, and Ambassador extraordinary and plenipotentiary Nicolai **Uspensky** from the Security Council of the Russian Federation contributed to the report, detailing the growth of this new trend. The monograph is released under the editorship of Alexander **Fedorov**, the PIR Center Research Council.

In the authors' opinion, mega-terrorism refers to the use (or the threat of using) the most advanced weapon systems and technologies for terrorist purposes, which can cause a significant number of fatalities and do serious damage to the economy or environment at the state level. The tools for this are: weapons of mass destruction (i.e. biological weapons, chemical weapons, nuclear weapons) and also the means for affecting the ecosphere, information systems and the social psyche.

The monograph consists of four chapters:

- **Chapter 1:** The transformation of terrorism
- **Chapter 2:** New forms of terrorism: mega-terrorism
- **Chapter 3:** National law as a tool for countering new forms of terrorism
- **Chapter 4:** International relations and mega-terrorism

*To purchase a copy of the monograph please contact Elena Polidva via e-mail at:  
polidva@pircenter.org or phone: +7 (095) 234-0525.*

## Editorial

### GOOD NEWS FROM KANANASKIS

Summer 2002 the G-8 summit was held in Kananaskis, Canada. From June 25 to 27, 2002, the heads of the influential states discussed matters of global security, international terrorism, Russia's role in the G-8, together with problems of education, transport security, etc. Without question, the summit was a success for Russia.

First, a decision was made at the summit that in 2006 Russia would take upon itself the chairmanship and the duties of serving as the G-8 summit's host country. As was recognized at the summit by the states' leaders, in the changing world Russia has shown its capability of playing a sound and significant role in solving the current global problems.

Second, the G-8 leaders have bound themselves to attempt to pass laws in their countries on the allotment of up to US \$20 billion for the implementation of nonproliferation and counter-terrorism programs. In accordance with this decision, during the next 10 years the US would have to allocate half the sum, and the other G-8 states would provide the rest. Russia was declared to be the main recipient of these means, thus giving the mass media cause to say that "foreign states will present to Russia \$20 billion.

But it would be naïve to expect Russia to get such a sum after Kananaskis. First of all, the financial resources have been planned for use not in Russia alone. In the future, part of the sum is supposed to be allocated to other countries, as well. In general, the heads of the G-8 states put no formal restrictions on the eventual list of countries which would have the opportunity to receive some part of the \$20 billion.

Second, among the support variants not only the allotment of financial resources is mentioned, but also writing-off part of Russia's debts in exchange for the implementation of nonproliferation programs. Probably other options are possible as well. In any case, Russia will have to clearly determine the amount of work it is capable of carrying out by its own means.

Third, the declared intentions don't yet guarantee real financing. In democratic countries it is the parliament's prerogative to allocate the budget means, and nobody can be sure in advance of an unimpeded passing of corresponding laws by the parliaments of the G-8 states. In spite of the obvious necessity of assigning the money, the process never goes off smoothly. For instance, in the beginning of 2002 the US Congress suspended of some support programs to Russia because of non-compliance with the entire set of required formal conditions of rendering the aid.

Even if Russia gets the maximum possible amount of financial resources, a question should be asked whether the money would solve the task of

preventing weapons of mass destruction from falling into the hands of terrorists. In spite of the fact that the aid from the G-8 would be undoubtedly useful, one cannot, evidently, assert the means as being sufficient.

In the Baker-Cutler report prepared by a task force of top-ranked experts for the US Department of Energy, the figure of about US \$30 billion for 10 years was recommended to fund DOE programs alone. Hence, the level of funding recommended in the report is half as much as that declared by the G-8, and the recommendations don't take into account programs of the US Department of Defense and the US Department of State with total amount of efforts comparable to that of the DOE programs.

In this a situation, Russian leadership should clearly realize what tools of the nonproliferation regime consolidation and counter-terrorism they have at their disposal. A statement made by Vladimir Putin at the summit is of interest: he said that Russia would be ready to take part in efforts for the elimination of weapons of mass destruction not only at home but in other states possessing them, too. The very fact of making such a statement is evidence of Russia's readiness to actively confirm its status as the leader of global efforts in the fields of weapons of mass destruction nonproliferation and counter-terrorism.

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DIGEST OF THE RUSSIAN JOURNAL  
**YADERNY KONTROL**  
**(NUCLEAR CONTROL)**

**International Security. Nonproliferation. Arms Control.**

**Volume 8**

**N 1–2 (25–26)**

**Winter/Spring 2003**

Published since 1996

Contains selected analytical articles from *Yaderny Kontrol*,  
a journal published quarterly in Russian

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Subscriptions worldwide (Russian and English editions): please, send requests to fax +7+095-234-9558 or e-mail: [info@pircenter.org](mailto:info@pircenter.org). Checks or wire transfers. Express mail delivery.

**Circulation:**

Russian journal: 2,000 copies

English Digest: 500 copies

**Signed for printing**

on November 4, 2002

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- The editors wish to express special thanks to the Center for Nonproliferation Studies at the Monterey Institute of International Studies and Carnegie Corporation of New York for making this publication possible through their support of the Center for Policy Studies in Russia. All views expressed herein are solely the responsibility of the authors.

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*Yaderny Kontrol (Nuclear Control) Digest. Volume 8, No.1–2. Winter/Spring 2003*

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**Hot Topic****US NUCLEAR POLICY AND THE  
FUTURE OF ARMS CONTROL**

**by Jon B. Wolfsthal**  
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**Endowment for International Peace**

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There is a saying among U.S. non-proliferation experts – what's bad for the country is good for business. The past two years has been very good for business, but very difficult times for those concerned about the proliferation of weapons of mass destruction. It has been a difficult period, however, not because of some major catastrophe in the field of proliferation. Quite to the contrary, the non-proliferation field has witnessed some stunning and unprecedented successes in the past decade. Yet, despite an impressive track record, there is a growing perception in the United States, and particularly within the Bush administration, that the proliferation of nuclear, chemical and biological weapons is running out of control and that the traditional regime-based tools are no longer adequate to address these problems. As the U.S. National Security Strategy released by the White House in September 2002 states "our enemies have openly declared that they are seeking weapons of mass destruction, and evidence indicates that they are doing so with determination. We cannot defend America and our friends by hoping for the best."

This view, which has helped give support to concepts such as a "pre-emptive war," has fed the growing public perception that proliferation is inevitable and uncontrollable by traditional means. Moreover, the potential link between proliferation and terrorism has fed this new threat perception in the United States that hold serious consequences for security policy, U.S. alliances, and non-proliferation efforts.

Thus, as perhaps like no time before, the view within the United States, and between

the United States and its allies, is split on the issue of proliferation. During the cold war, there was a broad international consensus on the nature and scope of the threat posed by the proliferation of weapons of mass destruction. Moreover, there was a consensus as to the tools needed to control these threats. This consensus, even between seemingly intractable adversaries such as the Soviet Union and the United States, helped create what has become known as the international non-proliferation regime that includes the Non-Proliferation Treaty, the International Atomic Energy Agency's (IAEA) safeguards system, and the US-Soviet/Russian legacy of formal arms control agreements.

This consensus, however, has evaporated and has resulted in two points of view. One camp, firmly represented by hard liners within the Bush administration, sees proliferation as inevitable and spinning out of control. Secretary of Defense Donald Rumsfeld stated before the Senate Appropriations Committee on May 21, 2002 that "it is only a matter of time before terrorist states, armed with weapons of mass destruction, develop the capability to deliver those weapons to U.S. cities, giving them the ability to try to hold America hostage to nuclear blackmail."

The other camp, largely supporters of the non-proliferation's regime of treaties, inspections and legal norms see the issue of proliferation as manageable and limited to a few hard cases. Where people come out on this issue helps define their worldview, and informs their overall approach to dealing with proliferation issues and international security more broadly.

This debate, on which reasonable minds can and do disagree, gives rise to a reasonable question "Does Nuclear Arms Control have a Future?" US-Soviet/Russian arms control was a critical component of the non-proliferation regime for starting in the early 1970s. For 30 years, this process formed the backbone not only for East-West security, but for global security as well.

In an age when the US government openly questions the utility of the non-proliferation regime, and the value of traditional arms control, it is reasonable to consider whether

the vital historic method of negotiated, verified arms control remains a viable or an attractive tool for ensuring U.S. and broader security.

### **The Bush Administration**

As with any administration, there are debates and contrasting points of view. The current US government is no exception. But since taking office, a predominant point of view with regards to proliferation has emerged from the administration, and it is one that poses significant problems for the longevity and vitality of the international non-proliferation regime and its supporters. In short, the current US government views can be summed up as follows:

- There are numerous countries and sub-national groups dead set on acquiring weapons of mass destruction and using them against the United States.
- Treaties and legal norms can do little, if anything, to stop their acquisition of these weapons.
- Deterrence is an outdated, cold war theory and is less effective against this new breed of proliferators.

Each of these tenets ignore the long history of proliferation issues and the critical role played by the non-proliferation regime in preventing the wide spread of weapons of mass destruction. But this predominant view is worse than flawed. It, combined with a larger distrust of “multilateralism” and a well developed sense of self-righteousness on the part of hard line elements within the U.S. administration, has stymied efforts to expand the agenda for traditional arms control as the U.S.-Russian relationship improves. Moreover, this has further undercut momentum in efforts to reinforce the international non-proliferation regime. It is this view, that proliferation is spiraling out of control, that is feeding a desire within the United States administration and the U.S. nuclear military to retain large segments, and even augment U.S. cold war nuclear capabilities with a view toward new missions and targets.

This view can be firmly seen in the outcome of the U.S. nuclear posture review and in the emerging nuclear posture of the United States. While there are positive elements

within the review itself, such as the rhetorical removal of Russia as a central threat to U.S. security, its underlying conclusions hold out a larger role for nuclear weapons in U.S. security policy, raise the profile of such weapons internationally, slow their control and elimination, and undercut efforts to reinvigorate the broader non-proliferation regime.

### **The Nuclear Posture Review**

The nuclear posture review was requested by President Bush in 2001 and briefed to the public by administration officials in January 2002. The review outlined plans to continue reductions in Strategic Forces, develop national ballistic missile defenses and to develop advanced precision guided munitions without changing any fundamental strategic doctrines, policies or guidance that have guided U.S. nuclear policy for the past decade. The initial warhead reductions announced paralleled those planned during the Clinton administration. By 2007, the Bush administration plans to reduce the deployed U.S. strategic arsenal down to approximately 3800 warheads, as did the previous administration. This will include reductions of 500 warheads from the 50 Peacekeeper ICBMs, 800 from the 96 missiles carried on four Trident submarines to be converted to conventional military operations, and 1,000 from the removal of two warheads from each of 500 Minuteman III ICBMs, as called for under the terms of the 1993 START II treaty.

The administration plans to field 1,700 to 2,200 operationally deployed strategic warheads by 2012. This represent a slower pace of reduction then envisioned by the previous administration. In 1997, the United States and Russia agreed on a reduction goal of 2000 to 2500 deployed strategic warheads by the end of 2007. The lower number proposed by the Bush administration is derived by no longer counting warheads on submarines or bombers in overhaul as “operationally deployed.” Two Trident submarines, with 192 warheads each, are usually in overhaul at any given time, as are several bombers with dozens of weapons, thus allowing lower numbers without changing any existing nuclear force plans.

These targets have been enshrined in the Treaty of Moscow, signed by Presidents Bush and Russian President Putin in May, requires each party to reduce to no more than 2200 deployed strategic offensive nuclear weapons, but lacks any binding timetable for reductions or firm verification procedures. Moreover, there are no requirements for the control, accounting or elimination of weapons to be removed from "operationally deployed" forces, leaving thousands of nuclear weapons potentially available for deployment by either side.

Some warheads removed from delivery vehicles will be dismantled, but the majority will be maintained in the active stockpile for potential return to delivery systems on short notice (weeks or months). This "hedge" reserve of warheads that could be re-deployed, should strategic conditions change for the worse. One of the goals of the proposed START III treaty, however, had been to require warhead dismantlements to make future reductions transparent and irreversible. It appears this is no longer a U.S. goal. The administration also plans to shorten the time required to restart nuclear testing.

There is considerable resistance from some military and civilian officials to further reductions or policy changes. In the most authoritative public statement on the rationale for maintaining large numbers of deployed forces configured as they were during the Cold War, then-Commander-in-Chief of the Strategic Command Admiral Richard Mies argued in July 2001 that burden of proof fell on those who advocate reductions to demonstrate exactly how and why such cuts would serve to enhance U.S. security. "There is a tyranny in very deep numerical reductions that inhibits flexibility and induces instability in certain situations," he said. "We must preserve sufficient deterrent capability to respond to future challenges, to provide a cushion against imperfect intelligence and surprises, and to preserve a reconstitution capability as a hedge against unwelcome political or strategic developments."

These views apparently prevailed in the Nuclear Posture Review. The Bush

administration concluded that there will be a need to maintain thousands of deployed nuclear weapons in a triad of bombers, submarines and land-based missiles for the indefinite future. The diversity is required to "complicate any adversary's offensive and defense planning calculations while simultaneously providing protection against the failure of a single leg of the triad," according to Mies. That is, U.S. forces must remain capable of withstanding a first-strike and responding after the attack with an overwhelming and devastating nuclear counter-attack. Mies explained: "Intercontinental ballistic missile continue to provide a reliable, low cost, prompt response capability with a high readiness rate. They also promote stability by ensuring that a potential adversary takes their geographically dispersed capabilities into account if contemplating a disarming first strike... [T]he strategic submarine force is the most survivable leg of the triad, providing the United States with a powerful, assured response capability against any adversary... The United States must preserve a sufficiently large strategic nuclear submarine force to enable two-ocean operations with sufficient assets to ensure an at-sea response force capable of deterring any adversary in a crisis... Strategic bombers... allow force dispersal to improve survivability and aircraft recall during mission execution. The low-observable technology of the B-2 bomber enables it to penetrate heavily defended areas and hold high-value targets at risk deep inside an adversary's territory... the B-52 bomber can be employed in a standoff role using long-range cruise missile to attack from outside enemy air defenses."

The nuclear posture review also calls for steps that makes the use of nuclear weapons by the United States more likely, even in response to non-nuclear threats or attacks. The review states that the United States must rely on nuclear weapons to deter and respond to threats from weapons of mass destruction, defined in the review to include not only nuclear weapons, but chemical and biological weapons and even conventional explosives.

Within the new nuclear use policy, there are few if any military contingencies that might

not allow the U.S. to respond with nuclear weapons. This policy raises concerns that, by threatening the use of nuclear weapons, even against conventionally armed adversaries, Washington is actually increasing the incentive for states to acquire nuclear weapons, if for no other reason, than to deter the United States' use of such weapons. The current case of Iraq is especially illustrative. With all of the debate in the United States and internationally regarding Iraq's programs to acquire weapons of mass destruction, no one in the United States as explicitly discussed the issue of nuclear attack against Iraq. There is no indication that a nuclear option is under active consideration within the White House. This, however, does not prevent statements from the White House, such as the President's statement on October 8, 2002 that the "full force and fury" of the U.S. military would be unleashed in any war with Iraq. Such statements leave the possible use of nuclear weapons ambiguous, further raising the nuclear ante and reversing the trend towards a minimization of the role of nuclear weapons in the conduct of international affairs.

Another more subtle, but equally important development in the NPR is the closer integration of conventional and nuclear force planning. The Pentagon states that by more closely linking intelligence, communication and force operational planning for nuclear and conventional operations, that conventional forces can more easily replace operations previously limited to nuclear options, making the use of nuclear weapons less likely. It is possible, however, that this linking of operational capabilities will also work in the reverse, making it easier to target and use nuclear weapons in missions previously reserved for conventional missions. These changes to operational integration, in combination with more direct planning to consider the use of nuclear weapons against states including China, North Korea, Iraq, Iran, Syria, Libya and others, reverses the trend of de-emphasizing nuclear weapons and could make the use of nuclear weapons far more likely and actually encourage, not discourage, the acquisition of nuclear weapons by additional states.

It remains to be seen what affect, if any, the views of the active military will have on these policies. Traditionally, the uniformed military in the United States has widely resisted anything that would counteract the traditional conventional superiority of the United States, or that might complicate military planning by forcing troops to operate in contaminated battlefields (i.e., chemical or biological weapons or radiation). These concerns have been driving factors in the development in the United States of advanced conventional capabilities as opposed to modern, battlefield nuclear weapons. It is possible that the process of integrating the top down directives of the NPR will be difficult and that the position of the uniformed military may lead to further modification of these policies.

#### **Implications for Arms Control and Non-Proliferation**

Although Presidents Bush and Putin have signed the Treaty of Moscow setting targets for nuclear reductions on both sides, the Bush administration remains committed to preserving its flexibility on military and security matters, apparently at all costs. This desire to preserve its nuclear options is behind the lack of firm constraints on non-deployed warheads within the Treaty of Moscow and does not bode well for proposals to deal with critical nuclear security and non-proliferation issues lingering from the aftermath of the cold war, including issues related to tactical nuclear weapons, excess nuclear materials and the arsenals of other nuclear weapon states.

Although U.S. and Russian officials have stated their intent to rely on START verification provisions to guide the implementation of the Treaty of Moscow, it is not clear to what extent the two countries will go in providing the other with broader transparency into the planned reductions in nuclear forces. It does appear that the United States intends to focus its limited interest in nuclear arms control in this narrow area of work at the expense of other areas of progress.

Moreover, the underlying assumptions of the nuclear posture review - the continued requirement for large, flexible nuclear

arsenals, the reinvigoration of the U.S. nuclear weapons testing and production infrastructure, and the initial steps required to develop the next generation of nuclear weapon launchers (including submarines, ICBMs and aircraft) – all raise serious questions regarding the “unequivocal commitment to the ultimate goals of a complete elimination of nuclear weapons” made by the United States (and the other four declared nuclear weapon states) at the 2000 NPT Review Conference.

Judging from the nuclear posture review, and the track record thus far of the Bush administration, the near term outlook for traditional U.S. Russian arms control would appear bleak. This bleak outlook is all the more frustrating for those concerned about nuclear security and weapon control issues given the wide range of security concerns that could be addressed, at least in part, through negotiated, verified undertakings on the part of the United States, Russia, and other nuclear weapon states.

While the Bush administration’s inclination to pursue them are in doubt, the potential benefits offered by existing opportunities to utilize traditional arms control, supplemented with more innovative methods, to improve U.S. security, and reinforce non-proliferation efforts are not. Key among these is to potential to utilize the new, closer U.S.-Russian relationship to better control and account for non-deployed nuclear weapons and to ensure the secure storage and disposal of excess nuclear materials. Proposals to include tactical nuclear weapons within future arms control measures laid out in 1997 could be revived and, given extensive cooperation research conducted by both states in the past, could make quick progress should a political decision be made to pursue the goal of monitored storage and elimination.

The current U.S. aversion to pursue new arms control agreements, however, may not be permanent. As U.S. and Russian reductions proceed, it is possible that the lack of firm verification under the Treaty of Moscow could give rise among hard line conservative in the United States as to Russian compliance with its commitments (as

has been seen in the area of its chemical and biological weapon commitments). This could lead to a renewed interest within the administration (for political, if not philosophical reasons) to negotiate binding, verified reductions and controls on those part of the Russian arsenals and infrastructure that raise U.S. security concerns.

One final issue continues to emerge that may provide a needed impetus for broader arms control efforts. Growing international concern regarding the potential access by terrorists and states of proliferation concern to weapons-usable nuclear material could lead to new efforts to improve global control and use over such material. By far, the weakest link in international nuclear control issues is the state of the former Soviet Union’s nuclear infrastructure. Cases involving nuclear smuggling and possible thefts and diversion are well documents and even sensationalized in popular culture.

This area continues to drive the threat perception in the United States and elsewhere about the possible acquisition by terrorists groups of nuclear weapon, a perceptions that may over time convince the Bush administration of the need to pursue more formal, intrusive and comprehensive controls over nuclear materials in Russia and elsewhere. It is this area that could provide fertile ground for arms control and non-proliferation efforts in the coming years, and lay the ground work for a revitalization of broader, more traditional arms control efforts including controls on tactical nuclear weapons, nuclear materials, and even a return to verified, binding controls on strategic nuclear weapons. While no one would wish for such a turn of events, conclusive evidence that nuclear materials or weapons had been stolen by terrorists, or worse, an actual nuclear attack, could be expected to galvanize pressure on the U.S. and other countries to more firmly pursue opportunities to control nuclear weapons and materials more tightly and with firmer, legally binding methods. Barring such a terrible developments, progress can be expected to be incremental, at best, given the current U.S. approach.

## **Interview**

### **YURI BALUYEVSKY: 'THE TREATY ON STRATEGIC OFFENSIVE REDUCTIONS MEETS RUSSIA'S INTERESTS OF TODAY AND TOMORROW'**

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*First Deputy Chief of the General Staff of the Russian Armed Forces Colonel General Yuri Baluyevsky, gave an exclusive interview to the PIR Center's Yaderny Kontrol reporter Ilya Fabrichnikov.*

**YADERNY KONTROL: The Strategic Offensive Reduction Treaty signed at the last Russian-American summit evoked ambiguous expert opinions both in Russia and abroad. How do you assess the importance of the Treaty from the viewpoint of current and future security of Russia?**

**YURI BALUYEVSKY:** The Strategic Offensive Reduction Treaty (SORT) ensures continuity of the process of limitation of strategic offensive arms and from this viewpoint it meets Russia's interest of today and tomorrow. The format of the new treaty differs from the formats of the previous START I and START II since it is determined by the modern state of relations between Russia and the United States and the military and political situation in the world at large, and the entire logic and history of the negotiations in this field.

Although SORT was prepared within a very tight timeframe (within approximately six months), one cannot say that the negotiations were easy. The negotiations were tough, one had to overcome many objective and subjective hurdles on the road to the conclusion of a new treaty, which was so important both to our two countries and the entire world. At first, the U.S. party proposed to carry out reductions of the strategic offensive arms by codifying the concept of 'operationally-deployed warheads' (ODW) that assumes the presence of 1,770-2,200 nuclear warheads ready for immediate use

within the framework of operatively deployed nuclear forces, while the rest of the current number of warheads are removed to the warehouses. Such approach would have allowed the parties to preserve their strategic offensive forces at the level of about 6,000 strategic nuclear warheads allowed by START I and would have legitimized the replacement of a real disarmament process by a token exclusion of strategic weapons from counting.

Such approach gave rise too many concerns. The Russian position was based on the need to carry out real cuts in strategic offensive arms while ensuring equal security for the parties, the predictability of the nuclear policy and taking into account the ratio between the cuts in and limitations of strategic offensive arms and the limitations of defensive systems. Our proposals were:

- within 10 years, carry out real reduction in warheads deployed on strategic carriers from the level of 6,000 units (START I level) to 1,700-2,200;
- ensure elimination of the downloaded strategic delivery platforms in a more economically rational way;
- widen transparency and confidence-building measures on the basis of a verification system provided in the START I Treaty;
- codify the natural interrelation between the strategic arms reduction process and limitation of defensive capability after the United States' withdrawal from the 1972 ABM Treaty.

Moreover, each of the parties would have independently determined the structure of its nuclear forces proceeding from its national interests and economic capability and taking into account the limitations set forth in the new Treaty.

The essence of the U.S. proposals was to preserve to the maximum extent the letter as well as the spirit of the rules of warhead counting that were provided by the START I Treaty and that have proved their efficiency, while at the same time to simplify some of the procedures of that Treaty associated with the elimination of strategic arms and to simplify the verification mechanism developed in the Cold War era.

Such difference in approaches used to be a stumbling block at negotiations for quite a long time. However, the mutual desire to continue the nuclear disarmament process, the desire to codify the achieved level of mutual understanding and trust helped identify common approaches and prepare an agreed version of the treaty while relegating the resolution of details to a later period. In the end, the chief factor that ensured the success of the negotiations was that, in the process of negotiating a new treaty, both Russia and the United States assumed that the nuclear arsenals of both countries are currently excessive, which made mutual cuts in nuclear weapons within the strategic deterrence forces quite reasonable. Now that the SORT Treaty is signed, one can see that Russia's stance described above was adequately reflected therein.

At the same time, during the negotiations and after the signature ceremony, there were indeed many ambiguous expert opinions on the SORT Treaty. This is quite natural since the issues of reductions in strategic arms and deployment of a missile defense are very important and of great concern for the general public. Therefore, every person interested in the problem, as well as experts, has the right to express one's opinion on the subject. One would like, however, that more weighted and reasoned opinions about the negotiations and the goals to be achieved by Russia in their process were voiced in the public discussion in the mass media.

**Q.: The joint Declaration of the President Bush and President Putin addresses the issue of studies of possible programs of joint Russian-U.S. research and developments in the ABM technologies. In preliminary terms, what do you think of the prospective main areas of such cooperation? What such cooperation can give Russia and the United States?**

**A.:** We are very interested in any proposals concerning the cooperation between Russia and the United States in missile defense both within the bilateral framework and within the framework of the Russia-NATO Joint Permanent Council. Such cooperation can be carried out in terms of identifying the conceptual framework for developing the missile defense systems and elements,

mutual early warning systems, joint military exercises and even joint industrial development of missile defense systems. It is important to stress that, in many respects, we cooperate quite intensively, and the practical value of this cooperation is expressed by deeper mutual understanding and the search for mutually acceptable fields of cooperation in ABM issues.

Each of our two countries has large scientific and technical as well as industrial capability in ABM development, which is surely of interest for the partner. We can save our own forces and resources if we use efficient solutions, which had been found earlier, for the achievement of common goals.

Meanwhile, one of the main tasks to be addressed jointly is the creation of a Pan-European ABM system in the theater of military operations (TMD). This is an important and complex task that requires the search for new, often non-traditional ways and means. However, our experience of relations with the NATO countries has shown that any task, even those that look extremely difficult, may be eventually resolved provided there is mutual desire to achieve the goals and provided the partner's opinion is treated with respect and is taken into account. Our confidence is supported by the recently achieved results of our joint efforts, including those achieved during joint ABM exercises in the theater of military operations.

We also believe that the cooperation between Russia and the United States, as well as among Russia and other states, should be developed on the basis of the following principles:

In the first place, the benefits of cooperation should outweigh the benefits of unilateral actions.

The benefits may be of different nature: political, military, economic, technological, etc. Therefore, the cooperation shall be carried out in different areas and on different levels of integration, depending on the extent of the parties' involvement in the implementation of specific projects.

In the second place, the cooperation shall assume equal rights and long-term prospects

since the specifics and complexity of the tasks addressed in the development of an ABM system require involvement of substantial resources (both material and intellectual) and are time-consuming.

In the third place, the cooperation requires transparency with respect to the intents and capabilities of the parties.

This has to do with the fact that the ABM is a very sensitive element of national defense of any state since it may very substantially affect the changes in both regional and global balance of forces. At the same time and for the same reason, there should be an efficient mechanism of protection of information (technological, scientific and military) exchanged by the parties in the process of cooperation. Such information should not be disclosed to third parties or persons who are not involved in the cooperative efforts.

**Q.: How do you assess the modern state of Russian-U.S. cooperation in the military domain, including the elimination of dismantled strategic arms, safekeeping and safe transportation of nuclear weapons? What is to be done in order to raise the efficiency of Russian military?**

**A.:** It is important to stress that over the past several years the Russian-U.S. cooperation went through different periods. Thus, with the coming to power of the new Republican administration, the prospects for cooperation between Russia and the United States in different areas looked very uncertain. The U.S. foreign policy was aimed to ensure the possibility for unlimited unilateral actions, which led to a more rigid position of the United States on many issues starting from the discussion of the Kyoto protocols for limitation of industrial air emissions and ending by reductions in strategic arms and the deployment of a national missile defense. Therefore, the future of fruitful cooperation between our countries, including in the military domain, became very fragile.

However, the situation radically changed after the September 11 events when Russia joined the U.S. in the fight against common enemy, the international terrorism. Terrorist acts in New York and Washington have demonstrated to the global community that

the issues of ensuring security of any state in the modern world cannot be viewed separately from the development of the international community as a whole and that a joint struggle with new challenges and threats is necessary. These events allowed to start a new dialogue, new negotiations on a wide spectrum of problems, including the development of a treaty in the field of reduction of strategic offensive arms.

Indeed, the elimination of dismantled strategic arms is a very important and complex challenge. It involves many aspects: political, technical, economic and other. I would like to stress that Russia, despite the difficulties that our country faces, fulfills all the obligations in this domain assumed in accordance with international treaties. The United States as well do help us, within the framework of the Nunn-Lugar Program. This program helped enhance the security of dozens of nuclear material storage facilities and strengthen their protection and monitoring systems in the FSU countries, including Russia. The importance and the need of international efforts in this respect was emphasized in the statement of the eight leading industrial powers on launching the G-8 Global Partnership Against the Proliferation of the Weapons and Materials of Mass Destruction agreed on June 28, 2002 in Kananaskis that provides for raising up to \$20 billion over the next ten years.

In our view, growing efficiency of cooperation in the military, including military and technical, sphere depends on the formation of a clear-cut legal framework. From this point of view, one of the key elements required for the formation of such framework is the conclusion of an agreement on the protection of confidential information that the parties exchange during cooperation efforts. Such agreement is not only a guarantee of non-proliferation of sensitive technologies, but also a means for safeguarding the economic interests of our two countries.

**Q.: The proliferation of the weapons of mass destruction as well as the missiles and missile technologies causes growing concern of experts and politicians. What, in your view, is the danger of such proliferation and the resulting threat? What**

**is to be done in order to neutralize this threat?**

**A.:** Indeed, the strengthening of the regime of non-proliferation of the WMD, the prevention of the 'flight' of sensitive nuclear and missile technologies is becoming especially important today. This is necessary because the evolution of the system of international relations against the backdrop of changing global environment over the past decade has substantially weakened the regime of non-proliferation of the WMD that was formed by the end of the 80's and whose stability was secured by the two superpowers (the United States and the USSR).

After the bipolar world came to an end, the incentives for many states to acquire nuclear weapons and WMD in general have grown, while the capacity to counter this process has decreased. This has to do with the fact that earlier (in Cold War times) the bipolar system ensured certain deterrence in addition to coercion. This was equally applicable for the Third World countries: superpowers were watching each other with suspicion and made everything to prevent the use of force against the so-called 'neutral' countries, which might strengthen the opposing block. Today, with the actually *decreasing UN role* in controlling the use of force, there are objective incentives for acquisition of both nuclear and other WMD by the countries that are outside of the so-called 'U.S. zone of influence'.

The rapid evolution of conventional weapons and breakthroughs in their quality resulted in a situation where the countries that feared to become the objects of the use of force sought *more attractive and affordable* WMD, including nuclear weapons. Therefore, the nuclear weapons developed in the middle of the past century as a weapon of rich states is gradually becoming the weapon of poor states that enables them to efficiently fend off the threats of developed countries. Furthermore, the *technological progress* makes nuclear weapon technologies more affordable, to say nothing of chemical and biological weapons.

From this viewpoint, we are concerned by the desire of the United States and Great Britain *to attribute to nuclear weapons the role of*

*deterrence against other WMD*, which is in conflict with the principle of 'negative security assurances' for non-nuclear states. Along these lines are the U.S. plans to build, in accordance with their new Nuclear Posture Initiative, small and ultra small nuclear warheads for carrying out pinpoint, including preventive, strikes with a 'noble' goal in mind - that of the struggle against terrorism.

Therefore, new threats and security challenges encourage more countries to rely heavily on nuclear arsenals, which indirectly increases the probability of proliferation of nuclear weapons, which, in its turn, results in a worsening situation in the area of strategic stability and a lesser security level.

Hence, in our view, the non-proliferation of nuclear weapons and other WMD as well as missiles and missile technologies should become one of the priorities of the national security policy of nuclear states.

Russia has a realistic program for achieving those goals.

In order to create a mechanism for stemming the proliferation of missiles and missile technologies, it is essential to use new ideas, such as the concept of a Global Control System for the Non-Proliferation of Missiles and Missile Technology proposed by the Russian party, the draft Code of Conduct prepared by the member states of the MTCR as well as the codification of existing rules and new proposals within a unified international law framework. The Russian party prepared a draft of a Memorandum of Understanding in the area of missile non-proliferation based on the ideas of the GCS and The Code of Conduct. This draft may serve the basis for future negotiations concerning the establishment of a new global missile non-proliferation regime.

**Q.: And last but not least: it is no secret that the situation in the Russian Armed Forces is beyond criticism. How are the decisions of Russia's Security Council on military reform being carried out? What is to be done as a matter of priority?**

**A.:** Indeed, Russia is carrying out its military reform in a very complex situation, which has to do with a number of causes.

The Armed Forces of the USSR and the military establishment of the state in general were excessive in terms of structure, composition and number of servicemen and were not adequate to the economy's capacity. The country was constantly lacking financial and other resources for their maintenance. When the financing of the defense was cut dramatically and government orders for weaponry tumbled, the defense enterprises found themselves in dire straits. Beginning with 1993, the state budget appropriations for development and maintenance of the Armed Forces were 1.5–2 times less than it was necessary for addressing the assigned tasks, all the more so since the approved appropriations were not disbursed in full. With each passing year, the gap between the needs of the Armed Forces and the disbursed appropriations widened. The military reform as a system of interrelated economic, social, political, military and other measures designed to improve the military establishment, became an integral part of the general reforms of every aspect of Russia's life.

Due to exacerbated financing problems, the attempts to reform the Armed Forces in 1992–1996 failed to provide structural adjustments or to close the existing gaps; as a result, the reform whittled down to gradual reduction in the level of strength and composition of the Armed Forces.

The approaches to the military reform had to be reconsidered. The Guidelines of the Government Policy of the Russian Federation in Military Development Until 2005 codified anew the goal and the main tasks of development of the military sector as well as the thrust of joint activity of the federal executive government bodies in terms of ensuring country's defense and the state security by military means. Considering the changes in external and internal environment, the main guidelines for military development until 2010 were set forth in August 2000.

It is important to understand that a real military reform is impossible without the reform and improvement of the entire military establishment that includes the Armed Forces, other troops, military

commands and bodies that are meant for dealing with the tasks of state defense and security by military means as well as their command bodies. The military establishment comprises also a part of Russia's industrial and scientific potential that is immediately involved in ensuring military security.

The goals and content of the reform assume, essentially, getting the military establishment rid of everything excessive, inoperative, overlapping and obsolete, of inefficient bodies and agencies, as well as renovation, improvement of the quality and efficiency of the infrastructure and the manning and training systems, as well as cutting down inefficient expenditures that are not justified by the interests of national defense and security. These transformations are goal-oriented and systemic. Among the goals are consistent build-up of technology intensiveness, professionalism, mobility and quality of the military establishment, adaptation of the system of preparedness activity of the economy and the country's population to the market environment and ownership relations as well as restructuring of the system of financing. A cornerstone task is the social security for the servicemen. Social security should be adequate to the conditions and civic significance of the military service, special nature and content of the military service.

The decisions made in 2001 enabled a successful transition of the Armed Forces to a triad structure composed of: the Ground Forces (the Army), the Air Force and the Navy. This enabled the realization of the principle of the use of forces by areas of confrontation: the earth, the air and space, and the sea.

The Strategic Missile Forces were demoted from a branch of the armed forces into two independent arms of the service: the Strategic Rocket Forces and the Space Force.

The Chief Command of the Ground Forces was established. Within the framework of optimization of the military and administrative division of the country's territory, the Privolzhsky and Uralsky military districts were united into Privolzhsko-Uralsky Military District. The forces alignments on potentially dangerous

directions, the South-Western and Central-Asian, were strengthened through the deployment of additional combat ready commands and units.

The strategic branch of the Armed Forces military command was optimized. The structure, composition and strength of the central bodies of military command of the Armed Forces was brought in line with the changed structure and effective combat strength of the branches and arms of the Armed Forces. The functions of the senior staff of the Ministry of Defense were streamlined.

Another, no less important, task is the improvement of the system of equipment support, government orders for weapons and military equipment. The essence of transformations in this field is the development and carrying out of a unified engineering policy in the Armed Forces and in the country as a whole. The logistic system will be optimized, as well. A unified logistic system for the Armed Forces, other arms, commands and military bodies will be developed. The system provides for unification, by territorial principle, of storage, transportation, medical and other infrastructure controlled by a single body.

In the domain of military science, a unified military science center with a rational structure, composition and strength will be set up. The center will have a forward-looking scientific and practical position with respect to addressing urgent problems of national defense and security as one of its priorities.

Another important problem that is linked to the very basics of the military reform is the improvement of the Armed Forces manning system.

In accordance with the instructions of the President and the Government of Russia given in November of 2001, the Ministry of Defense, jointly with federal executive bodies, commenced a practical development of the Federal Program for Manning of the Armed Forces with Servicemen on Contract.

It is important to stress that this is a complex problem that involves theoretical science, organizational, legal, military economic, social psychology and other aspects. All the

above problems are to be solved in the nearest future.

In accordance with the instructions of the President and the Government of Russia, the Ministry of Defense, jointly with federal executive bodies, commenced a practical transition to manning the Armed Forces with servicemen on contract. This year, an experiment is carried out on the basis of one of the airborne units. After the results of the experiment are obtained, a draft of a federal dedicated program is to be developed by the end of 2003 and submitted for the Russian President approval.

The passing of the necessary laws on military service is one of the priorities of the Ministry of Defense. Within the framework of such activity, the Ministry of Defense, jointly with the respected ministries and agencies, developed a draft law on alternative civil service, which is currently being studied by the State Duma. The preparation of this bill is based on the principles of observing equal social rights of citizens that are in the military or in the alternative civil service.

There will be stage-by-stage transformations in other areas that involve all the main spheres of the Armed Forces life and activity.

In this way, by 2006, Russia's Armed Forces will take the new shape and, presumably, remain that way until 2015.

What the Army and the Navy are to expect in the nearest future? First of all, further improvement of the structure and composition of the Armed Forces, elimination of excessive and overlapping structures and bodies and, naturally, cuts in the number of servicemen that is associated with this improvement. At the same time, there will be no new wave of axing. Today, the optimization of the strength of the Armed Forces is carried out strictly within the boundaries established by the planned parameters.

In general, the cornerstone of the military reform is its social segment, i.e. urgent resolution of the problems of allowances, lodging, employment and re-training of the discharged servicemen and the resolution of other problems associated with raising the

prestige of the military service among the general public.

There is no need to dwell in details on the passed decisions concerning the raising of the servicemen' allowance. I would just emphasize that starting from July 1, servicemen' allowances have been linked to salaries of federal civil servants. In future, servicemen' emoluments for rank will be linked to allowances for category of federal civil servants.

As for the housing problem, I would like to stress that, for the first time over the past years, the residential construction plan for 2002 will enable to give apartments to the discharged servicemen and to form a strong trend towards the reduction in the overall number of 'homeless' servicemen. Over the next few years, we are planning a phased reduction in the number of 'homeless' servicemen by using every source for obtaining accommodation - by construction of houses with our own efforts, with the help of 'residential certificates' and gradual transition to the provision of servicemen on contract with accommodation during their years in service.

Naturally, the Ministry of Defense will be involved in the resolution of the problem of re-training and employment of the discharged servicemen. On October 15, 2001 the Government of the Russian Federation adopted the State Program 'Social Adaptation of Servicemen to be Discharged from Russia's Armed Forces, other Troops, Commands and Bodies and Members of their Families' to be carried out until 2005. This program will provide an overall resolution of the problems of vocational training, re-training and employment of the discharged servicemen and members of their families.

In other words, despite the complexity of the task, we clearly see the ways to resolve it, and even today we have achieved a considerable success and have laid down a strong basis for further transformations.

## Interview

### **SAM NUNN: 'UNITED STATES AND RUSSIA MUST TAKE THE LEAD IN CREATING A GLOBAL COALITION AGAINST CATASTROPHIC TERRORISM'**

**[This article was originally published in Russian in *Yaderny Kontrol*, No. 5, Vol. 8, September-October, 2002]**

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*During past ten years of the Nunn-Lugar program Russia and CIS countries were provided international assistance that helped to resolve a number of critical problems and to accomplish necessary tasks. "The greatest success [of the program for the past years] was that we managed to persuade Ukraine, Kazakhstan and Byelorussia to give up nuclear weapons, inherited from the Soviet Union" the co-chairman of the "Nuclear Threat Initiative" Sam Nunn said in his interview to the Yaderny Kontrol Editor-in-Chief Vladimir Orlov.*

**YADERNY KONTROL: Most of the people in Russia now agree that the Nunn-Lugar Program (as CTR, MPC&A, and other U.S. assistance programs are known in Russia) is in the Russian national interest. Could you please explain why you believe it is also in U.S. national interests to maintain and perhaps expand this Program?**

**SAM NUNN:** The United States has an enormous national security interest in making sure that dangerous weapons and materials - wherever they are located - are secure and do not get into the hands of the world's most dangerous people. At a time when Russia faces serious economic and social challenges, the United States certainly has an interest in ensuring that sufficient resources are committed to helping Russia manage and improve security surrounding the weapons and weapons-usable materials inherited from the Soviet Union's Cold-War arsenal. We cannot afford to lose sight of the fact that terrorists and certain states are racing to acquire weapons of mass destruction, and we ought to be racing together to stop them.

**Q.: Now, already ten years after the launch of the Program, what would you call the best success story of the Nunn-Lugar Program, as far as nuclear nonproliferation is concerned?**

**A.:** I believe the biggest success has been the work in persuading Ukraine, Kazakhstan, and Belarus to give up the nuclear weapons they inherited from the Soviet Union. This eliminated more nuclear weapons than those contained in the entire nuclear arsenals of China, France, and the United Kingdom combined, and kept these newly independent states from adding their fingers to the nuclear trigger. Equally important, this success proves that Russia and the United States can cooperate to affect dramatic change and improvement in the sphere of global security. It is imperative that we find new and creative ways to build upon this cooperation in the face of catastrophic terrorism.

**Q.: Efforts to reduce risks of megaterrorism have been declared as one of the major issues in the U.S.-Russian security agenda, based on a new strategic partnership. What practical steps do you believe should be implemented by the United States, Russia, and by both our countries *jointly* in the near future in this regard?**

**A.:** I agree with your assessment and would add that preventing the spread and use of nuclear, biological and chemical weapons should be the central organizing security principle uniting the efforts of both of our countries in the 21<sup>st</sup> century. I believe the United States and Russia must take the lead in creating a global coalition against terrorism. The greatest dangers of the 21<sup>st</sup> century are threats that all nations face together and no nation can solve on its own. Acquiring weapons and materials is the hardest step for the terrorists to take, and the easiest step for us to stop. By contrast, every subsequent step in the process is easier for the terrorists to take, and harder for us to stop.

The coalition I envision would begin with Russia and the United States, but should quickly expand to include nations other nations in Europe, Japan, Canada, China, India, and Pakistan. This coalition should include every state with nuclear weapons

and weapons-usable materials. We must remember that nearly 20 tons of civilian highly enriched uranium exists at 345 civilian research facilities in 58 countries, yet there are no international standards for securing these nuclear materials within a country. With U.S. and Russian leadership, we can assist every state with nuclear materials adopt standards and cooperative programs for inventory control, safety, and security. The coalition would also work to improve border security and export controls, and train international teams to respond in the event of a terrorist nuclear explosion or the loss of control of nuclear weapons or materials.

**Q.: What do you think the NTI, a private foundation, should add to the international efforts to reduce proliferation threats in the former Soviet Union?**

**A.:** The Nuclear Threat Initiative (NTI) is a charitable organization working to reduce the global threats from nuclear, biological and chemical weapons. NTI is currently undertaking an effort in cooperation with Russia's Ministry of Atomic Energy to assess the feasibility of accelerating and expanding efforts to blend down highly enriched uranium extracted from dismantled Russian nuclear weapons. NTI is undertaking similar work in Kazakhstan, which is designed to consolidate and blend down HEU located at research reactors. NTI is also funding a collaborative effort - in which I am pleased to note that the PIR Center has been an active participant - between U.S., Russian and other European research institutes for the purpose of increasing European participation in cooperative threat reduction activities in Russia and the former Soviet Union. Part of this effort might involve further exploration of the prospects of forgiving a portion of Russia's Soviet-era debt in return for a greater commitment of Russian resources toward increasing security at sites that store Russia's weapons and weapons-related materials.

**Commentary****MYANMAR NUCLEAR FUTURE****by Anatoly Luchin**

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In the present time Russia is trying to expand its nuclear power plants and technologies market. Along with major projects like building nuclear power plants in India, China and Iran Minatom is engaged in less ambitious projects. Now the negotiations are held between the governments of Russia and Myanmar Union regarding building a nuclear research reactor in Yangon.

**The Negotiations**

During a visit to Russia, in July 2000, Win Aung, Myanmar's Minister of Foreign Affairs, held discussions with Russian Minister of Science and Technology, Ilya Klebanov, and requested that the Russian side consider a cooperative effort for constructing and operating a 10 megawatt nuclear research reactor in Myanmar. An official appeal was later addressed to Ilya Klebanov.

In December 2000, by invitation from Evgeny Adamov, Minister of the Russian Federation for Atomic Energy, U Thaung, Minister of Science and Technology for Myanmar, came to Moscow. He visited a number of Russian research institutes where he had the opportunity to become familiar with the methods used for training research reactor specialists. During his trip, U Thaung expressed Myanmar's readiness to send a group of scientists to Russia for training at Russian research reactors.

In February 2001, Russia offered to hold negotiations with Myanmar for the construction of a light-water water-cooled research reactor with an output of 10-15 megawatts and an isotope laboratory. Later, Minatom representatives held negotiations with the Myanmar government and, in June 2001, Joint Stock Company Atomstroyexport finalized a contract with Myanmar for the development of a nuclear reactor project.

From July 3-5 2001, Win Aung, accompanied by officials from Myanmar's Ministries of Defense, Energy, Industry and Railroads, again visited Russia where he met with his counterpart Igor Ivanov and Ilya Klebanov. During the trip both sides initialed the construction agreement.

In January 2002, according to an unconfirmed source, under a shroud of secrecy, the first brick was laid for the substructure of a future nuclear power plant on the outskirts of Meguey (central part of Myanmar). Russia is planning to supply equipment for the nuclear reactor in 2003. In February 2002, Yangon established a National Ministry for Atomic Energy.

On May 15 2002, the Government of Russian Federation issued decree № 312 "On concluding an Accord between the Government of the Russian Federation and the Government of the Union of Myanmar about the construction of a Center for Nuclear Research in the Union of Myanmar. This decree charges Minatom to hold negotiations with Myanmar and, after reaching an agreement, to sign the mentioned accord.

**The terms of the agreement**

In July 2002, Atomstroyexport informed the Myanmar government of the basic cost for the construction. So far, there has not been a reply from Myanmar.

According to estimates, the final price of this project will total five million dollars – not including post-construction servicing. Additionally, some sources say that more than 300 Myanmar engineers are already training in Russia. Neither Russia nor Myanmar has officially confirmed this information.

It is expected that the Russian contract for the construction of the reactor will be paid for with foodstuffs and raw materials. Foodstuffs presumably refers to rice, whereas raw materials may include exotic woods (such as teak) and raw rubber, which has been an object of interest for the Russians since a visit four years ago by the Myanmar Minister of Agriculture and Timber Industry to Moscow. It is also possible that Russia will attempt to restart a copper mining project in

Myanmar that had been postponed after the collapse of the Soviet Union or that it will participate in new oil and gas mining projects.

#### **Cooperation between Myanmar and the IAEA**

Myanmar's interest in nuclear power has a long history. In 1956, the Burmese Research Institute established a special department for nuclear energy studies and one year later, Burma joined the IAEA.

Officially, Myanmar supports nuclear weapons nonproliferation, the unconditional and comprehensive nuclear test ban and the elimination of nuclear arsenals. Myanmar joined the NPT in 1992 and later became a member of the CTBT. Myanmar was the first Southeast Asian country to ratify the 1995 Nuclear Weapons-Free Zone treaty, which entered into power in 1997. Myanmar's approach to the additional protocol of the treaty follows the common approach of the other ASEAN states.

In 1994, Myanmar became the member of a regional cooperative agreement under the aegis of IAEA. Later, in 1995, it became subject to IAEA safeguards.

In October 1996, the Government of Myanmar established the Ministry of Science and Technologies, which it tasked with studying the practical utilization of nuclear energy, including the production of radioisotopes, in a research reactor. According to the NPT, Yangon has a sovereign right to develop its own peaceful nuclear program. The Myanmar leadership also stresses that all neighboring countries – aside from Laos – already possess nuclear research reactors.

In 1999, the Government of Myanmar asked the IAEA to assist it in developing the technical and legal regulations necessary for constructing a nuclear research reactor – capable of producing isotopes and for conducting nuclear research in the fields of medicine, agriculture and education.

On September 15 2000, Myanmar officially informed IAEA director Mohammed El Baradei about its intentions to build nuclear research reactor. However, after visiting Myanmar from June 13–20 2001, and

studying this issue within the framework of the regional cooperation agreement, the IAEA commission reported to El Baradei that Myanmar was not ready to construct a reactor. This judgment was based on the lack of necessary infrastructure, qualified personnel and a competent regulating body that could provide for the secure operation of the research reactor. The deputy director of the IAEA, Jiang Ji Xuei, officially informed Yangon about the report of the IAEA commission. Inasmuch as at present there are no nuclear materials or nuclear reactors that are subject to IAEA safeguards in Myanmar, there is no need for conducting IAEA inspections.

In autumn 2001, the IAEA commission visited Myanmar two more times and concluded that the level of state security in the country, necessary for maintaining facilities, like a nuclear power reactor, was still insufficient to meet even minimal IAEA demands. Nevertheless the Myanmar leadership accepted the new IAEA report and described it as "impartial."

Currently, the IAEA is fielding inquiries from the US, Australia, Argentina, China and the EU regarding the planned contract for the nuclear plant. IAEA director Mohammed El Baradei has expressed the desire to have more detailed information about the contract being prepared. He also insists that IAEA specialists should contribute their efforts for creating a more reliable infrastructure for the secure work of the reactor.

#### **Construction of the reactor as a possible catalyst for the bilateral economic cooperation**

The accomplishment of the Russo-Myanmar project may evolve into a true breakthrough in bilateral economic relations. At the present time, trade and economic cooperation is vanishing small. The current annual turnover of goods barely equals 300,000 dollars.

Russia had close partnership ties with Myanmar during Khrushchev's tenure. At that time, Soviet specialists constructed an irrigation plant at Chemoltay, the Yangon Technological Institute, rebuilt a tin-tungsten mine in Mochi and expanded a gypsum surface mine in Sipkho. There were also a number of projects initiated by the United

Nations Development Program and United Nations Industry Development Organization.

However, during Brezhnev's term, Russo-Myanmar relations deteriorated and Myanmar took the path to self-isolation. In the second half of 1970s, the goods turnover dropped precipitously.

At this time, the only developments are in military cooperation. From 1993-1997, Aviaexport delivered several MI-17 "Hip H" transport helicopters to Myanmar. But after a visit by FSB Deputy director Valentin Sobolev to Yangon in 1997, military and technical cooperation received new impetus. By starting cooperation in the field of countering narcotics traffic (Myanmar forms part of the infamous "Golden Triangle") in the year 2000, both countries started negotiations about military exports to Myanmar. It appeared that the Russian military industrial complex had planned to take over the Myanmar market from its Chinese colleagues, who have previously supplied Chengdu F-7M and Nanchang A-5C fighters for Myanmar's air force modernization programs. Moscow has offered to sell Yangon 10 multipurpose MIG-29 "Fulcrum" fighters and two MIG-29UB combat trainers for the modest sum of 130 million dollars. Such a small price can be explained by the Russian desire to sell surplus MIGs, built in mid-90s for Russia's former allies in the Warsaw Pact, but which have remained largely unclaimed. As a result, after the signing of the nuclear research reactor deal, Yangon purchased the MIG fighters as well. At that time, Igor Ivanov named Myanmar "Russia's promising partner in the Asian-Pacific Region."

It appears that construction of a Russian nuclear reactor in Myanmar may give a further boost to bilateral economic cooperation. It bears remembering that Myanmar possess rich natural resources like gas, oil, copper, zinc, tin, tungsten, gold, rubies and rare woods - together with fish reserves and water resources. A significant part of the country's peripheral regions are not developed - so Russian companies may be interested in developing them. Such development became possible after the Myanmar leadership significantly improved

the investment climate in the country by reducing the size and scope of customs duties for consumer commodities and by liberalizing its exports.

### **The reactor and the problem of nonproliferation**

The Russo-Myanmar deal for construction of the nuclear plant has generated concern and uneasiness in several countries. The US Department of State has officially asked for "additional information about the purpose" of the nuclear reactor and anticipated security measures. The Americans haven't yet indicated what their reaction will be, should Myanmar refuse to provide Washington with the information. While the US does agree that Myanmar has a sovereign right to "utilize the advantages of nuclear energy if it is used for peaceful purposes," it stresses that delivery of the Russian reactor must be done according to terms stipulated by the IAEA.

Americans acknowledge that they do not suspect that Myanmar will use the reactor for military purposes. Still, the fact that the nuclear plant will be under the control of the governing military regime troubles the US. Suspicions by the US are also tied to the fact that, since Myanmar suffers from chronic shortages of electrical power, it is unclear why it needs a reactor that will be used principally for medical research.

It should be mentioned that Myanmar's nuclear program attracted Washington's attention after the events of September 11, 2001. When the US became interested in connections between renowned Pakistani atomic scientists Suleiman Asad and Mohamed Ali Muhtarto and Bin Laden, there appeared information that, in November 2001, the two had been seen in Myanmar. No proof exists that those two are involved in the Russo-Myanmar project and Myanmar officials deny their presence in Myanmar.

The absence of democratic rule and constant human rights violations in Myanmar (it is always included in resolutions by the UN General Assembly Third Committee and UN Commission for Human Rights) provides Americans with additional arguments that Myanmar is not the best country to cooperate with in nuclear area.

### **Political aspects of Russo-Myanmar cooperation**

The geopolitical component of the US hard line towards Myanmar is understandable. Myanmar is a naturally convenient corridor from China and South Asia to the Indian Ocean and from South Asia to Southeast Asia. According to American policymakers, establishing a pro-American regime there would significantly reduce Chinese geopolitical capabilities and would provide greater control over the entire region.

The new realities of the post-bipolar world, aggravated by US policy to advocate political ostracism of Myanmar, make it look for "special relations" with other countries, especially with China.

China was first to recognize a new military regime in Myanmar, and the Myanmar government values this fact. In turn, China considers Myanmar as a part of its sphere of influence - vital for improving the well being of the southwestern Chinese provinces of Yunnan, Sichuan, and Guizhou. China is intensively and extensively modernizing Myanmar's river and port infrastructure for its own economic and strategic interests. It's also no surprise that, since the 1980s, Beijing has been the major military supplier for the Myanmar army - selling it military equipment at bargain prices. In December 2001, Chinese Prime minister Jiang Zemin visited Myanmar for the first time since 1988.

The Russo-Myanmar deal has not been greeted in Beijing with much enthusiasm. China has been successfully "coaxing" Yangon for a handful of years now and sees it as its private domain. It is expending little effort to hide its frustration with Russian attempts at making inroads into Chinese "feeding grounds."

Myanmar's plans to build a nuclear plant and its purchase of ten Russian jets have alerted many of its neighbors, whose relations with Yangon are far from ideal. Myanmar and Thailand sometimes have border clashes. Relations with Bangladesh are tense as well; both sides have drawn several infantry divisions close to the common border. Dhaka is enhancing the fighting capability of its air force by also purchasing MIG-29s from Russia, while

Thailand, whose traditional military supplier is the US, has requested an urgent delivery of AIM-30 air-to-air missiles for its jets.

Nevertheless, the cooperation between Russia and Myanmar could play into the hands of India, which has been troubled by increasing Chinese influence in Southeast Asia and the Indian Ocean. India is also concerned about Chinese plans to build an ELINT station and deploy missiles, aimed at Indian territory, from within Myanmar. India has been "coaxing" Myanmar in an attempt to drive the Chinese out - even though the chances of that happening are very remote. Still, India wouldn't mind having Russia - its strategic partner - there.

Simultaneously, one should not forget that not Russia alone, but also Germany, France and the US possess the level of technology necessary for constructing a nuclear research reactor. The West, of course, would prefer to deny Myanmar access to nuclear technology. Still, in the event of a change of regimes in Myanmar (they now drafting a proposal for a democratic republic, headed by a president) western companies would gladly participate in the construction of a "peaceful" nuclear reactor.

**Analysis****THE DIFFERENT FACES OF  
NUCLEAR TERRORISM**

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The threat of nuclear terrorism is not a new one and has been the subject of both scholarly and policy-oriented analyses for decades. It also has generated a variety of national and international legal and political instruments, programs, and guidelines designed to address various aspects of the perceived threat. In the aftermath of September 11, the issue of nuclear terrorism acquired new urgency because of revised assessments by many analysts about the readiness of sub-national organizations to employ weapons of mass destruction.

Major new initiatives to combat nuclear terrorism have been launched by some national governments and international organizations, and considerable sums of financial and political capital may soon be invested in new and continuing programs to enhance international nuclear security and safety. Although many of these efforts are worthy of support, it is not obvious that most are the product of a careful and systematic assessment of the full range of nuclear terrorist threats or are well informed about or coordinated with other relevant initiatives.<sup>1</sup> This paper is intended to provide a very brief introduction to the different faces of nuclear terrorism, the multitude of ongoing and inchoate mechanisms to address the threat, and a set of preliminary recommendations tailored to different facets of the nuclear terrorism problem.<sup>2</sup>

**The Nature of the Problem**

There are at least four very different types of threats often lumped together under the heading "nuclear terrorism." They include the dispersal of highly radioactive material by 2

conventional explosives or other means to create radiological dispersal devices (RDDs), the attack on or sabotage of nuclear power installations, the theft or purchase of fissile material for the purpose of building a nuclear explosive device, and the seizure of intact nuclear weapons.

All of these nuclear threats are real, all merit the attention of the international community, and all require the expenditure of significant resources to reduce the likelihood and impact of their occurrence. The threats, however, are different and vary widely in their probability of occurrence, their consequences for human and financial loss, and the ease with which their likelihood of occurrence can be reduced.

*Radiological dispersal devices:* Millions of tons of radioactive material exist globally, much of it in the form of spent nuclear fuel. Highly radioactive sources such as cobalt-60, cesium-137, and irridium-192 also are used widely in agriculture, industry, medicine, and research. No reliable inventory of these materials exists, and a large percentage of these sources are no longer in use, having been discarded or lost. Although many radiological sources are not readily accessible or easy to incorporate into an RDD, "orphan sources" have turned up repeatedly on the black market and are known to have been acquired by Chechen rebels in Russia.

The "dirty bomb" variant of RDDs can be produced by matching radioactive sources with conventional explosives. In principle, sources could range from low level industrial, research, or medical waste to spent nuclear fuel and high level defense waste. In addition, RDDs could involve non-explosive dispersal means such as the concealment of radiation sources in the ventilation systems of public buildings or in other confined and crowded venues.

RDDs probably constitute the most immediate nuclear terrorist threat because of generally lax security for radiological sources, their widespread availability, and the relative ease with which RDDs can be assembled. They are unlikely, however to pose a major threat in terms of human casualties. The greater risk concerns their potential for disrupting society by instilling widespread panic and necessitating costly cleanup operations.<sup>3</sup>

*Sabotage of nuclear facilities:* According to a recent IAEA report, globally there currently are 438 nuclear power reactors, 277 operational research reactors, and hundreds of fuel cycle facilities, including uranium mills and conversion plants, enrichment plants, fuel fabrication plants, interim storage sites, and reprocessing facilities.<sup>4</sup> Many of these facilities, which are distributed throughout much of the world, are deficient in such basic defensive elements as intact perimeter defenses, vehicle barriers, and surveillance cameras. Others lack armed guards due to both cultural and economic reasons. Many have never been subject to design basis threat analyzes to determine their vulnerability to terrorist attack or sabotage and few have been subject to performance testing based upon realistic threats.

An attack with conventional weapons on or sabotage of a nuclear power facility has the potential to cause far more casualties and economic chaos than an RDD, although both involve the release of radioactive material. The risk of a catastrophic accident is especially acute for those nuclear power plants, which lack containment structures and redundant safety features.

Although not widely known, there have been a number of incidents in which nuclear power facilities were the targets of criminal or terrorist actions. At least four episodes occurred in the mid-1990s and involved plants in Lithuania and Russia. There is good reason to believe that nuclear power stations in the West, including the United States, also are vulnerable to armed assault, cyberterror (to disable the plants' safety systems), and insider malevolence. At present, for example, the "design basis threat" for U.S. nuclear power plants does not include protection against air-based attacks or accidents.<sup>5</sup>

In addition to power plants, research reactors and spent fuel storage sites also constitute potential terrorist targets. In the United States, for example, there are three dozen research reactors in 23 states, many of which are located at universities. Research reactors, however, generally are much less vulnerable to core accidents than are power reactors, contain less radioactive fuel than do power reactors, and therefore represent a lower risk in terms of the potential consequences of a terrorist attack designed to disperse radioactive debris.<sup>6</sup>

Because of the sheer amount of radioactive material present, terrorists might be attracted to spent nuclear fuel storage sites. In most countries, spent fuel is stored nearby the reactors where it was produced. In the United States, for example, over 40,000 metric tons of spent fuel is stored under water in cooling ponds adjacent to the power reactors. A much smaller quantity of spent fuel is stored in dry casks. Although the consequences of a terrorist attack on spent fuel storage sites is very dependent on the characteristics of those facilities, a recent assessment by the National Research Council of the National Academies concludes that in most instances little or no release of radioactivity is likely due to the robust nature of the storage casks and the ability to provide emergency cooling of the fuel using "low tech" measures. The National Research Council report also minimizes the threat posed by spent fuel in transport in the United States because of the protection provided by the fuel containers.<sup>7</sup> These optimistic conclusions, however, are not shared by other analysts who are especially worried about the potential for spent fuel in cooling ponds to catch fire with possibly catastrophic loss of life and environmental damage.<sup>8</sup>

*Theft of fissile material for the manufacture of a nuclear weapon:* Considerable progress has been made in the past ten years to enhance the material protection, control, and accounting (MPC&A) of nuclear material in the former Soviet Union. The magnitude of the task, however, is enormous. Although security upgrades have been accomplished at many Russian facilities, and also in Belarus, Kazakhstan, Ukraine, and Uzbekistan, they are apt to be effective primarily against the threats posed by amateur thieves or individual and small group incursions, but not necessarily against the more sophisticated threats of terrorist organizations. Hundreds of tons of highly-enriched uranium (HEU) and separated plutonium exist globally, large quantities of which are not subject to IAEA safeguards and/or lack adequate MPC&A.

Although both HEU and plutonium can be used for nuclear explosive purposes, it is much easier to fashion a nuclear bomb with HEU. Were individuals or groups to succeed in acquiring considerably less than 100 kg. of HEU, one could not rule out their ability to

manufacture a crude but effective improvised nuclear device (IND).<sup>9</sup> What has changed since September 11 is not that it has suddenly become easier to build a nuclear bomb—it has not—but that we now must assume that there are organizations that covet nuclear material for the purpose of actually detonating nuclear explosives in our cities. The main obstacle in their path is obtaining HEU.

*Seizure of nuclear weapons:* According to conventional wisdom, intact nuclear weapons are more secure than are their fissile material components. Although this perspective is probably correct, as is the view that the theft of a nuclear weapon is less likely than other nuclear terrorist scenarios, one should not be complacent about nuclear weapons security. Of particular concern are tactical nuclear weapons (TNWs), of which thousands exist, none covered by formal arms control accords. Because of their relatively small size, large number, and in some instances lack of permissive action links (PALs) and deployment outside of central storage sites, TNWs would appear to be the nuclear weapon of choice for terrorists. At this moment, however, neither the United States nor Russia has displayed any inclination in pursuing negotiations to reduce further TNWs or to reinforce the informal and fragile TNW regime based on parallel, unilateral declarations by the United States and the Soviet Union/Russia in 1991 and 1992.

### **International Initiatives**

Sustained international public attention to the dangers of nuclear terrorism is relatively recent. A surprisingly large number of initiatives relevant to different dimensions of the problem, however, have been in play for an extended period of time. They range from the EURATOM Treaty of 1960 to various Nuclear Weapon-Free-Zone (NWFZ) treaties of the 1960s, 70s, 80s, and 90s to ongoing efforts to amend the 1980 Convention on Physical Protection of Nuclear Material. Significant characteristics of over two dozen of these international initiatives, a number of which are extant treaties, are summarized in Appendix One of this paper. Constraints of space preclude elaboration on many relevant aspects of these initiatives. Instead, an effort is made in this section to illustrate how a number of these legal instruments, programs, and non-binding guidelines address the four facets of nuclear

terrorism previously identified. This exercise may be helpful in indicating the scope and occasional overlap of current nuclear security efforts and what more is required to meet the different challenges of nuclear terrorism.

### *Prevention of Terrorist Acquisition of Radioactive Material*

Ironically, the international community today is least well prepared to address the nuclear terrorist threat regarded as most likely by many experts. A major reason for this paradoxical situation is the tendency historically to regard radiological sources as posing primarily safety rather than security risks. As a consequence, most international conventions, programs, and guidelines dealing with radiological sources confine their provisions to promoting safety objectives.<sup>10</sup> As Appendix One indicates, the principal exceptions to this rule are the 1997 International Convention for the Suppression of Terrorist Bombings (whose provisions regarding jurisdiction, prosecution, and punishment of offenses extend to weapons using radioactive material), the non-binding post-1992 International Basic Safety Standards for Protection Against Ionizing Radiation and the Safety of Radiation Sources, the U.S.-Russian Cooperative Threat Reduction Program, and the 2002 IAEA Action Plan to Combat Nuclear Terrorism. The draft Convention on the Suppression of Acts of Nuclear Terrorism submitted by the Russian Federation in 1996 also would apply to radioactive material were it to be adopted in its current form. Both the Russian draft convention and the IAEA Action Plan emphasize the need for national governments to adopt legislative, administrative, and technical measures to ensure the physical protection of radioactive material. The IAEA Action Plan also establishes a program to provide assistance to member states in their efforts to locate and secure or dispose of orphan sources. An associated IAEA initiative adopted in 2001 creates a non-binding “Code of Conduct” to promote improved safety and security practices for radiological sources.

### *Protection of Nuclear Facilities Against Sabotage and Attack*

Very few international legal instruments are in force, which pertain to the physical protection (as opposed to the safe operation) of nuclear facilities. Those few accords with relevant

provisions also tend to focus on threats posed by state actors.<sup>11</sup> The one notable exception is the 1997 International Convention for the Suppression of Terrorist Bombings. This measure obliges parties to adopt domestic legislation for prosecution and punishment of terrorist offenses. The 1996 Draft Convention on the Suppression of Acts of Nuclear Terrorism and the revised 2000 Draft Comprehensive Convention on International Terrorism also would apply to the sabotage of and attack on nuclear facilities were they to come into force.

Probably most pertinent to the prevention of terrorist acts against nuclear installations are a number of non-binding IAEA guidelines and programs. They include the 1995 International Physical Protection Advisory Service (IPPAS), INFCIRC 225/Rev 4 (standards revised in 1999 relating to “The Physical Protection of Nuclear Material and Nuclear Facilities”), and several components of the 2002 Action Plan.

#### *Prevention of Theft of Fissile Material*

International mechanisms are most well developed in the sphere of fissile material safeguards. A wide array of measures has long been in place to address different facets of MPC&A. They include the NPT, the IAEA systems of safeguards, provisions in most NWFZ treaties, the Convention on the Physical Protection of Nuclear Material, and U.S. and international nonproliferation assistance programs to the former Soviet Union. The safeguards provisions in most of these initiatives, however, were conceived with the object of deterring diversion by state actors and are poorly suited to guard against theft by sophisticated terrorists. The effectiveness of the Physical Protection Convention also suffers from its limited scope—a focus on material in international transit. Efforts to amend the convention to expand its scope have been unsuccessful to date. The most comprehensive approach to safeguarding nuclear material—the U.S. led effort to upgrade nuclear sites in the post-Soviet states and to down-blend large quantities of HEU—has made significant headway in the past ten years. Enormous stocks of fissile material in Russia, however, still require enhanced safeguards and no comparable program is yet in place on a global scale to address the risks posed by terrorist acquisition of fissile material.

#### *Prevention of Nuclear Weapons Theft*

A number of arms control and nonproliferation treaties indirectly address the issue of nuclear weapons security by reducing the number of weapons and restricting their deployments. The 1991/92 parallel, unilateral declarations by the United States and Russia reducing tactical nuclear weapons and redeploying others in central storage directly diminished the prospects for terrorist acquisition of nuclear arms. These declarations, however, are not legally-binding and have not yet been fully implemented. Although the Final Document of the 2000 NPT Review Conference and the Chair’s Summary of the 2002 NPT Prep Com indicate widespread support for further TNW reductions, neither the United States nor Russia have been responsive to this approach.

By far the most sustained multilateral effort to enhance the security of nuclear weapons has been the U.S.-Russian Cooperative Threat Reduction Program. It has facilitated the elimination of nuclear weapons in Belarus, Kazakhstan, and Ukraine, and has improved the security of nuclear weapons in Russia. Unfortunately, to date it has yet to be applied to the safeguarding of TNW.

#### *Enforcement Measures*

Although most international measures related to nuclear terrorism are preventive in orientation, a number also address issues related to enforcement. They derive principally from efforts within the United Nations to create a global legal regime against terrorism. Three of the twelve UN “anti-terrorism” treaties, for example, pertain to different facets of nuclear terrorism.

The 1997 International Convention for the Suppression of Terrorist Bombing, currently subscribed to by 67 states parties, calls upon members to adopt domestic legislation establishing acts of terrorist bombings as criminal offenses requiring prosecution and punishment. These acts extend to weapons using radioactive material, nuclear material, and also to attacks on infrastructure facilities such as nuclear installations. The 1999 International Convention for the Suppression of the Financing of Terrorism, in force for 42 states parties, prohibits individuals from financing any terrorist act defined by other treaties, including the Convention on Physical

Protection and the Convention on Terrorist Bombing. It includes nuclear smuggling as one of the sources for financing international terrorism and provides for the detection, freezing, and seizure, of any funds used or allocated for purposes of committing an offense, as well as the prosecution and extradition of offenders. The 1980 Convention on the Physical Protection of Nuclear Material also is regarded by the United Nations as an "anti-terrorism" treaty. In addition to its physical protection measures, it contains provisions that obligate states to treat as criminal offenses acts or threats to misuse nuclear materials in order to harm the public.

In an effort to provide measures geared more directly towards nuclear terrorism, the Russian Federation introduced in 1996 a Draft International Convention on the Suppression of Acts of Nuclear Terrorism. The draft treaty, still under consideration within the UN General Assembly's Sixth (Legal) Committee, would obligate states to cooperate in prosecuting acts of nuclear terrorism by a variety of means, including the adoption of national legislation punishing unauthorized access by individuals to radioactive material, nuclear material, nuclear installations, and nuclear explosive devices. Even though this convention would represent the most comprehensive legal instrument to date for the prosecution and prevention of acts of nuclear terrorism, it is unclear whether negotiations will be completed in the foreseeable future. The main stumbling blocks - diverging national views over the definition of terrorism and the potential overlap between this draft convention and other treaties - have led the committee to prioritize work on a Draft Comprehensive Convention on International Terrorism before finalizing the Russian draft.

In addition to the aforementioned treaties and draft convention, there are several other important international agencies and initiatives relevant to enforcement efforts in the nuclear terrorism realm. They include Interpol's Public Safety and Terrorism Sub-Directorate, the UN Terrorism Prevention Branch, and the Counter-Terrorism Committee of the UN Security Council. The latter body, established in 2001 by UN Security Council Resolution 1373, serves as a focal point for states to report on national

measures taken to address the threats posed by WMD terrorism. The June 2002 G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (also known as the "10 Plus 10 Over 10 Initiative") also may be relevant to enforcement as one of its six principles includes the development and maintenance of law enforcement efforts and international cooperation to detect, deter, and interdict cases of illicit trafficking in nuclear, chemical, radiological and biological weapons; missiles; and related materials, equipment and technology.<sup>12</sup>

#### *Response Measures*

An effective strategy to combat nuclear terrorism requires a response dimension as well as preventive and enforcement measures. Ideally, agreements should be in place to locate, disarm or render harmless, and recover radiological or nuclear material/devices used by terrorists, to provide forensic assistance in determining the origin of the radiological or nuclear material devices, to render medical and financial assistance to victims, to decontaminate affected property, and to exchange relevant information in a timely fashion.

Regrettably, few international mechanisms currently are in place to respond to nuclear terrorism, and those which do exist are geared more to nuclear accidents and safety failures than to deliberate attacks. The 1986 Chernobyl accident, for example, gave rise to the conclusion in that year of both the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. These conventions obligate states to report any incident which may have transboundary effects, and create an international framework for cooperation among states and the IAEA to facilitate effective assistance.<sup>13</sup> It may be desirable, however, for parties to the latter convention to agree explicitly that accidents include terrorist-instigated incidents.<sup>14</sup> It also is imperative for states to begin now to supplement existing agreements in the nuclear safety sphere with those specifically tailored to meet the potentially more demanding needs of emergency response to nuclear terrorist acts.

### Priority Recommendations

The challenges posed by the different facets of nuclear terrorism are substantial and require both immediate and sustained efforts by national governments and international organizations. A very preliminary and incomplete set of recommendations to address these challenges is provided in Appendix Two. The following measures represent a subset of that list which should have the highest priority.<sup>15</sup>

#### *Develop Comprehensive Action Plan*

There is a compelling need to assess the full range of nuclear terrorist threats and to invest limited financial and political resources where they can have the greatest impact. The objective should be the development of a comprehensive action plan based on a systematic comparison and assessment of different nuclear terrorist threats, an analysis of their probable occurrence and consequences, and knowledge of their susceptibility to preventive and remedial action. It also should be informed by a clear appreciation of relevant extant legal and political instruments, programs, and guidelines. Many national governments would be well-advised to undertake this kind of assessment, and a coordinated international effort also is recommended. An important step in this direction was taken by the IAEA when its Board of Governors endorsed an eight-pronged "Action Plan" in March 2002. The plan, however, is limited by the organizational purview of the IAEA and does not cover the full range of nuclear terrorist threats or the entire menu of appropriate responses. Although, in principle, the UN Counter-Terrorism Committee could also undertake to develop a thorough nuclear terrorism specific study, the much broader mandate of the committee is likely to interfere with that objective. It therefore may be desirable to establish a UN General Assembly mandated group of experts to study the issue and formulate a comprehensive action plan.

#### *Undertake Quick Fixes*

Some significant vulnerabilities to nuclear terrorism already are evident and can be reduced substantially and rapidly at reasonable cost. Priority should be given to

such preventive measures (e.g., tightened personnel screening at nuclear power plants; protection of high consequence nuclear facilities from truck bomb attacks) while a longer term action plan is under development.

#### *Secure, Consolidate, and/or Eliminate HEU*

Significant quantities of fissile material exist globally which are not needed, are not in use, and, in many instances, are not subject to adequate safeguards. From the standpoint of nuclear terrorism, the risk is most pronounced with respect to stockpiles of HEU in dozens of countries, much of which was supplied as fuel for hundreds of research reactors. It is imperative to secure, consolidate, and, when possible, eliminate these HEU stocks. Elimination should be pursued by converting research reactors to run on low-enriched uranium (LEU), negotiating the repatriation of all Soviet-origin HEU from research facilities outside of Russia, and downblending existing stocks of HEU to LEU. A model for this kind of action is the August 2002 operation in which the United States, Russia, the IAEA, and the Nuclear Threat Initiative collaborated in the removal of nearly 50 kg. of Soviet-origin HEU from Vinca, Yugoslavia and its return to Russia for downblending. The United States has long supported an international conversion program for U.S.-supplied reactors. It should now join with Russia and other leading exponents of peaceful nuclear research in a global campaign to convert all research reactors to run on LEU and to down-blend most stocks of HEU to low enrichment levels.

#### *Amend Convention on Physical Protection of Nuclear Material*

Renewed efforts are required to establish binding international standards for the physical protection of fissile material. An important means to accomplish that objective is to amend the Convention on the Physical Protection of Nuclear Material to make it applicable to civilian nuclear material in domestic storage, use, and transport. Ideally, the amendment would oblige parties to provide protection comparable to that recommended in INFCIRC 225/Rev 4 and to report to the IAEA on the adoption of measures needed to bring national

regulations into conformity with the amendment.

*Promote Adoption of Stringent, Global Security Standards*

Amending the Convention on the Physical Protection of Nuclear Material is likely to require an extended negotiation. In the meantime, it is desirable for as many like-minded states as possible to agree to meet a stringent material protection standard. This standard, which should at least be equivalent to INFCIRC 225/Rev 4, should apply to all civilian and military HEU and plutonium.

*Strengthen National Regulatory Control and Security over Radioactive Sources*

National regulatory procedures must be strengthened to ensure that radioactive sources are subject to inventory accountancy and security at all times. Particular emphasis should be given to safeguarding the relatively small percentage of powerful radioactive sources capable of inflicting serious radiological harm. The IAEA budget should be commensurate to the tasks of providing assistance to the many states lacking any regulatory infrastructure and working with governments to adhere to the 2001 Code of Conduct on the Safety and Security of Radioactive Sources.

**Secure and Reduce TNW**

Priority should be given to safeguarding and reducing tactical nuclear weapons—the category of nuclear arms most vulnerable to theft. Although it would be desirable to initiate negotiations on a legally-binding treaty to secure and reduce such arms, this approach does not appear to have much prospect for success. As a consequence, one should concentrate efforts on two alternative means: (1) encourage the United States and Russia to reaffirm in a joint statement their continued commitment to the 1991/92 parallel unilateral declarations and (2) utilize the Cooperative Threat Reduction (CTR) program as a vehicle for safeguarding TNW and enhancing their transparency. Given the growing interest on the part of the international community in TNW reductions, it would be desirable for other states to join the United States in supporting this expanded CTR effort.

*Conclude Negotiations on Convention on the Suppression of Acts of Nuclear Terrorism*

It is necessary to complement measures designed to prevent nuclear terrorism with those that facilitate the identification, prosecution, and punishment of offenders. The Russian draft text of the Convention for the Suppression of Acts of Nuclear Terrorism suggests a useful legal basis for such enforcement measures. Efforts should be renewed to complete negotiations of the convention.

*Develop Emergency Response Plan*

States should be encouraged to develop emergency response procedures based upon an assessment of national vulnerabilities to nuclear terrorism. International organizations such as the IAEA can play a useful role in providing technical advice, serving as clearinghouses of information, and coordinating international response preparedness.

*Initiate Balanced Public Education Effort*

Another important component of emergency response relates to the public's preparedness for potential nuclear terrorist acts. Because the issue may evoke extraordinary fear it is essential that the public at large receive accurate information regarding the nature of the threat and what is being done to mitigate the risk. Particular attention should be addressed to the threat of RDDs, which typically has been exaggerated by the news media. The UN Experts Group on Disarmament and Nonproliferation Education may wish to consider this issue in its final report.

**Conclusion**

It will be years before we can eliminate all TNW and secure the entire global stockpile of HEU against theft, and it may never be possible to provide absolute protection for all nuclear installations or to control every radioactive source that might find its way into a dirty bomb. But it should be possible in a matter of months to initiate most of the measures noted above. These must be our priorities as we pursue a combination of national and international initiatives to combat the multiple threats posed by the different faces of nuclear terrorism.

**Appendix One: Summary of International Initiatives Related to Nuclear Terrorism (Rev. August 27, 2002)**

<b>Initiative</b>	<b>Type of Initiative</b>	<b>Status and Scope</b>	<b>Relevant Objective</b>	<b>Related Threat</b>
EURATOM 1960	Legal Instrument	Regional: 15 EU Member States	Prevention: The safeguarding of civilian nuclear material and facilities to prevent their diversion to military programs	Theft of nuclear material
Treaty on the Non-Proliferation of Nuclear Weapons 1970	Legal Instrument	Near-Universal: 187 Parties	Prevention: The safeguarding of civilian nuclear material and facilities to prevent their diversion to military programs; The elimination of nuclear weapons	Theft of nuclear material, Seizure of a nuclear weapon
Zangger Committee 1971	Legal Instrument	Multilateral: 35 Members	Prevention: The safeguarding of exports of sensitive nuclear material, equipment and technologies	Theft of nuclear material
Convention on the Physical Protection of Nuclear Material 1980	Legal Instrument	Multilateral: 68 Parties and EURATOM	Prevention/Enforcement: The physical protection of nuclear materials during their international transport	Theft of nuclear material
Convention on Early Notification of a Nuclear Accident 1986	Legal Instrument	Multilateral: 87 Parties	Response: The notification of nuclear accidents which have transboundary radiological safety consequences	All four nuclear terrorism threats
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency 1986	Legal Instrument	Multilateral: 83 Parties	Response: Cooperation among States and the IAEA to facilitate assistance and support in the event of nuclear and radiological emergencies	All four nuclear terrorism threats
India-Pakistan Non-Attack Agreement 1991	Legal Instrument	Bilateral: India Pakistan	Prevention: The reduction of nuclear risks between India and Pakistan through preventing dangerous conventional attacks on nuclear installations	Attack on or sabotage of nuclear facilities
Treaty of Pelindaba, Article 10 and 11 1996	Legal Instrument	Regional: 52 African States are signatories. Not yet in force.	Prevention: Physical protection of nuclear material and facilities, Prohibit the attack of nuclear facilities	Attack on or sabotage of nuclear facilities, Theft of nuclear material
Draft International Convention on the Suppression of Acts of Nuclear Terrorism 1996	Legal Instrument	Draft/In the process of negotiation (A/AC.252/L.3)	Prevention/Enforcement: Foster cooperation in preventing and prosecuting acts of nuclear terrorism	All four nuclear terrorism threats
International Convention for the Suppression of Terrorist Bombing 1997	Legal Instrument	Multilateral: 67 Parties	Enforcement: The adoption of appropriate domestic legislation in order to establish acts of terrorist bombings as criminal offenses	All four nuclear terrorism threats
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste 1997	Legal Instrument	Multilateral: 27 Parties	Prevention: Achieving and maintaining a high level of safety in spent fuel and radioactive waste management	Manufacture of RDD
International Convention for the Suppression of the Financing of Terrorism 1999	Legal Instrument	Multilateral: 42 Parties	Prevention/Enforcement: Reduce the power and the capacity to do harm by international terrorists by suppressing terrorist financing	All four nuclear terrorism threats

<b>Initiative</b>	<b>Type of Initiative</b>	<b>Status and Scope</b>	<b>Relevant Objective</b>	<b>Related Threat</b>
Draft Comprehensive Convention on International Terrorism, Rev. 2000	Legal Instrument	Draft/In the process of negotiation (A/C.6/55/1)	Prevention/Enforcement: Cooperation against, prevention and punishment of acts of terrorism	All four nuclear terrorism threats
Reduced Enrichment for Research and Test Reactors (RERT) Program 1978	Organization/Program	US program applicable to countries possessing US supplied nuclear reactors	Prevention: Conversion of US supplied nuclear reactors to use LEU	Theft of nuclear material
Ad Hoc Committee of the Conference on Disarmament on Radiological Weapons 1980-1992	Organization/Program	Multilateral: Member States of the Conference on Disarmament	Prevention/Enforcement: Consider issues relevant to the prohibition of radiological weapons and to the prohibition of attacks against nuclear facilities	Manufacture of RDD, Attack on or sabotage of nuclear facilities
IAEA Emergency Preparedness and Response Unit 1986	Organization/Program	IAEA	Response: Support Member States in developing their emergency preparedness and ensure an effective and appropriate response to radiological emergencies	All four nuclear terrorism threats
Interpol Public Safety and Terrorism sub-directorate 1987	Organization/Program	Multilateral: 179 Member States	Prevention/Enforcement: The prevention of acts of international terrorism and the punishment of perpetrators	Terrorism in general
World Association of Nuclear Operators (WANO) 1989	Organization/Program	Private: Unites all nuclear electricity operators	Prevention: The safe operation of nuclear power plants	Attack on or sabotage of nuclear facilities
Cooperative Threat Reduction (CTR) and Related Programs 1992	Organization/Program	Plurilateral: US, Belarus, Ukraine, Kazakhstan, Russia	Prevention: Dismantle nuclear weapons and safeguard nuclear material in the former Soviet Union	Seizure of a nuclear weapon, Theft of nuclear material
International Science and Technology Center (ISTC) 1992	Organization/Program	Plurilateral: Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, EU, Japan, Russia, US, Norway, and Republic of Korea.	Prevention: Prevent the brain drain of NIS scientists to countries of concern and terrorist organizations	Theft of nuclear material
IAEA Illicit Trafficking Database Program 1993	Organization/Program	IAEA Program: Joined by approximately 70 States	Prevention/Enforcement: Collect and share information on incidents of trafficking of nuclear materials and other radioactive sources	Theft of nuclear material, Manufacture of RDD
IAEA International Physical Protection Advisory Service (IPPAS) 1995	Organization/Program	Available to all States	Prevention: Provide States with assistance in the physical protection of their nuclear material and facilities	Attack on or sabotage of nuclear facilities, Theft of nuclear material
UN Terrorism Prevention Branch 1999	Organization/Program	Multilateral: UN Member States	Prevention/Enforcement: Promotion of research and international cooperation to prevent terrorism	Terrorism in general
UNSC Res. 1373 Counter Terrorism Committee 2001	Organization/Program	Plurilateral: All 15 Members of the UN Security Council	Prevention/Enforcement: Foster cooperation among States in the fight against terrorism.	Terrorism in general

<b>Initiative</b>	<b>Type of Initiative</b>	<b>Status and Scope</b>	<b>Relevant Objective</b>	<b>Related Threat</b>
Debt Reduction for Nonproliferation Act 2001	Organization/Program	Bilateral: US - Russia. In the process of being reviewed by US Congress	Prevention: Provide additional funding sources for nonproliferation efforts in Russia	Seizure of a nuclear weapon, Theft of nuclear material
IAEA Action Plan to Combat Nuclear Terrorism 2002	Organization/Program	IAEA	Prevention/Enforcement/Response: Strengthen worldwide protection against acts of terrorism involving nuclear and other radioactive materials	Theft of nuclear material, Manufacture of RDD, Attack on or sabotage of nuclear facilities
Nuclear Suppliers Group 1975	Guidelines/Commitment	Multilateral: 39 nuclear supplier States	Prevention: The safeguarding of exports of sensitive nuclear material, equipment and technologies	Theft of nuclear material
1991-1992 Unilateral Declarations on the Elimination and Redeployment of Sub-Strategic Nuclear Weapons	Guidelines/Commitment	Parallel Unilateral Declarations: US and Soviet Union/Russia	Prevention: Provide for the elimination or removal to central storage facilities of US and Soviet/Russian tactical nuclear arsenals	Seizure of a nuclear weapon
International Basic Safety Standards for Protection against Ionizing Radiation and the Safety of Radiation Sources (BSS) 1992	Guidelines/Commitment	IAEA - issued standards	Prevention: Secure radioactive sources to prevent theft or damage	Manufacture of RDD
INFCIRC/225/Rev.4 The Physical Protection of Nuclear Material and Nuclear Facilities 1999	Guidelines/Commitment	IAEA - issued standards	Prevention: Physical protection of nuclear material and facilities	Attack on or sabotage of nuclear facilities, Theft of nuclear material
Final Document of the 2000 NPT Review Conference, Paragraphs 42,43	Guidelines/Commitment	NPT Member States	Prevention: Strengthen the regime governing the physical protection of nuclear material and facilities.	Theft of nuclear material, Attack on or sabotage of nuclear facilities
IAEA Code of Conduct on the Safety and Security of Radioactive Sources 2000	Guidelines/Commitment	IAEA - issued code of conduct	Prevention: Achieve and maintain a high level of safety and security of radioactive sources	Manufacture of RDD
G8 Global Partnership Against the Spread of Weapons of Mass Destruction 2002	Guidelines/Commitment	G8 Members: Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States	Prevention: Establishes 6 principles to prevent terrorists, or those that harbour them, from gaining access to weapons or materials of mass destruction, and commits \$20 billion to support such projects over the next ten years, with an initial geographic focus on Russia.	Attack on or sabotage of nuclear facilities, Theft of nuclear material, Seizure of a nuclear weapon

## Appendix Two: Selected Approaches to Redress the Threat of Nuclear Terrorism<sup>16</sup>

### Prevention

- Undertake national nuclear terrorism vulnerability assessments
- Prepare comprehensive nuclear terrorism action plan
- Adopt U.S. National Academy of Sciences recommendation for a “stored weapons standard” for physical protection of nuclear material
- Accelerate MPC&A assistance to Russia
- Extend modified U.S.-Russian CTR program to other regions
- Repatriate to Russia all Soviet-origin HEU
- Expand and accelerate HEU blend-down in Russia and globally
- Improve national and international capabilities to detect and interdict illicit nuclear trafficking
- Undertake rapid accounting (tagging) of fissile material stocks, followed by physical measurements
- Provide incentives to facilities to relinquish their stocks of fissile material or implement rapid security upgrades
- Expand physical protection training programs globally
- Expand intelligence-sharing regarding illicit nuclear trafficking
- Convert research reactors to run on LEU fuel
- Develop power reactors with “inherent safety” features
- Avoid development of power reactors fueled with HEU (e.g., conversion of naval reactors to civilian power plants)
- Use debt swaps to finance MPC&A upgrades
- Amend Convention on Physical Protection of Nuclear Material to extend coverage to nuclear material in domestic storage, use and transport
- Adopt a stringent nuclear material security standard at least equivalent to INFCIRC 225/Rev 4 and applicable to civilian and military stocks of HEU and Pu
- Secure and reduce TNW, with the goal of total elimination
- Expand CTR Program to include the dismantlement and safeguarding of TNWs
- Expand budget for IAEA IPPAS program and 2002 Action Plan
- Establish cooperative nuclear industry organization dedicated to improving global security standards comparable to the World Association of Nuclear Operators in the nuclear safety sector
- Incorporate at the national level design basis threat analyses for all high consequence nuclear installations
- Undertake quick fixes to enhance the security of high consequence nuclear installations, especially against the threat of truck bombs
- Provide assistance, when requested, to States that are especially vulnerable to nuclear terrorism but lack the resources to implement necessary security measures
- Make provision of effective MPC&A the condition for conducting business in the international nuclear marketplace
- Foster cooperation between IAEA safeguards inspectors and the agency’s physical protection experts
- Strengthen national regulatory control and security over radioactive sources

- Locate and secure high consequence “orphan sources”
- Increase IAEA budget to implement 2002 Action Plan
- Develop and implement procedures for improved personnel reliability screening at all nuclear facilities
- Expand adherence to the IAEA Additional Protocol on Nuclear Safeguards
- Expand adherence to and fully implement the relevant international conventions and protocols relating to terrorism and Security Resolutions 1269 (1999), 1368 (2001), and 1373 (2001).

### Enforcement

- Adopt and implement national legislation and regulations regarding the prosecution of malicious acts involving nuclear and other radioactive material
- Adopt and enforce penalties for offenses involving nuclear terrorist acts commensurate with the seriousness of the offense
- Conclude negotiations on Draft Convention on the Suppression of Acts of Nuclear Terrorism
- Conclude negotiations on Draft Comprehensive Convention on International Terrorism
- Expand adherence to International Convention for the Suppression of Terrorist Bombing
- Expand adherence to International Convention for the Suppression of the Financing of Terrorism
- Deny safe haven to those who finance, plan, support, or commit nuclear terrorist acts
- Investigate the linkage between international terrorism and transnational organized crime, illicit drugs, money-laundering, illegal arms trafficking, and illicit trade in nuclear material
- Enhance coordination of efforts at the national, subregional, regional, and international levels to identify, arrest, and prosecute individuals engaged in nuclear terrorist activities.

### Response

- Develop national emergency response procedures
- Initiate a balanced public education effort
- Develop curriculum and materials for training experts in nuclear terrorism prevention, enforcement, and response.

<sup>1</sup> Two very useful, recent studies of nuclear and radiological threats which are comparative in nature are National Research Council, *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*. Washington, DC: The National Academies Press, 2002, especially pp. 39–64; and Matthew Bunn, George Bunn. *Strengthening Nuclear Security Against Post-September 11 Threats of Theft and Sabotage*. *JNMM*, Spring 2002, pp. 1–13.

<sup>2</sup> The Center for Nonproliferation Studies at the Monterey Institute of International Studies has launched a project to assess the different faces of nuclear terrorism and to make recommendations about where and how finite resources can have the greatest impact. Project findings should be available in early 2003.

<sup>3</sup> One point of reference is the September 1987 accident in Goiania, Brazil involving a discarded radiotherapy machine. During the course of one week, more than 240 persons were contaminated by cesium powder from a canister dismantled by scavengers. Four persons died, 54 were hospitalized and more than 34,000 people were inspected by health authorities. See: Case Study: Accidental Leakage of Cesium-137 in Goiania, Brazil, in 1987. [www.nbc-med.org/SiteContent/MedRef/OnlineRef/CaseStudies/csgoiania.html](http://www.nbc-med.org/SiteContent/MedRef/OnlineRef/CaseStudies/csgoiania.html).

<sup>4</sup> See: Anita Nilsson. The Threat of Nuclear Terrorism: Assessment and Preventive Action. Symposium on Terrorism and Disarmament, United Nations, October 25, 2001.

<sup>5</sup> The design basis threat for nuclear power plants is defined by the U.S. Nuclear Regulatory Committee as a ground attack by several armed individuals abetted by an inside terrorist collaborator. See: Making the Nation Safer, p. 42.

<sup>6</sup> Ibid, p. 44.

<sup>7</sup> Ibid, pp. 46-88.

<sup>8</sup> See, for example: Robert Alvarez. What about the Spent Fuel? *Bulletin of the Atomic Scientists*, January/February 2002, pp. 45-47.

<sup>9</sup> Many accounts indicate that technical information necessary to manufacture an IND is available in the public domain. See, for example: Mark J. Carson et al. Can Terrorists Build Nuclear Weapons. In: Paul Lowenthal and Yonah Alexander (Eds.). Preventing Nuclear Terrorism: the Report and Papers of the International Task Force on Prevention of Nuclear Terrorism. Lexington, MA: The Nuclear Control Institute and Lexington Books, 1987; Morten Bremer Maerli. Relearning the ABCs: Terrorists and "Weapons of Mass Destruction". *The Nonproliferation Review*, Summer 2000, pp. 108-118, and Making the Nation Safer, p. 40.

<sup>10</sup> See, for example, the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the 1994 Convention on the Prevention of Marine Dumping of Wastes and Other Matters, and the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

<sup>11</sup> See, for example, the 1991 India-Pakistan Non-Attack Agreement and Article 11 of the Treaty of Pelindaba, which prohibits parties to the NWFZ from taking, assisting or encouraging "any action aimed at an armed attack...against nuclear installations in the African nuclear-weapon-free zone."

<sup>12</sup> See: Christine Chuen, Michael Jasinski, Tim Meyer. The 10 plus 10 over 10 Initiative: A Promising Start, But Little Substance So Far. CNS Research Story of the Week, <http://cns.muis.edu>.

<sup>13</sup> The IAEA's Emergency Preparedness and Response Unit (EPRU) fulfills the Agency's obligations under these conventions by providing support to Member States in strengthening their emergency preparedness and ensuring an appropriate IAEA response to an ongoing emergency situation. The EPRU also manages the Emergency Response Center, which operates as a 24-hour contact point for notification or request for assistance.

<sup>14</sup> This recommendation is made by Harald Muller in "Weapons of Mass Destruction and Terrorism: Risks and Remedies," Discussion Paper presented to the UN Secretary General's Advisory Board on Disarmament Matters, Geneva, July 17-19, 2002. Muller also identifies additional forms that agreements on mutual assistance might take.

<sup>15</sup> A number of these recommendations also are suggested by Matt Bunn and George Bunn. Nuclear Theft & Sabotage: Priorities for Reducing New Threats. *IAEA Bulletin*, 43/4/2001, pp. 2-11 and Matthew Bunn, John P. Holdren and Anthony Wier. Securing Nuclear Weapons and Materials: Seven Steps for Immediate Action. Harvard University and the Nuclear Threat Initiative (May 2002).

<sup>16</sup> Ibid.

## Analysis

### **THE TOMORROW OF MISSILE ARMS IN THE MIDDLE EAST AND ASIA**

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**[This article was originally published in Russian in *Yaderny Kontrol*, No. 1, Vol. 8, January-February, 2002]**

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Today, over 20 countries of the Middle East, Asia, Africa and Pacific Region are armed with short-range and medium-range missiles with conventional and chemical (most probably, nuclear in case of Israel) warheads with a flight range from 80 to 700 km. Modifications are being worked on to increase the ultimate range of the ballistic missiles, to decrease the impact error and develop the new types of the warheads, to increase the endurance and reliability of the missile systems.

The below data is based on the information from the open sources. The characteristics of the missiles, available in these sources, are double-checked and verified against the known methods of the ballistics calculations in terms of compliance with the launch weight of the missiles, some of their structural specifics, the most probable types of fuel, throw weights and flight ranges.

**Israel** still refuses to sign the Treaty on the Non-Proliferation of Nuclear Weapons on the grounds of perceived potential threats from a number of Middle East countries. By enhancing its military-political cooperation with the United States, Tel-Aviv hopes to avoid opposition to the development of its nuclear program. Israeli leaders consider the problems of international security in the field of nuclear weaponry only from the point of view of their regional interests and they are not going to support any efforts by other countries in promoting nuclear disarmament until the establishment of such an order in the Middle East that would ensure sustainable security for Israel. In particular,

Israel considers it possible to sign the treaty on the nonproliferation of weapons of mass destruction and means of their delivery only two years following the signing of peace treaties with all the Arab countries.

The nuclear missile potential of Israel, as estimated by foreign experts, ranks 6-th in the world after the United States, Russia, France, the United Kingdom and China. The Israeli defense forces have 12 U.S.-made *Lance* medium-range missile launchers and 17 Israeli *Jericho-1* medium-range missile launchers, which are deployed 4 km northwest of the town of Zechariah. The range of these missiles is 80 and 500 km respectively. The *Jericho-1* ballistic missiles, with a range of up to 500 km, are currently being replaced with medium-range *Jericho-2* ballistic missiles.

According to specialists, the *Jericho-2* MRBM is a two-stage solid fuel ballistic missile with a launch weight of around 14 tons, an ultimate range of approximately 1400–1500 km, and a warhead weight of 800 to 1000 kg. The impact accuracy (circular error probable) of this missile is within 0.75–0.85 km.<sup>1</sup>

These missiles are to be replaced by 2010. The total number of medium-range tactical missiles and medium-range ballistic missiles may reach 20 during this period. This replacement is to be accompanied by flight tests of the upgraded version of *Jericho-2* MRBM, also known as *Jericho-2B*.

According to estimates, the two-stage solid fuel ballistic missile *Jericho-2B* can deliver a 1000 kg single releasable warhead a distance of approximately 3000 km with an impact accuracy of around 1 km. By 2010–2015 Israel will be capable of deploying up to 20 *Jericho-2B* launchers.

As of January 1, 2001, five flight tests of this missile were made. Flight ranges varied from 800 to 1450 km. All the test flights began at the *Palmachim* test range, located 22 km southwest of Tel-Aviv, and carried the missiles over the Mediterranean Sea. Based on the technology used by the *Shavit*, *Next* and *Star-460* carrier rocket production, design work on the *Jericho-3* ICBM can be completed by 2010. Most likely this ICBM

will be a three-stage solid fuel ballistic missile with a launch weight of 28–32 tons, a total range of 5,000–7,550 km and with a warhead weight of 500–1,000 kg. The impact accuracy of this ICBM may lie within 1.4–1.6 km. Israel will be able to deploy from 2 to 4 *Jericho-3* ICBM launchers. The *Jericho-2*, *Jericho-2B* and *Jericho-3* ballistic missiles can be equipped with conventional explosive warheads, various types of chemical warheads, or with nuclear weapons with a blast power of 15–20 kilotons.

It is worth mentioning that in addition to missile production, Israel has developed both a R&D program and production base for its nuclear industry that enables it to manufacture weapons-grade plutonium, which allows it to develop and produce a limited number of nuclear weapons. As of January 1, 2001, Israel may have already produced about 60 nuclear weapons of up to 20 kilotons each. The main nuclear weapons production activities are carried out at the Dimona R&D Center of the Ministry of Defense, which is located in the Negev desert 120 km southeast of Tel-Aviv. It is not under IAEA control.<sup>2</sup> According to estimates, the nuclear reactor of this center is capable of producing 10–15 kg of weapons-grade plutonium per year. By January 1, 2001, they may have already produced up to 340 kg of plutonium.

**Iranian** military and political leaders support the concept of deterring their regional enemies by threatening to conduct a missile strike on their major cities – expecting that this will deter states that are outside of the region and ensure Iranian predominance within the region. The Iranian missile program is the government's top priority in the modification and development of its armed forces. Work to create missile launch systems for ballistic missiles has been carried out since the early 1980s. Moreover, missile production is the most dynamically growing industry in the country.

The main efforts of the military-political leadership of the country are focused around the creation of one of the most powerful missile armories in the region by the year 2010–2015. The state positively refuses to adhere to the Missile Technology Control

Regime. However, due to a relatively low level of R&D; the successful design, construction and implementation of serial production for the missiles depends largely on foreign assistance. That comes mostly from China and North Korea.

Today, the Iranian armed forces have 50–60 launchers for the *Luna-M*, *Nazeat*, *Shaheen*, *Ohab*, *Fardj* and *Mushak* short-range missiles, which have flight ranges varying from 20 to 200 km, as well as around 40 *Scud-B*, *Scud-C* and *Shahab-3* medium-range missile launchers, of North Korean and/or local manufacture. They have flight ranges which vary from 300 to 1,000 km. The launchers are located near the towns of Hamadan and Isfahan.<sup>3,4</sup> Since 1992, Iran has been working on its *Shahab* missile program, which is aimed at developing several types of liquid propellant ballistic missiles. As a result of cooperation with North Korea, Iran has developed the *Shahab-3* MRBM, basing it on technical information about the *Nodong-1* medium-range missile, which was obtained through a bilateral agreement with the North Koreans. According to foreign experts, the *Shahab-3* MRBM is a one-stage liquid propellant ballistic missile with a launch weight of almost 20 tons and a total range of 1,200–1,300 km. The missile has a single releasable warhead, which weighs approximately 1,000 kg and has an impact accuracy of 1.9–2.1 km.<sup>5,6</sup> By 2010, Iran will be able to deploy 16 to 20 launchers for these missiles.

In addition to these projects, Iranian specialists are working on the creation of the *Shahab-4* MRBM, which is based on the North Korean *Taepo Dong-1* missile. It will be a two-stage liquid propellant ballistic missile with a launch weight of 27–30 tons, the capability of delivering a single releasable warhead (1,110–1,200 kg) a distance of up to 2,200 km and with an impact error of approximately 2 km. It is expected that the first launchers for these missiles (2–6 units) will be added to the Iranian arsenal by 2010. By 2015, the Iranians may have up to 10 launchers. Answers to engineering problems solved during the design of *Shahab-4* can be used in the development of the *Shahab-5* ballistic missile, which may be similar to the North Korean MRBM *Taepo Dong-2*. According to estimates,

the two-stage liquid propellant ballistic missile *Shahab-5* will have a launch weight of 84–86 tons, a total range of 3,400–3,550 km and impact accuracy of 4 km. The first *Shahab-5* MRBM launchers (2–4 units) might be added to Iran's arsenal by 2010 and their number might increase to 6 units by 2015.

Iranian MRBMs will be equipped with single releasable warheads with conventional explosives. However, according to Iranian specialists, these missiles can also be equipped with chemical warheads.<sup>7,8</sup>

In **Iraq**, all activities linked to the creation of a missile arsenal and nuclear weapons have been suspended. In compliance with Resolution #687 of the UN Security Council, all detected ballistic missiles with a flight range of over 150 km, the launching facilities and any associated equipment were destroyed under the supervision of an international commission. The UN representatives inspected the missile production facilities, test ranges and R&D centers before December 1998. Currently, the Iraqi armed forces have around 50 *Luna-M*, *Ababil-50*, *Sahard-200* and *Ababil-100* short-range tactical missile launchers with missile flight ranges of 50 to 150 km.<sup>9,10</sup> If the international arms control regime is weakened, a quick restoration of the Iraqi missile potential can be expected due to the resumption of the frozen missile programs. Using technology based on the Argentinean-Brazilian *Condor-2* missile and local developments, Iraq may be able to create a promising medium-range ballistic missile by 2010. According to estimates, this may be a two-stage solid fuel ballistic missile with a launch weight of 84–86 tons, which will be capable of delivering single releasable warhead (750 kg) up to a distance of 2,000 km and with an impact error of roughly 1 km. Conventional explosives can be used in the warheads for this missile, as well as different types of chemical or nuclear weapons with a blast power of up to 15–20 kilotons.

A status report and analysis of the Iraqi missile industry reveals that the first 2–4 launchers for these missiles can be added to Iraq's arsenal by 2010 and from 8 to 10 units by 2015.

The military-political leadership of **Saudi Arabia** has no intentions to create its own

missile systems and does not plan to start either a missile R&D program or production activities. Under a 1988 agreement between Saudi Arabia and China, the Chinese supplied Saudi Arabia with *Dong Feng-3* MRBMs with non-nuclear warheads and test launch equipment. The *Dong Feng-3* MRBM with a non-nuclear warhead is a liquid propellant ballistic missile with a launch weight of around 65 tons and a single releasable warhead (1,500–2,000 kg). The total range of this missile is 3,000 km with an impact accuracy within 2.4–2.5 km. In 1996, three missile launching facilities: Missile Base 511 – with 2 launchers – located in El-Kharip (90 km south of Riyadh), Missile Base 522 – with 2 launchers for *Dong Feng-3* MRBM – located near Sulei'il (425 km south of Riyadh), and Missile Base 533 – with 1 launcher – located near Er-Rauda (280 km south-west of Sulei'il), were merged into a separate combat arm of the armed forces and the Missile Command center was established.<sup>11,12</sup> By 2010, Saudi Arabia may acquire the more advanced Chinese *Dong Feng-21* MRBM systems with conventional warheads. The *Dong Feng-21* MRBM is a two-stage solid fuel ballistic missile with a launch weight of around 15 tons. The maximum range of this missile is 1,780–1,810 km with a warhead weighing 740–760 kg. It has an impact accuracy of 1.5 km.<sup>13,14</sup> It is expected that 4 to 6 launchers will be added to the Saudi Arabian arsenal by 2015.

Conventional explosives warheads are used for the *Dong Feng-3* and *Dong Feng-21* MRBMs. However, it is also possible to outfit the missiles with a chemical warhead.

The military-political leaders of **India** consider the threat of nuclear force as the principle strategic method to deter potential enemies in neighboring countries and other states immediately outside the Indian subcontinent from using WMD against India. India still refuses to join the Missile Technology Control Regime.<sup>15</sup>

In the year 2000, the military-political leadership of India worked out the foundations of their nuclear strategy, which defined the principles to be used for the deployment of national nuclear deterrence forces. The cornerstone principles of this strategy are: never to be the first to use

nuclear weapons, minimal deterrence (130–150 nuclear warheads in the national armed forces) and refusal to use a nuclear weapon against a non-nuclear country. Nuclear strikes are supposed to be conducted against large enemy administrative centers and military facilities.<sup>16</sup>

Within the framework developed for the implementation of the national nuclear strategy, the military-political leadership of the country is planning to create several nuclear deterrence forces. This includes forces for ground-based, sea-based and air-based nuclear weapons. It also plans to create a reliable short-range control system for these weapons, a reconnaissance program, a missile early-warning system and arrangements for the storage and maintenance of the nuclear armaments.

Indian armed forces currently possess 12 ground-based *Prithvi* medium-range missiles launchers with conventional warheads and a flight range of 150–250 km. Power characteristics of these missile allow the installation of single warheads with a yield of 10–15 kilotons. The launchers are part of the 333<sup>rd</sup> missile regiment, which is based near the town of Haidarabad.

In April 1999, the two-stage solid fuel ballistic missile *Agni* was successfully tested. It is capable of delivering a 10–15 kiloton nuclear warhead up to 2,500 km. According to estimates, the launch weight of the *Agni* MRBM is around 16 tons, with an impact accuracy of about 1 km. A solid fuel booster rocket is used as the first stage, and a liquid propellant rocket from the medium-range *Prithvi* missile is used as the second stage.<sup>17</sup>

The power characteristics of the *Agni* MRBM allow outfitting it not only with a single releasable nuclear warhead, but also with a 1000 kg conventional explosives warhead or a chemical warhead. Presently, this missile is ready for serial production. According to the Indian Defense Minister, the *Agni* MRBM meets all the Indian defense requirements and will be added to the arsenal by 2005. By this time 1 or 2 *Agni* MRBM launchers may be deployed, and by 2015 their number may increase to 10–14. Further modifications of this missile may follow in order to increase its total range to 3,500 km.

Based on their experience with the *Agni* MRBM, Indian military-political leaders are pressing for the creation of the *Surya* ICBM with a flight range of 9,000-12,000 km.<sup>18,19,20</sup> According to estimates, the *Surya* ICBM would probably be a three-stage ballistic missile with solid fuel rockets in the first and second stages and a liquid propellant rocket in the third stage.

The launch weight of the missile may reach 270-275 tons, with an impact error of around 2-2.8 km. The missile may have a 2,490-3,490 kg releasable front section with 2-3 nuclear warheads of 15-20 kilotons each. There are plans to use the second stage propellant engine of the *Vikas* booster rocket during the development of this missile to increase its flight range. It is expected that the *Surya* ICBM will be added to the Indian armed forces deterrence arsenal by 2015. Two to 4 launchers may be deployed for this missile.

Based on the *Prithvi* medium-range tactical missile and under the *Janush* project the development of a *Prithvi-3* sea-based ballistic missile with a range of 250 km is underway. The *Prithvi-3* SLBM would be a one-stage liquid propellant ballistic missile with a launch weight of 4-4.4 tons, equipped with a 500 kg single releasable conventional or a 10-15 kiloton nuclear warhead. The impact accuracy of the missile may be less than 1 km. According to estimates, 2-3 such SLBM missiles may be produced by 2005 to be initially installed on a battleship. Once the Indian armed forces are in possession of an *Advanced Technology Vessel*, the SLBM *Prithvi-3* will be deployed on this SSBN. It is expected that by the end of 2015 India would have two such submarines equipped with 2-3 *Prithvi* SLBM each.<sup>21</sup>

The Indian air force has 56 *Jaguar* fighter-bombers with a range of 1,400 km, 8 *Su-30MK* fighter-bombers with a range of 1,700 km and 35 *Mirage-2000* fighter-bombers with a range of 1,400 km capable of carrying one 12 kiloton nuclear bomb each.<sup>22</sup> It may be expected that by 2015 the Indian air force will have over 100 fighter-bomber aircraft equipped with nuclear bombs. The total number of carriers and nuclear weapons in

the Indian deterrent forces may reach 130-150 by the end of the forecast period.

The Indian leaders view Pakistan and China as potential enemies who are capable of conducting a nuclear first-strike against India. The leadership believes that if were known that India would be able to unequivocally destroy five major towns in Pakistan or ten in China if it were attacked, those levels of damage would be unacceptably high for the leaders of the aggressor country. Given the possibility that two-thirds of the Indian nuclear forces would be lost during the initial stages of a war, the Indian armed forces would require 130-150 nuclear charges and carriers (at least 45 for Pakistan and 90 for China). According to Indian specialists, it would take 10 years to put in place such an arsenal.<sup>23,24</sup>

The **Pakistani** military-political leadership is working on a national military nuclear doctrine. While their doctrine is based on the principle of nuclear deterrence, it allows for the conducting of a preemptive nuclear strike in case of a threat to Pakistan's national security. Pakistani military-political leaders believe that once the nuclear forces have been formed, it would enable them to resolve both their political and military objectives, become a deterrent factor for a potential enemy and a means of retaliation.<sup>25,26</sup>

Currently there are 6-12 *Hatf-1* short-range tactical missile launchers in the Pakistani armed forces, with a flight range of 100 km. They form part of the 2<sup>nd</sup> Artillery Division located near the village of Kharian and the 155<sup>th</sup> Missile Regiment near the town of Sargodha. The latter also includes 6 *Khatf-2* medium-range missile launchers with a range of 300 km that are modeled after the Chinese *M-1* missile.<sup>27</sup> The manufacturing of the one-stage liquid propellant *Ghauri* MRBM is almost complete. With a 680-710 kg warhead (conventional, chemical or nuclear (10-15 kilotons), the *Ghauri* MRBM has a total range of about 1,300 km.<sup>28</sup> The first test flight took place in 1998. It is expected that by 2005 two *Ghauri* MRBM launchers will be deployed in the 2<sup>nd</sup> Artillery Division, and that their number can double by 2010. Several sources quoted an announcement made by the Pakistani military command that, allegedly,

the *Ghauri* missile is being produced using indigenous technology and production facilities. At the same time, there is information about the close cooperation between Pakistan, China and North Korea in the field of missile construction.<sup>29,30</sup> A comparative analysis of this missile's specifications has revealed that the *Ghauri* MRBM parameters are very similar to those of the North Korean *Nodong-1* ballistic missile.

In addition to the development of the *Ghauri* ballistic missile, Pakistan is working on the solid fuel *Shaheen* MRBM, which has a range of approximately 2,000 km. It is based on technology used in the Chinese *Dong Feng-21* MRBM. According to estimates, the *Shaheen* MRBM may be a two-stage solid fuel ballistic missile with a launch weight of 15 tons and a single releasable warhead (800–1,800 kg) equipped with conventional explosives or 15 kiloton nuclear charges. The impact accuracy of a missile is estimated to be less than 1 km. The probable completion date for the design and engineering work on this missile is 2010. Deployment of 2–4 missiles is possible by the year 2015.

Pakistan views India as its most deadly enemy and believes that the potential for their forces to retaliate against an Indian strike by annihilating a minimum of 25 targets – including 4–5 major cities, important military premises, airfields with the nuclear weapon carriers, ballistic missile launchers, nuclear armament stores, major communication centers, etc. – is sufficient to deter India from launching an attack onto Pakistan. For this purpose, Pakistan plans to keep at least 45–60 nuclear weapons deployed on ballistic missiles and fighter-bomber aircrafts.<sup>31</sup>

In late 80s **North Korea** launched a missile program, which had three main objectives:<sup>32,33,34</sup>

- *Scud* medium-range missile modification;
- Development of the *Nodong-1* medium-range tactical missile, which is based on modifications to the *Scud* using indigenous technology;
- Development of the two-stage ballistic missiles *Taepo Dong-1* and *Taepo Dong-2*.

*Scud* medium-range missile modification entailed extending the missile's total range by

means of using larger fuel tanks. There are currently 21 *Luna-M* short-range missile launchers in North Korea, with a flight range of 65 km, and 28 *Scud-B* and *Scud-C* missile launchers, whose maximum ranges are 300 km and 700 km respectively.

By the beginning of the 1990s, North Korea had developed a liquid propellant medium-range missile, the *Nodong-1*, which has a range of 1,000 km. The propellant engine of this missile is a four-chamber pack of *Scud*-type, one-chamber liquid propellant rockets. Conventional, chemical and nuclear warheads were all considered for these missiles. In 1992, pilot production of the *Nodong-1* medium-range missile began, and there were plans to start mass production by the mid 1990s. However, this missile was not added to the North Korean arsenal due to changes in the opinion by the country's leadership on specifications for the missile's armaments. According to the leaders' new strategy, the *Nodong-1* medium-range missile is to be regarded as an intermediary step in the way of the creation of a MRBM.

Based on the results of the *Nodong-1* 1991–1992 program, development of two new liquid propellant medium-range ballistic missiles, the *Taepo Dong-1* and *Taepo Dong-2*, was moved into a separate program.

The *Taepo Dong-1* two-stage ballistic missile is an upgraded version of the *Nodong-1* medium-range missile. According to American and Russian specialists, the *Nodong-1* medium-range missile is used as the first stage for this missile, and *OTP-300* or *OTP-600* medium-range missiles as the second stage. The launch weight of the *Taepo Dong-1* MRBM is 27–28 tons and it has an impact accuracy of 2.8–3.0 km. The prototype for the first stage of the *Taepo Dong-2* MRBM is the Chinese *Dong Feng-3* liquid propellant ballistic missile, whereas the second stage was modeled after the *Nodong-1* missile. According to estimates, the launch weight of the *Taepo Dong-2* MRBM can reach 84.5–85.5 tons and have an impact accuracy of 3.8–4.0 km. The use of such a design may enable maximum ranges of up to 2,200 km for the *Taepo Dong-1* MRBM, and 3,500 km for *Taepo Dong-2* MRBM. The North Koreans plan to use 1,200–2,000 kg single warheads

(conventional, chemical or nuclear with a 10–15 kiloton yield) for these missiles.<sup>35</sup> It should be noted that if the weight of the *Taepo Dong-2* MRBM warhead is reduced to 1,000 kg, its total flight range may conversely increase.

According to information obtained, North Korean specialists participated in the development of separable multiple warheads in China. Therefore, it is possible that the *Taepo Dong* missiles can be outfitted with *MIRV* nuclear warheads. The first flight test of the *Taepo Dong-1* missile was made in 1998.

Although the *Taepo Dong-2* MRBM is in its late developmental stage, it will not be ready for its first flight test until 2004. It is expected that it will be added to the country's arsenal by 2005. By this time, the North Koreans may have already deployed 4 to 6 launchers for the *Taepo Dong-1* MRBM. In five years, this number can be increased to 14–16. Two to 4 *Taepo Dong-2* MRBM launchers may be added to the arsenal by 2010 and this number may increase by an additional 2 units by 2015.

Further modifications to the two-stage *Taepo Dong-2* MRBM may be aimed at increasing its total range by adding more propellant stages. One may expect that the modified MRBM *Taepo Dong-2* will have *Taepo Dong-2* ballistic missile as the first two stages, and the second stage of *Taepo Dong-1* missile as the third stage. In this case, the ultimate range of the modified *Taepo Dong-2* ballistic missile will be as much as 6,000 km.

The North Koreans' work in the area of missile design and engineering is being carried out in cooperation with Chinese scientists and other foreign experts. It is also being partly financed by Iran. The introduction of the Missile Technology Control Regime and other restrictions, undertaken by the world's leading countries, has not yet stanchd the proliferation of North Korean missile technology among Third World countries.

North Korea has become one of the main suppliers of missiles, with parameters beyond the restrictions imposed by the Missile Technology Control Regime. North Korea has close military and technical ties with Iran, Syria, Libya, Pakistan, Yemen and

Egypt. In these countries, North Korean specialists are involved in the construction of missile facilities; delivery and installation of the equipment for the production and assembly of ballistic missiles; and in rendering technical assistance for mastering the missile technology.

According to **Turkish** leaders, their country is working on its medium-range missile arsenal. The rationale behind these activities is to strengthen Turkey's role as a leader in the region and among Muslim countries in general. It is also a measured response to the existence of missiles in the arsenals of its potential enemies. At the same time, taking into account the poor quality of local R&D, lack of production facilities for missile construction and a heavy reliance on imports, the Turkish government is taking steps to create a national network of labs and enterprises, and is preparing specialists in the field of missile armaments.

Presently the Turkish Army has 12 U.S. *ATACMS* mod.1 medium-range missile launchers available. The missile's flight range is around 190 km. They are now conducting R&D on a two-stage solid fuel medium-range ballistic missile. It will be capable of delivering an 800 kg single warhead to a distance of 2,000 km.<sup>36</sup> According to estimates, the launch weight of this missile may vary between 14.5 and 15 tons, and it has an impact accuracy of about 1.5 km. There are plans to use conventional explosives for the missile payload. If the engineering phase of this MRBM is successfully completed according to Turkey's timetable, this MRBM may be ready to add to the Turkish arsenal by 2010. The Turkish armed forces may deploy 2–4 launchers for these missiles. According to the American experts, Turkey has the potential to do independent research work in the sphere of missile technology.

The results from an analysis and from assessments made concerning missile development in Third World countries reveal that by 2015, the total number of nuclear missile launchers deployed in Israel, Iran, Iraq, India, Pakistan, North Korea and Turkey will be somewhere around 45 to 70. Almost all Russian military and strategic

facilities will be within striking range by these missiles.

However, how should one take into account traditional relationships and coalitions? Even though it is extremely difficult – if not impossible – to predict the future military and political situation in the world, it is unlikely that the above-mentioned countries will pose a threat to Russian national security.

The Iranian *Tammuz-1*, *Shahab-4* and *Shahab-5* MRBMs; the Pakistani *Shaheen-2* MRBM; and the Indian *Agni* MRBM and *Surya* ICBM will all be able to reach Western Europe by 2015. According to estimates, these countries may deploy altogether 40–50 missile launchers.

United States territory may be within reach of ICBMs from such “states of concern” as Iran and Iraq by 2015, since launching ballistic missiles longitudinally over the North Pole toward US territories reduces the distance by over 10,000 km. In case North Korea succeeds in the creation of the modified three-stage *Taepo Dong-2* MRBM, Hawaii and Alaska will be within striking distance by this missile. However, the number of modified *Taepo Dong-2* MRBM launchers will be around 4 to 6.

In the assessing the missile programs of Third World countries, one has to take into account that ballistic missiles capable of such a relatively long flight distance; in the above-mentioned quantities; with the impact accuracy mentioned; and with conventional warheads are very inefficient armament systems when considering the relationship between the potential damage they can inflict and their cost. Even the massive use of ballistic missiles with conventional explosives by the Nazis during the World War II (which amounted to several thousand missiles) proved to be militarily non-efficient when one looks at the results. Therefore, it is obvious that the Third World countries are very much interested in obtaining nuclear technologies and in mastering nuclear weapons production. While there is the possibility of outfitting ballistic missiles with other types of weapons of mass destruction (chemical, bacteriological, radiological), their efficiency is much less than that of a nuclear weapon. Moreover, there are no indications of any full-scale experiments with these types

of weapons, placed onto ballistic missiles, being conducted even in the highly developed countries. The technical side of this issue is by far more complicated.

All this confirms the vital importance of improving and increasing control over the observance of the Treaty on the Non-Proliferation of Nuclear Weapons.

<sup>1</sup>*Inside Missile Defense*, March 2001.

<sup>2</sup>*Jane's Defense Weekly*, November 2000.

<sup>3</sup>*Inside Missile Defense*, March 2001.

<sup>4</sup>*Inside Missile Defense*, March 2000.

<sup>5</sup>*Ibid.*

<sup>6</sup>*Aviation Week and Space Technology*, June 2000.

<sup>7</sup>*Inside Missile Defense*, March 2001.

<sup>8</sup>*Jane's Defense Weekly*, March 2000.

<sup>9</sup>*Inside Missile Defense*, March 2001.

<sup>10</sup>*Jane's Defense Weekly*, September 1999.

<sup>11</sup>*Ibid.*

<sup>12</sup>*Jane's Defense Weekly*, August 1998.

<sup>13</sup>*Ibid.*

<sup>14</sup>*Aviation Week and Space Technology*, October 1997.

<sup>15</sup>*Jane's Defense Weekly*, August 1999.

<sup>16</sup>*Jane's Defense Weekly*, June 2001.

<sup>17</sup>*Jane's Defense Weekly*, August 1998.

<sup>18</sup>*Jane's Intelligence Review*, June 1999.

<sup>19</sup>*Jane's Defense Weekly*, November 1999.

<sup>20</sup>*Jane's Defense Weekly*, June 2001.

<sup>21</sup>*Ibid.*

<sup>22</sup>*Defense News*, April 2001.

<sup>23</sup>*Jane's Defense Weekly*, August 1999.

<sup>24</sup>*Jane's Intelligence Review*, June 1999.

<sup>25</sup>*Jane's Defense Weekly*, November 1998.

<sup>26</sup>*Jane's Intelligence Review*, May 1999.

<sup>27</sup>*Jane's Intelligence Review*, August 2000.

<sup>28</sup>*Ibid.*

<sup>29</sup>*Ibid.*

<sup>30</sup>*Jane's Intelligence Review*, May 1999.

<sup>31</sup>*Jane's Defense Weekly*, November 1998.

<sup>32</sup>*Jane's Defense Weekly*, September 1999.

<sup>33</sup>*Jane's Defense Weekly*, August 1999.

<sup>34</sup>*Aviation Week and Space Technology*, March 2000.

<sup>35</sup>*Defense News*, September 1998.

<sup>36</sup>*Inside the Air Force*, March 2001.

**Analysis****TERRORISM AND  
INTERNATIONAL  
INFORMATION SECURITY****by Alexander Fedorov  
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Russian in *Yaderny Kontrol*, No. 5, Vol. 8,  
September-October, 2002]**© *Yaderny Kontrol*, 2002. All rights reserved© *PIR Center*, 2002. Abridged version

The problem of information security has emerged from the issues of military security and the ways to combat new hi-tech crimes. It is obvious why it has become so important in the information age. There has always been the problem of information protection, but the issue of international information security has emerged only in the recent era. The transition of mankind to the information age and globalization have made information a productive force, the most powerful weapon and the weakest link of post-industrial society. Thus, information protection tasks and the mission of preventing the proliferation of cyber weapons have become global security issues. They attract the interest of military strategists, criminals, and terrorists. Terrorists are armed with information technologies (IT) and information warfare means and hence, their activities are being transformed into megaterrorism – the terrorism of the information age.

In general, by the late 20<sup>th</sup> century, the rapid development and use of new information and communication technologies (ICT) has led to substantial economic, scientific, and technological progress, but has also caused a number of negative consequences. Such technologies can be used for criminal, military, and terrorist purposes and have already resulted in the emergence of cyber weapons. The latter enhance the capabilities of traditional terrorists.

This informatization changes the vision of the world, including the minds of terrorists. In mid-2001, the idea of global terrorism was only a hypothesis, a potential asymmetrical

response to modern global political problems. After September 11, megaterrorism based on information technologies has become a reality. Within several minutes three IT supported terrorist acts with took the lives of thousands of people from over 60 countries. The pandemic of anthrax has been terrorizing mankind for more than two months.

The danger of megaterrorism is that it may provoke the outbreak of international conflicts, especially if international tensions are not eliminated. It is *deadly effective*, and one never knows the source of attack and all this is quite threatening.

Megaterrorism is the threat or use of advanced weapons or technologies of mass destruction for terrorist purposes. The terrorists may strive to inflict mass casualties, or to inflict unacceptable (for the state) economic or environmental damage. Such advanced arms can be chemical, nuclear, and biological weapons, as well as the means to affect the environment and the cyberspace (information warfare).

The threat of nuclear terrorism (the use of nuclear explosive devices or terrorist attacks against the nuclear facilities) attracted the attention of researchers in the early 1960s and since that time, mankind has achieved significant progress in combating this challenge. There are a number of international agreements that reduce the risk of unauthorized access to fissile material and nuclear explosive devices. This threat is mentioned in the national legislation of many states. The security systems of nuclear power plants and other nuclear facilities are constantly upgraded. In accordance with Russian initiative, the UN has begun to prepare the Convention against Nuclear Terrorism.

The situation is more complicated, as far as chemical weapons (CW) are involved. The only existing mechanism dealing with chemical agents is the CWC. This document attempts to reduce the CW stockpiles in the world, but does not efficiently impede the efforts of terrorists. The terrorists are not concerned about export controls of the goods and technologies applied to develop CW. The fact that CW has not yet become a regular

weapon for terrorists cannot be regarded as a merit of international efforts. The terrorist act in the Tokyo subway in 1995 by *Aum Shinri Kyo* with the use of sarin (a nerve gas illegally produced in the clandestine laboratory) became the first and the only known act of megaterrorism.

Biological terrorism is a new phenomenon. It has become a reality since September 2001. The spread of anthrax in regular mail was its devilish invention. However, one has to find out whether the anthrax terrorist acts had an independent value, or whether this was used to affect the major communication channel of the United States (the mail). If the latter is true, this spread of anthrax was an information psychological weapon. Regardless, the economic and psychological damage can hardly be underestimated.

One of the new phenomena is a terrorist attack against the environment. So far, there have been no notorious examples of this kind of terrorism, but specialists know that this is more than a hypothetical.

Information terrorism (cyber terrorism) has recently become a significant factor of international life. It has evolved from hacking, freaking, and other information hooliganism, which uses high-technology means to affect the information and communication systems. It has later transformed into an separate component of criminal activities with an unlimited potential for affecting any (even the most critical) state structures.

A particularity of information terrorism is that it may serve to divert attention and to cover-up other large-scale terrorist activities. Moreover, one may assume that cyber terrorism will become an integral part of all future megaterrorist acts. It seems that in case of anthrax mailing in the United States the terrorists have deliberately chosen the postal service, i.e. the communication means, the information channel. Their expectations have come true. Americans can do without the subway, can walk in gas masks, or have autonomous water supplies (classical hypothetical methods of germ warfare are atmospheric dispersion and intoxication of water supplies), but they cannot live without mail. In the United States, mail serves as the

means to receive passports and driving licenses, to send checks and invoices. As a result, business activity diminished (indexes at all major exchanges collapsed), and the U.S. GDP fell by 0.5% in October 2001. Thus, the objective of the act (which was called biological terrorism) was information terrorism resulting in more than several dozens of victims. And it is understandable why anthrax (a weak disease that can easily be identified and cured and is safe for the authors of the act) has been chosen. One cannot rule out that the initiators of the attack regarded this as a humane act.

To a certain extent, one can speak about the natural flow of events. The list of known cyber attacks indicates that such means and methods have already been utilized by international terrorist and extremist organizations (such as *Aum Shinri Kyo*, *Hamas*, *Tupac Amaru*, and *Al Qaida*) and national movements (the *East Timor Company*, *Tamil Tigers*, etc.). There are some reports of attacks against the information systems of nuclear centers (the next target will be their control systems). In 1998, the Bhabha Atomic Research Center in India was attacked. Both analysts and terrorists realize that the state, its economy, and population can easily be affected via information systems. The latter do not only include computer networks, so they can be attacked with other means, besides viruses, electromagnetic pulse, and the Internet.

To realize the potential threat originating from cyber terrorism, one has to note that the potential targets for such terrorist acts are all key elements of governmental, economic, transport, financial, military structures, mass media, etc. However, this list is not complete. If the terrorists acquire the means to influence the psyche, any human being will become the potential target for them. One has to bear in mind the indirect damage, e.g. plane crashes caused by the paralysis of flight traffic control system.

Many terrorists and terrorist groups use information systems, including cryptographic means, to maintain contacts and to organize the terrorist acts.

The terrorists widely use one-time mobile phones to make their demands and hold

further negotiations, so it becomes useless to identify the incoming call.

Moreover, information means make up the support systems of terrorist activities. Terrorists are armed with different IT devices, including the components of information warfare - scanning radios, jamming systems, means to imitate radio and other signals, etc. According to some initial data (later concealed), the air attacks of September 11 were preceded (or supported) with the failures in the work of U.S. airports, flight traffic control systems, and U.S. air defense. The anthrax mailing has also affected information battlefield. Nowadays, everyone realizes the devastating role of mass media in catalyzing the terrorist effect of the September 11 actions. The psychological effect of *CNN Live* was enormous - even the most talented sociopsychologists and journalists would not have managed to achieve such results within such short period of time.

The mass media may become a devastating weapon in the hands of megaterrorists. The *CNN effect* is eloquent. If this channel broadcasts the consequences of the terrorist act, the very terrorist act would be needless. Such a report (or series of reports) re-broadcasted by TV stations all over the world will make it difficult to verify or to refute the news. Is this the world power? Yes, it would be enough for the specialists (cyber terrorists) to gain control of the CNN control room for half an hour to provoke the chaos.

All developed nations have already suffered from information terrorist acts in different forms. Anti-globalism can hardly be regarded as terrorism (though if to regard globalism as the world politics, then it makes sense), but the example of anti-globalists and their information warfare is quite eloquent. According to the *Euronews* broadcast of November 12, 2001, some unknown hackers made two copies of the WTO site in the Internet. According to an Interpol official, they used the same design, but the content differed. Unfortunately, *Euronews* did not specify what other sites were modified the same manner (such actions require an enormous amount of work and access to servers and nodes of the net). One has to

think twice about the information he gets from the Web.

It is clear that the higher the level of development, the more vulnerable the state is. Its structures and public are susceptible to cyber attacks and psychological warfare. But as with any weapons, cyber weapons are dangerous for developed nations and countries with low-developed infrastructure.

All these factors and the fact that no international treaty regulates the production and distribution of software used by terrorists, make us speak about the urgent need for international cooperation in the area of information security, in order to prevent all forms of information crime, notably terrorism, at national and international levels.

Obviously long before September 11, the specialists undertook some steps. Russia has always emphasized the interconnection between the information security and information crime (and cyber terrorism as its part). Moscow has always set forth and endorsed any initiatives aimed at countering any information challenge. The Russian national legislation provides some serious penalty for cyber crimes (up to seven years of imprisonment). Russia supported the US initiative to submit to the 55<sup>th</sup> session of the UN General Assembly a special resolution on cyber crime and ways to combat it. Russian experts negotiate this problem within the G-8 and the Lyon Group. Russia backs the initiative of the Council of Europe to draft the Cybercrime Convention. It was open for signature on November 23, 2001, and this was a remarkable event.

During the last four sessions of the UN General Assembly, Russia sponsored draft resolutions urging the development of an international mechanism to control the proliferation of cyber weapons, to prevent information warfare and to maintain information security (in criminal and military terms).

All these steps should impede the spread of cyber weapons, cyber crime, and information terrorism. Besides, it would hamper the megaterrorism as such. The major obstacles to such efforts are the different approaches

towards cyber weapons practiced by various states.

### **What Is Bad about the Information Security?**

The International Federation of Scientists at its 25<sup>th</sup> session in August 2000 named international information security challenges as the top threats to mankind in the 21<sup>st</sup> century. Why did this intellectual core of humanity pay so much attention to this threat and set aside the environmental problems, the energy issues, etc.? Why did the security of the information space become a problem? Just five years ago international gatherings did not even mention the international information security.

What has happened since then? The information age is being born in turmoil: the new conflict in Yugoslavia accompanied by active cyber activities of NATO and the United States; the scandal with the *Echelon* system; thousands of cyber attacks against the information and control systems of economic and political structures in different countries; *Kulturkampf*; the Internet claiming the priority in shaping the new information society; or megaterrorism. The international community has a chance to think about the role of information in the world, about war and peace in cyber space, to realize that information has become a productive force and a key element of control of critical infrastructure, to understand that cyber weapons are powerful and realistic. Many politicians have finally seen examples of trans-border information operations (of a military and terrorist character) and realized the enormous threat (whose traces the world witnessed on September 11 in the CNN reports).

Realizing the grandeur of the menace, some governments begin to implement national long-term programs to ensure their information security, above all the security of the critically important infrastructure. However, they had to face the phenomenon of global interdependence of national cyber spaces and had to admit that the success of national efforts would depend on the security and non-aggression of the information systems of other countries (and not only neighbors). Globalization reflects

itself in the emergence of a single world information space, which is indispensable for further human development and affects the future of all states. Therefore, the protection of this single space should be the common cause.

The international community should have established appropriate mechanisms long ago - to treat the proliferation of cyber weapons and information attacks as criminal acts, to prevent global and local information wars. The UN General Assembly urged all UN member states to follow the Russian proposal and to discuss this problem, to take adequate measures in order to rule out the use of information counter to the international security principles. However, no practical steps have been taken. The International Federation of Scientists reaffirmed its 2000 decision in 2001, but failed to raise the funds for practical measures and had to suspend the already commenced preparation of the International White Book on Information Security. Why?

The answer is simple - the struggle for information superiority is under way. The regional dimension of such superiority has become evident during the recent local wars and peace-marking operations.

The opponents of the debate on international information security have the following arguments:

*There is no military component of the issue.* But how should one treat the numerous U.S. official documents that state the opposite and argue that information operations should become a part of any army and strategic operation? There are more vivid examples. Small defects in the computers of combat aircraft will at a certain moment make them uncontrollable for the pilots. Those who do not believe in such things should analyze the experience of the *Desert Storm* operation. And what should the commander do if he sees on the screen or hears on the radio his commander-in-chief ordering to stop the hostilities? In fact, what should the commander-in-chief do, since this will be surprise for him as well? These weapons already exist. This may seem a joke in comparison with small interference in the work of satellite navigation systems

connected with the strategic aircraft and Navy, with the control devices of the missile systems, etc. In this case the potential aggressor may regret possessing nuclear weapons. Such examples are only theoretical, but realistic threats do exist.

*The criminal and terrorist aspects of the issue make the real danger.* After September 11 this thesis seems correct, but what should be done against state terrorism? The crime committed by one state against another state for political purposes is nothing else but war and vice versa.

It is noteworthy that the authors of the 1949 Washington Treaty did not make a distinction between attacks on the part of the states or non-state groups. This enabled the NATO states in October 2001 to join legally the US retaliatory operation in Afghanistan.

Thus, it would narrow down the problem of international information security, if crime and terrorism become the only targets. Meanwhile, one should not forget about its criminal aspects and terrorism should be prevented in any form – there is no doubt about this.

*Cyber weapons are the means to affect information systems and networks;* other means do not fall under this classification or should be regarded as psychological warfare means. In this case, it is necessary to harmonize the systems of terms. And besides, if the psychological operation inflicts serious casualties or economic and military damage, what is it? Let us remember the anthrax example again...

*It is impossible to identify the actors of information warfare.* Firstly, even if this is true, one should say “so far impossible”; let us remind the reader of the problem of detecting the launching sites of missiles, which was successfully resolved. Secondly, the world knows of the trials of many hackers, who have been identified and their actions have been detected. Thirdly, why did the United States submit the draft resolution on cyber terrorism and cyber crime to the 55<sup>th</sup> session of the UN General Assembly? In fact, the US draft made it clear that there were no technological difficulties in detecting the

criminal. And what is the sense of the Cybercrime Convention then?

*There is no terminological unity in approaches towards different aspects of the international information security.* This is a real international problem, but it is mostly of a technical character. It requires an urgent solution. But such a solution may come at the earliest possible date only after concerted efforts of the international community under the UN aegis, since the UN is the only political body of a global scale. All this can be found in the Russian initiatives on international information security.

*National legislations are not harnessed.* This is also true, but this mistake should be corrected. The natural question would be how and on what basis? On the basis of the legislation of a state? And what country will enjoy the right to expand its national legal norms (and interests) to the entire world? Who will start to modify the national laws and to introduce the provisions concerning the protection of information space of other states? This sounds unrealistic. Hence, international law is the only way out and this has been reiterated in UN General Assembly Resolutions 53/70, 54/49, and 55/28.

*The problem has not been studied enough; one should wait for the complete results of scientific research.* Obviously, it would be easier to solve the problem on the basis of fundamental research results. But who will wait and why? Those who develop cyber weapons will not wait and will have enough time to fulfill their R&D activities. On the contrary, the states that have not yet developed such weapons may be isolated from participation in decision-making on this urgent problem. Moreover, their vulnerability to information aggression will be preserved. Would all this impair the information superiority and information wars or not? We believe, no. And many terrorist acts will get information support enhancing their efficiency.

#### **Conclusion**

Taking into account the current situation and common sense, one should proceed from the following assumptions:

- Cyber weapons in all their forms (criminal, military, terrorist) should be the

focus of attention of the international community;

- A terrorist act is any criminal offence conducted for political purposes, or the threat of committing such offense;
- Any act of the state, individual, or corporation should be regarded as terrorism only if sufficient legal evidence is available;
- National legislation is the prerogative of the state and no one has the right to impose any laws or provisions on the sovereign states. International legal norms should become the basis for harnessing national legislations;
- Any state encouraging such information actions should be treated as an aggressor in accordance with appropriate international norms;
- The terms should be agreed upon at the international level and stated in the agreement or any other multilateral document;
- The UN should play the role of universal coordinator of state efforts to counter the international terrorism;
- The national information space should be regarded as a part of the international cyber space and international law should adequately cover it. The interference in the information systems of the state, which affects international and global systems, should be regarded as the attack against the latter.

In addition to negotiating international legal acts concerning the information security, it would be useful (and this may become the first step) to promote multilateral cooperation in combating the cyber terrorism. The following endeavors can be undertaken:

- The development of international law and agreements preventing terrorism in the information space;
- The establishment of specialized bodies (similar to the Interpol or within the Interpol) to assist in investigating terrorist acts in the information space or with the use of information warfare;
- The joint development of technologies and methods of monitoring, detection, and hindering cyber terrorism;

- The launch of an international program or structure aimed at checking the hardware and software for logic bombs, *Trojan horses*, and other hidden *bugs*;
- The elaboration of recommendations on the prevention of computer crime and notification of the emerging problems and information attacks (which may be incorporated in the Cybercrime Convention).

Along with international efforts, the parties should encourage bilateral and regional cooperation. Such agreements may be further expanded. The basic elements for such interaction would be:

- The identification of the threats related to illegal activities in the information space and coming to a common understanding of the potential challenges;
- The development of protection mechanisms and practical methods of reducing the vulnerability of information systems and data transfer systems;
- Exchanging the results of situation analysis of the cyberspace and exchanges of the data on potential unlawful acts and emergencies concerning the work of the information infrastructure. This will help to work out adequate measures to counter potential and actual threats;
- Agreement upon the joint and concerted efforts on the identification of attacks against critical infrastructure, to detect and to prevent such attacks and to identify the source of aggression or a terrorist act;
- Agreement upon the measures of mutual assistance in reconstructing the damaged components of the information infrastructure, which suffered from aggression or a terrorist act.

At the same time, one has to remember that the struggle against cyberterrorism is part of more general efforts to maintain international and information security. And if the latter are supported, this will facilitate the combat against cyber terrorism and megaterrorism, as well as against other forms of cyber crime.

Thus, the only adequate solution would be to establish an international mechanism to curb the cyber weapon arms race and to prevent

information warfare and information terrorism.

Nowadays it is too early to think about the specific model of such an international mechanism. The international community should decide this, but general guidelines may be stated in the multilateral declaration or a large-scale concept of international information security. In the future, the parties may conclude the multilateral international treaty or convention. The international community should practice a comprehensive approach towards these issues and deal with military and criminal (notably terrorist) challenges to military and civilian spheres. As Sergei Ordzhonikidze, the Russian Deputy Foreign Minister, emphasized in his speech at the UN General Assembly, the priority should be the formation of a global system providing for the inevitable punishment for the organizers and executors of terrorist acts.

These activities may benefit from the bilateral and UN experience in the area of preparation and conclusion of large-scale international conventions and agreements. However, it is clear that only wide international cooperation can yield some fruit. The 56<sup>th</sup> session of the UN General Assembly has already noted this with respect to megaterrorism. Only international cooperation may help the mankind to solve the complicated problems emerging in the information age and ensure the real international information security. The international information space should be a weapon-free zone, so that humanity may be free of new wars and megaterrorist acts.

## **Review**

### **PROSPECTS OF MILITARY REFORM IN THE RUSSIAN FEDERATION**

**by Victor Yesin**  
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**[This article was originally published in Russian in *Yaderny Kontrol*, No. 3, Vol. 8, May-June, 2002]**

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Military reform in the Russian Federation means a range of political, economic, legal, military and technical, social and other measures to be carried out within a predetermined period of time, aimed at a qualitative transformation of the military organization of the state in order to provide a sufficient level of military security for Russia based on an acceptable investment of financial, military, technical and human resources.

#### **On the substance, essence, and necessity of reforming the military in Russia**

The organization and implementation of the military reform is personally overseen by the President, the highest legislative authority and the government.

Military reform is no less important than economic or political ones. These reforms are closely interrelated and interdependent, therefore they have to be realized concurrently. Procrastination in one of them would inevitably result in a slippage of other.

In my view, the failure of the military reform of 1992–95 in Russia was predetermined, along with subjective factors, by the personalities of the nation's leaders. The setback was connected first with the flop of the economic transformations, which brought about the financial collapse of August 1998. Secondly, that was the period of extreme weakness of the "state's vertical subordination system."

In its essence, military reform in Russia might be visualized as a triangle, whose vertexes are formed by the state, the army and the society. The army means the entire

armed organization of the state, including the armed forces and other troops and militarized formations. The Law on Defense specifies them as the Federal Border Troops of RF, the Interior Troops of RF, the Railroad Troops of RF, the troops of the Federal Agency of Government Communications and Information with the President of the Russian Federation, Civil Defense troops, as well as engineering and road-building military formations of the Federal Special Building Service of the Russian Federation.

Following from the notional triangle, it would be unwise to consider and analyze the situation in the army irrespective of the situation in the country. Otherwise one can fall victim of oversimplification, or a layman's approach, so typical of various media, leading to erroneous conclusions and superficial, unrealistic recommendations. So far it would be premature to think that the establishment of the new Russian State has been completed. It's too early to say that it turned democratic.

Unfortunately there are too many shortcomings. They are well known, but since they are not the subject of my presentation, I won't dwell on them.

It will be also too early to conclude that a civil society has been set up in Russia. Therefore the solution of the army problem should be sought in conjunction with the nation-building and social development issues.

Today's Russia has only one strategic way to go – internal development, and economic, political and military revival. Only a stable and prosperous Russia will be able to overcome her problems and have a positive influence over international affairs.

Military reform is determined by a number of objective factors, the most important of which are:

- The changes in the geopolitical situation in the world, and consequently, Russia's new geo-strategic situation;
- Tremendous shifts in Russia's life and her relations with the outer world. Beyond the post-Soviet space Russia has found herself in a new security environment;

- Russia's increased economic dependency and lessened external economic independence;
- The excessive gap between the needs of the Russian state in the field of military security and its current military-economic potential given the existing structure of her military organization;
- The disparity between the structure, combat capacity and command and control system of the Armed Forces of the Russian Federation, along with the other services, military formations and the modern methods of warfare;
- The low level of military, technical and logistic supplies of the Armed Forces of Russian Federation, and other services and military formations due to the ongoing economic crises in the country (positive economic shifts in 2000-2001 fell short of significantly improving financial, material and technical well-being of the armed component of the state);
- The inadequate manning system of the Armed Forces of Russian Federation, other services and military formations to both their actual requirements the changed methods of warfare;
- Undermined respect to the service in the armed forces, the inadmissibly low social status of servicemen, retired personnel and their dependents.

It would be wrong to suggest, as some critics say, that the military reform in Russia hasn't started at all. It has been actually waged since 1992. The fact of the matter is that its effectiveness is poor, and the outcome of the carried out activities is insignificant. There is one tangible result yet. As of January 2001, the former Armed Forces of the USSR, which Russia inherited, were reduced by half – from 2.7 million to 1.365 million servicemen. Moreover, the armed grouping stationed abroad, numbering 600 000, was withdrawn back to Russia with all their military equipment within an amazingly short period of time (from two to four years). Another important achievement was the fact that Russia retained control over the former Soviet nuclear, chemical and other types of weapons of mass destruction. Today Russia is the only nuclear nation among the Commonwealth of Independent States.

I have already referred to the reasons impairing the effectiveness of the military reform under the current conditions of the Russian statehood coming into being. Another point needs to be mentioned, namely the lack of clearly articulated military policy (the military doctrine of the Russian Federation was only adopted in April 2000), as well as the disparity between the concept, program and plans of military restructuring and the financial and economic resources of the state.

As a result, the set goals of the military reform were not accomplished. The state failed to draw the nation's resources in order to change the quality of military organization, making it adequate to current security challenges. The key parameters reflecting combat readiness of the state's military organization (availability of resources, intensity of combat training, rate of procurement of current and future military equipment, subsistence allowance of servicemen) have shown no tendency to grow. Acute social problems of uniformed and civil servicemen impaired the performance of all power ministries and agencies.

By the year 2000 the above situation started to endanger the national security of the Russian Federation, prompting an urgent change in the state's military policy, the adoption and implementation of a number of stringent emergency measures to reform the military organization, based on the available economic potential of the country.

**Measures to reform the military organization of the Russian Federation and the course of their implementation in 2000–2001**

In August and November 2000, the Security Council of the Russian Federation debated the problems related to reforming the armed forces and the entire military organization of Russian Federation. Those sittings were preceded by an extensive preparatory work of two specialist committees, authorized by the President of Russian Federation on May 27 and August 17, 2000. One of the committees was headed by Deputy Prime Minister Ilya Klebanov, the other by Secretary of the Security Council Sergei Ivanov.

The committees produced not only the analysis of all aspects relevant to the defense posture of the state, along with the causes of its crisis but also specific proposals and recommendations to overcome the crisis and kick off the progressive evolvement of the armed forces of the Russian Federation, other military formations and agencies, as well as the entire military industrial complex (MIC) of the country.

The committees determined macroeconomic expenditure indexes for the national defense, law enforcement and national security for 2001–2010. By doing so, the financial and economic foundation of the overall process of future military structuring was set up, – an unprecedented fact in the recent Russian history. The Security Council defined the optimizing parameters for all integral components of the state military organization, ways to raise the attractiveness of military service, improve the social security system and upbringing of the servicemen, along with some other aspects of military restructuring.

The said sittings of the Security Council of the Russian Federation approved the proposals and recommendations of the specialist committees, and later President of Russian Federation Vladimir Putin they were included in presidential decrees, turning them into mandatory directives to all federal authorities.

Those decisions outlined the state's priorities in the military restructuring and evolution of military organization of the Russian state for the period until 2010. They can be reduced to the following points:

- Improving the systematic approach and quality of state control over military restructuring;
- Rendering the missions of the military organization adequate to realistic threats to the national security of the Russian Federation, considering the available allocations for defense, law enforcement and security of the state;
- Streamlining the system of military authority, structure and strength of the Armed Forces of the Russian Federation, other troops and military formations, in order to balance the development of all

integral components of military organization of the state, giving impetus to key parameters, determining their quality, and the frugal use of allocated financial and material resources;

- Raising the combat and mobilization readiness of the armed component of the state's military organization, by first and foremost, an increased percentage of permanent readiness units, build-up of trained mobilization resources and better skilled servicemen;
- Organization of closer cooperation of the Armed Forces of Russian Federation and other military formations in accomplishing common missions, increased coordinating role of the Defense Ministry and the General Staff of the Armed Forces of the Russian Federation in addressing challenges to the security of the nation;
- Building an improved operational network over the territory of the Russian Federation and the completion of the unified military infrastructure of the state;
- Transition to an inter-departmental (adjoint) unified system of technical and logistic support, military education and research, retraining of personnel and junior specialists, unified system of military upbringing, elimination of duplication of functions in these fields for the Armed Forces of Russian Federation, other troops and military formations and agencies;
- Structural and technological reorganization of the MIC, including better state-gearred regulation of its development;
- A better mechanism of financial and material support, sustained development of the procurement system for the Armed Forces of the Russian Federation, other troops and military formations, on the basis of the State Procurement Program;
- An Enhanced social security system for the period of military restructuring, better social status of servicemen and civil personnel of the Armed Forces of the Russian Federation, other troops and military formations and agencies, as well as workers at the MIC-oriented production facilities;
- Implementing an active state policy to promote the image of military service, as

well as the patriotic upbringing of citizens and their preparation to military service;

- Further development of the legislative basis of military restructuring.

At the same time the Government of the Russian Federation was entrusted to finance structural changes and the downsizing of the armed component of military organization of the state from federal budget under the functional classification of "Military Reform." The amounts spared by the reduction of the strength of the armed component of military organization of the state shall be intended for social programs, improvement of combat training, designing and procurement of promising weapon systems and other military equipment.

In addition, the Government of the Russian Federation and the heads of the power ministries and agencies were specifically instructed to carry out certain activities related to various issues of military restructuring. In particular it concerned the proposal, submitted to the President of Russian Federation, on establishing a unified (integrated) rescue service and potential options, terms and stages of transition to manning the armed forces by contract servicemen only, as well as the elaboration and submission to the State Duma of the Federal Assembly (hereinafter the State Duma) bills "On Martial Law," "On Emergency Situations" and "On Alternative Public Service."

In order to implement those decisions by all federal bodies of executive power and agencies drafting conscripts, the Government of the Russian Federation worked out and coordinated programs for development of military formations and agencies in 2001-2005, approved by the President of Russian Federation.

In 2001 on the basis of the "Approaches to the Social Protection of Servicemen" approved by the Security Council of the Russian Federation in 2000, the specially established governmental committee headed by Deputy Premier Valentina Matvienko carefully examined the most complicated social problems of servicemen and equated categories of citizens, retired servicemen and their dependents. The draft proposals were

considered at the meeting of Security Council of the Russian Federation, chaired by President of Russian Federation Vladimir Putin on May 11, 2001 and mainly approved. Due to the limited resources of the state and impossibility to address all social problems of servicemen, along with equated categories of citizens, retired servicemen and their dependents, the priority was given to reforming and increase of subsistence allowance and pensions, provision of housing and better medical care.

On October 30, 2001 the joint meeting of the Security Council of the Russian Federation and the Presidium of the State Council of Russia, chaired by President of Russian Federation Vladimir Putin, discussed the situation in the military industrial complex. For the first time such a kind of format was used in Russia. It enabled them to take into account the opinion of constituent territories of Russian Federation, where such production facilities are located. The meeting was prepared by the office of the Security Council of the Russian Federation, which set up a provisional inter-departmental working group where all federal executive bodies concerned, along with 28 constituent regions of the Russian Federation were represented.

Such an approach allowed them to thoroughly address all the problematic issues of the MIC and take a weighted decision on reforming and developing the MIC to the year 2010 and later. It was emphasized that the aim of the state policy in developing the MIC was to ensure its effective functioning as an advanced, multiple-disciplinary sector of the nation's industry, capable of attaining the following:

- Meeting the requirements of the Armed Forces of Russian Federation, other troops and military formations in modern military hardware, combat and special equipment of domestic make, and ensuring a sufficient level of mobilization readiness;
- Saturating the internal market by high-tech domestically produced dual-purpose or commercial equipment;
- Solidifying the position of the Russian Federation in the international market including the market of arms, military and specialist equipment;

- Improving the social and economic stability in Russia, especially in regions hosting the MIC enterprises.

On November 27, 2001 the Security Council of the Russian Federation was held with the agenda "On the State of Mobilization Readiness of the Russian Federation." The discussion finalized an almost year-long preliminary work of the inter-departmental committee on mobilization and training set up with the Security Council of RF. Considering the sensitivity of the subject debated at the Security Council of RF, I am not in position to go into detail of the decisions taken. I can only state that those decisions were adequate to existing and anticipated threats to the military security of Russian Federation and were taken with due regard to its actual economic potential, its material, technical and human resources.

Thus, in 2000-2001 the Security Council of the Russian Federation adopted, and President of Russian Federation Vladimir Putin approved all necessary decisions in the field of reforming military organization of the state. The decisions were translated into concrete plans for 2001-2005, and outlined as programs until 2010.

How are these collective decisions implemented?

Summing up what was achieved in 2001, it can be asserted that some progress in reforming military organization is evident, as the degradation trends are checked although no drastic improvement is reached.

First it should be noted that the proper funding of the armed component of the military organization of the state from the 2001 state budget was the greatest result in seven years. The aggregate financing of the power ministries ran to 380.5 billion rubles, or 115% of what was planned in the federal law "On the Federal Budget of 2001." An additional 34.5 billion were allocated for paying the subsistence allowance of servicemen and civilian personnel, longstanding arrears of pay to enterprises of military industrial complex, public services, as well as the construction of housing to servicemen.

The structure of the military budget also improved, as the share of investment component increased by almost 4% as compared to 2000. For the first time in Russia's recent history the Government of the Russian Federation paid in full for the accomplished defense order. The general level of financing amounted to 116.3%. By doing so the priority funding of investments into the state defense order was ensured, including the R&D, procurement of military and specialist equipment, capital building, reaching 120% of what was earmarked by the 2001 budget.

Thus we can conclude that the government of the Russian Federation managed to provide the power ministries with even more funds than were envisioned by the Security Council of Russian Federation. At the same time we need to mention that the actual volume of resources allocated to the military restructuring has been still insufficient. As a result the situation in the Armed Forces of the Russian Federation, as well as in other troops, agencies and MIC remains complicated.

The structural streamlining of the armed component of the military organization of the state, carried out in 2001, allowed them to get rid of redundant control levels and downsize the strength of services and armed branches. As a result, the positions of 103.7 thousand servicemen and 19.4 thousand civilian personnel were cut in the Armed Forces of the Russian Federation, as well as in other troops and agencies (against 87.1 thousand servicemen and 18.1 thousand civilians, as planned for 2001).

On November 1, 2001 the Government of the Russian Federation submitted to the President of the Russian Federation their proposals on the transition of the Armed Forces of the Russian Federation, other troops, military formations and agencies to the unified inter-departmental (adjoint) technical support system. Vladimir Putin approved these proposals and authorized the government of the Russian Federation to focus on practical steps on the way of transition of the Armed Forces of the Russian Federation, other troops, military formations and agencies to a new, less costly technical

support system, paying better attention to the unification of military and specialist equipment and the introduction of a unified procurement system. He also confirmed the Fundamentals of the policy of the Russian Federation in the field of development of the MIC for the period up to 2010 and further. On January 21, 2002 the Decree of the President of the Russian Federation adopted the State Armament Program MIC for the period up to 2010.

On February 19, 2001 the directive of the Government of the Russian Federation enacted the Plan of Major Activities on the Transition of the Armed Forces of the Russian Federation, other troops, military formations and agencies to the unified inter-departmental (adjoint) logistic support system, adopted by the President of Russian Federation.

In July 2001 the Government of the Russian Federation approved the Concept of reforming the system of military education in the Russian Federation, designed by the Ministry of Defense of the Russian Federation and coordinated with other agencies, as well as the office of the Security Council of Russian Federation. The document defined the goal, orientation and tasks of the state policy in the field of reforming the system of military education and training. It is aimed at establishing the inter-departmental (adjoint) training and military education system for the military organization of the state. Among the major objectives it stipulates the need to reduce the currently redundant net of military schools and military chairs in colleges.

On the basis of above Concept, in the first half of 2002 a Guide Program for reforming the system of military education in the Russian Federation has been drafted, to be approved by the Government of the Russian Federation.

In January 2001 the Government of the Russian Federation submitted to the President of the Russian Federation Vladimir Putin proposals on a stage-by-stage establishment of a unified (integrated) state rescue service. During the first stage (until 2005) the main efforts will be concentrated on perfecting the existing unified state system of

warning and handling of emergencies. During the second stage, considering the outcome of the activities of the first stage, they will establish a unified state rescue and civil protection system.

Vladimir Putin agreed to these proposals and authorized the Government of the Russian Federation to start their implementation. The first step in this direction was made on November 9<sup>th</sup>, 2001 when the Decree of the President of Russian Federation "On Improvement of the State Fire Fighting System" was enacted. The decree transformed the State Fire Fighting System of the Ministry of the Interior of Russian Federation into the State Fire Fighting Service with the Ministry of the Russian Federation for Civil Defense, Emergency Situations and Elimination of Consequences of Natural Disasters.

On November 16, 2001 President of Russian Federation Vladimir Putin examined and approved proposals, prepared jointly by the Government of the Russian Federation, relevant departments of the Office of the President of Russian Federation with the participation of public organizations on developing a program of transition to contract manning system for servicemen. He issued a directive to the Government of the Russian Federation to arrange for the development and later approval of a targeted program of transition to manning military positions with contract servicemen. The preliminary stage of the program will be dedicated to experiments in designated units in order to clearly define the nature and the volume of measures during transition to the contract manning system, as well as the required expenditures.

The Ministry of Defense of the Russian Federation estimates that the transition of one airborne division to the contract manning system will cost one billion rubles. I think, that this figure is insufficiently grounded and exaggerated, but in any case it is worth checking it in practice.

On May 31 2001, President of Russian Federation Vladimir Putin submitted a bill to the State Duma on reforming the allowance system for servicemen, gradually equating their grades to correspondent grades of

federal executive officials, including the monthly qualification bonuses. At the same time the pension allowance and perks in housing payments, amenities and telephone rates, as well as the compensation for income tax shall be abolished. These measures will allow, on the one hand, the increase by almost two times the monthly salary of the junior officers, while the allowance of field officers and generals will grow 1.7 and 1.4 times respectively. On the other hand it will reduce the burden on regional and local budgets, as they have had to find ways to compensate the servicemen's advantages in paying housing rents, amenities and telephone services.

Once the Government of the Russian Federation-proposed allowance system for servicemen and public employees equated to them is introduced, the total increase of budget allocations, including the pensions to retired servicemen, will amount to 55.7 billion rubles in 2001 prices. Such an increase of federal budget expenditures is quite tangible and cannot be realized within one fiscal year without detriment to other material and technical expenses of the federal executive authorities enrolling military and other specialist personnel. Therefore the Government of the Russian Federation suggested a gradual realization the program.

During Phase 1, in July 2002, there was an increase of allowance to servicemen and public employees equated to them. Phase 2, from January 2004, will increase the pay rates in accordance with servicemen (specialists, public employees) ranks.

During the preparation of the bill on reforming the servicemen allowance advantages system, for further deliberations at the plenary session of the State Duma, a spirited discussion stirred up among the members of the parliament and mass media. Negative comments by servicemen and equated public employees were caused by the forthcoming abolition of some advantages (everybody certainly wanted to enjoy the entire range of bonuses).

Anyway, common sense prevailed and the amended bill was adopted by the State Duma on November 15<sup>th</sup>, 2001 in the first reading. The major amendment concerned the

timetable of increasing the allowance of servicemen (and equated public employees) in accordance with their military (specialist) grades. The decision was taken to kick off the increase from January 1, 2003. The second reading of the bill is planned for March 20, 2002, and its final adoption can be expected by May 2002.

President of Russian Federation Vladimir Putin forestalled the enactment of the bill, announcing on December 29, 2001 the priority measures on additional material incentives and better social protection of contract servicemen. According to his decree, starting from January 1, 2002 the monthly allowance for hazardous duty, complexity and intensity of service has grown 20%, while contract servicemen on positions of commanding officers and those having subordinates have received a leadership allowance ranging from 300 to 500 rubles.

In order to accelerate reformation of the servicemen allowance system, on March 4, 2002 Vladimir Putin issued Decree No. 249 "On Measures to Improve the Allowance System for Servicemen." The decree obligates the Government of the Russian Federation to present proposals on establishing the table of correspondence between typical military positions and military grades of contract servicemen and positions of federal and public employees and their qualification grades in order to determine the size of the said categories of servicemen, as well as terms and extension of raising the allowance of conscripts (currently most conscript soldiers get 36 rubles a month).

In 2001 servicemen and public employees equated to them received more than 33 000 apartments free off charge, which is 42% more than in 2000. It allowed a curb of the tendency dominating for the last 10 years of permanently growing number of homeless contract servicemen, although the housing situation among the military remains troublesome. As of January 1, 2002 in the Armed Forces of the Russian Federation only 93 000 families of servicemen live in dormitories or rent flats.

In order to increase the attractiveness of the presidential "State Housing Certificate Program" Article 106 of the Federal Law "On

the Federal Budget of 2002 stipulates that in 2002 in order to provide housing to servicemen of reformed control bodies, military units, establishments and organizations the funds from the federal budget, designated for the section of "Military Reform" will be directed to all servicemen to the tune of 100% of the estimated price of the living quarters they intend to buy (earlier servicemen who served less than 20 years could count on a grant of 80% of the estimated price of the acquired living quarters). In 2001 working on the completion of the legislative basis for military security and military restructuring, the Government of the Russian Federation elaborated and submitted to the State Duma drafts of federal constitutional laws "On National Emergency" and "On Martial Law." Both bills were adopted by the State Duma, approved by the council of federation of the federal Assembly of the Russian Federation and signed by the President of Russian Federation. On February 22 of this year, the Government of the Russian Federation submitted to the State Duma the draft of federal law "On Alternative Civil Service."

These were the primary results of the implementation of decisions, taken in 2001, which predetermine the completeness and quality of reforming the military organization of the Russian Federation by the year 2005.

#### **On approaches to further reform of the military organization of the Russian Federation (after the year of 2005)**

The issues of the long-term development of the military organization of the Russian Federation are under the examination of the inter-departmental working group, established in February 2001 with the Office of the Security Council of the Russian Federation (the head of the group is deputy secretary of the Security Council of the Russian Federation Vladimir Potapov).

To date, the inter-departmental working group has prepared the draft of "Fundamentals of the State Policy of the Russian Federation on Military Restructuring for the period until 2010" (referred as "Fundamentals-2010"). At the end of May 2002 the draft "Fundamentals-2010" was

submitted for consideration by the interdepartmental committee of the Security Council of the Russian Federation (chaired by defense minister Sergei Ivanov). If approved, the document is scheduled for discussion at the meeting of the Security Council of Russian Federation. It is believed that the outcome of the discussions may lead to a decision which can correct to a certain extent previous (2000) selected guidelines of reforming the military organization of the state after the year 2005, but mainly it can define specific activities designed to qualitatively improve and streamline the armed component of the military organization of the state.

The gained experience of military reform in Russia demonstrated that keeping on the payroll such a number of troops, military formations and services (currently 11 power ministries and agencies draft soldiers) even with the downsizing underway, remains burdensome for the state, and cannot be afforded given the existing performance of economy and its medium-term and long-term forecast. Moreover, in the conditions of limited funding, the established military posture led to the indistinct functions of its integral component and the ineffective use of available financial and material resources.

The quest of qualitatively new ways of improving the current situation, brought about the understanding, reflected in the "Fundamentals-2010", that the system providing the national security of Russian Federation shall be further updated by military (forceful) ways.

It was deemed essential that:

1. The functions in the field of defense, state security and public order shall be concentrated within the framework of

respectively the military organization, community of special services and the system of public order, thus comprising the power component of the system of national security of the Russian Federation.

2. The composition of the military organization of the state shall include the country's defense forces (whose basis is formed by the Armed Forces of the Russian Federation) as well as the military component of state security, acting for the interests of defense, along with the element of public security, while all the redundant military structures shall be totally abolished.
3. To accomplish the goals of national security of the Russian Federation, requiring the use of military force, the units of Armed Forces of the Russian Federation shall be engaged, while similar armed structures in other federal agencies of executive power shall be abolished.
4. Optimization of the forces ensuring the state and public security shall be accomplished on the basis of their functional designation in combination with their consistent reduction or by demilitarization of armed elements of relevant federal bodies of executive power.

We can assume that such an approach to the optimization of the armed component of the national security system of Russian Federation can ensure that duplication of defense functions will be eliminated, while the available organizational, financial, material, technical, human and other resources will be concentrated on sweeping measures strengthening the national security of the Russian Federation.

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**Review****IRAN'S NUCLEAR PROGRAM IN  
THE RUSSIA-US RELATIONS**

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[This article was originally published in  
**Russian in PIR Study Paper, No. 18,**  
**December, 2001]**

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 Abridged version

In his State of the Union address to a joint session of the US Senate and House of Representatives of the US Congress in Washington, DC, on January 29, 2002, President George W. Bush introduced a new concept into the political lexicon: he declared that North Korea, Iraq and Iran form an "axis of evil." In his message, the president noted that the countries from the "axis of evil" aspire to possess weapons of mass destruction, aid terrorist activities and endanger the whole world.

Russia has a long history of mutual relations with Iraq and the DPRK (People's Democratic Republic of Korea). The USSR helped to launch Iraq's and North Korea's nuclear power plants' programs, and also ensured that both countries signed the NPT. However, in the late 1980s, certain difficulties arose concerning cooperation between the USSR/Russia and these countries. Approximately the same time, the international community declassified programs to develop nuclear weapons in both of these countries.

Russian-Iranian cooperation started to develop in the beginning of the 1980s, after the overthrow of a pro-American regime in Iran, and cooperation between Moscow and Tehran, in the field of nuclear power, started in the beginning of the 1990s. Having direct relation to the development of the Iranian nuclear program in the 1960s, the US started to show anxiety from the very beginning of the Russia-Iran negotiations in respect to the possible consequences which could result from the deliveries of the Russian high-tech products to Iran, which, in the opinion of the Americans, has secretly been engaged in developing nuclear weapons.

During the second half of the 1990s, there was no more acute problem in the Russia-US relations than the cooperation between Russia and Iran and, in particular, in the field of nuclear power. During this time, both Russia and the US elected new presidents, with Vladimir Putin and George W. Bush replacing Boris Yeltsin and Bill Clinton, respectively. Over this time there were two ministers of foreign affairs and five prime ministers in Russia, while in the US there were two secretaries of state and two vice-presidents; however the Russia-Iran cooperation continued to remain "the splinter" in Russia-US relations. Some experts even began to consider the Russia-Iran cooperation as "the best indicator of the level of Russia-US relations."<sup>1</sup>

With a Republican presidential administration in the US, the pressure on Russia regarding "the Iranian question" has increased. The expansion of bilateral contacts between Moscow and Washington, and in the high-tech areas foremost, Russian membership in international organizations is linked to abandoning military and technical, as well as nuclear power cooperation with Iran.

The US inclusion of Iran in the "axis of evil" probably means that, in the very near future, President George W. Bush's administration will pressure Moscow, using available economic and political levers, to completely sever cooperation with Iran.

In order to estimate the possible results of such steps and the effectiveness of the US comeback to the policy of linkages to prevent Russia-Iran cooperation, it is necessary to analyze the experiences of the previous US administration, estimate the effectiveness of the actions in this direction and effectiveness of sanctions against Russian companies and organizations for cooperating with Iran. Also, it is necessary to answer some other questions, including: what exactly is Russia-Iran partnership about; what deliveries to Iran were carried out and whether they can speed up the implementation the Tehran's program to develop nuclear weapons, if any; does the Russian government fully control the export of sensitive technologies to Iran, and how effective the export control system is in this case?

The answers to these questions, and an analysis of a history of the development of the Iranian nuclear program and scientific and technical potential of that country will help to understand Iran's capabilities in the field of developing nuclear weapons better and estimate the effectiveness of the US policy of linkages and sanctions.

### **Iran's Nuclear Power Program**

When analyzing Russian-Iranian cooperation, many experts leave the origin of the Tehran's nuclear power program out of their studies. It leaves impression that nuclear technologies and installations appeared in Iran after contacts in nuclear area between Moscow and Tehran were established. Let us address the history in order to try to understand the reasons for and the purpose of the nuclear power program in Iran.

In the early 1970s, Iran adopted a program on diversification of power supply sources where development of nuclear power became a priority direction. The decision was dictated first of all by the results of estimations of national stocks of oil (about 17 billion tons): if the existing rate of extraction holds (200 million tons per year), deposits will be completely exhausted by 2042. This decision was guided also by the desire to maintain the level of budget revenues from oil exports (about 90% of all revenues), having avoided thus power dependence in the future.<sup>2</sup> One more factor was a sharp increase oil prices – from 1.8 dollars per barrel, in January 1971, to 11.65 dollars, in January 1974 – which increased considerably the competitiveness of other types of energy supply.<sup>3</sup>

In 1974, the Shah of Iran, Mohammed Reza Pehlevi, promulgated a plan for the development of nuclear power program. It was planned to construct 23 nuclear reactors with an average capacity of over 20 MW. In order to implement the program, The Atomic Energy Organization of Iran (AEOI) was created, with its head directly subordinate to the Shah (subsequently to the president). The main AEOI functions were:

- use of nuclear energy to satisfy the needs of the country;
- purchase of the technologies necessary for independent construction of nuclear reactors;

- purchase of technologies necessary for the creation of a closed nuclear fuel cycle;
- use of “nuclear” technologies for industrial, agricultural and medical purposes;
- protection of people and the environment from radiation.<sup>4</sup>

In the short-term, it was decided to buy nuclear fuel abroad. Contracts were made in 1974–77 with Germany, France and the United States.<sup>5</sup> For the future, independent manufacture of fuel for nuclear reactors was planned. For that reason, prospecting works in search of uranium deposits were carried out, and negotiations were begun with foreign partners to purchase enriching technologies and installations.

A large number of Iranian experts received their education and preparation in the field of nuclear physics in the United States and Western Europe: in Belgium, Great Britain, Western Germany, Italy, Switzerland and France.<sup>6,7,8</sup>

The Iranian leadership considered Germany, France and the United States as its main partners for implementing the program. In 1974, an agreement between the AEOI and the German firm “Kraftwerk Union” (KWU) was signed for the construction of two nuclear PWR (Pressured Water Reactor) reactors with a capacity of 1300 MW in southern Iran, near the city of Bushehr, on the coast of the Persian Gulf.

According to the agreement, signed by AEOI and the German Ministry of Technologies and Research, in March 1977, the parties agreed to cooperate in the peaceful use of nuclear energy and expressed readiness to take part in joint construction and operation of the nuclear power plant and other nuclear installations; in training of the Iranian scientific staff; the maintenance of nuclear and radiation safety; and the manufacture and use of radioisotopes. There were negotiations carried out between the AEOI and German companies KWU and “Brown Boverie” concerning the signing of contracts for the construction of additional nuclear power reactors.<sup>9</sup>

In early March 1976, during a visit by the French President Valerie Giscard d'Estaing to Tehran, the parties signed an agreement on cooperation in the field of industrial and economic development within the

framework of which the construction of a nuclear power plant in Iran was provided.<sup>10</sup> As a result of the subsequent negotiations between the AEOI and the French company "Framatom," a contract for the construction of two 950 MW PWR reactors (costing about 2 billion dollars each) was signed. The reactors were to be built in Ahvaz, on the coast of the Karun River.

As Iran's nuclear power program began development of a closed fuel cycle and the construction of power reactors and search for uranium deposits continued, negotiations for the purchase of French equipment for uranium enrichment and spent fuel reprocessing were ongoing.

In 1974, AEOI paid 1 billion dollars for a ten-percentage share holding of a gas-diffusion uranium enrichment plant, which was being constructed in Tricastan (France). The shares were purchased from an international consortium: "Eurodif" which was co-owned by Spanish company ENUSA, Belgian "Synatom" and Italian "Enea."<sup>11</sup> Simultaneously, Iran acquired the right to purchase the plant's products and have full access to the enriching technology, being developed by the consortium.<sup>12</sup>

In order to train the Iranian scientists and engineers that would maintain the nuclear power plant, French experts assisted in the construction of a nuclear research center, in Isfahan, in 1974. In 1980, it was planned to locate there also a research reactor and a French facility for nuclear waste processing.<sup>13</sup>

In October, 1976, the Soviet Ministry of Foreign Affairs delivered a notice to France regarding France's plan to deliver to Iran a sensitive installation<sup>14</sup> for spent nuclear fuel reprocessing and plutonium recovery (in the long term this could have created the possibility for the development of an advanced nuclear infrastructure by a state south of the USSR).

Iran-US cooperation in the field of nuclear power began long before Iran had accepted the diversification plan for its energy sector. In 1957, an agreement between Iran and the United States on cooperation in the peaceful use of nuclear energy was signed within the framework of the American program "Atoms

for Peace." For the first time this program was submitted by Washington in December, 1953, at the United Nations General Assembly meeting, and included the US assistance in the development of peaceful nuclear energy in terms of deliveries of nuclear facilities and the equipment, and training of experts in exchange for the right of monitoring and inspecting these facilities to verify that they were used only for peaceful purposes.<sup>15</sup>

In 1967, according to the signed agreement and with the financial and technical assistance from the International Atomic Energy Agency (IAEA), the US has delivered a 5 MW research reactor and hot cells for plutonium production to the Tehran nuclear research center.<sup>16</sup>

In middle of 1970s, the government of Iran showed interest in purchasing eight US nuclear power reactors.<sup>17</sup> The deal was estimated at 6.4 billion dollars.<sup>18</sup>

Iran and the United States negotiated an agreement for cooperation in the field of civil use of nuclear energy which, according to the representative of the US Department of State, should have become a legal basis for the export of the US nuclear reactors and materials, Iranian investments into the US enriching industry, and other kinds of cooperation in the field of nuclear power.<sup>19</sup>

United States did not put forward any objections against the development of an Iranian closed nuclear fuel cycle. According to documents declassified in the late 1990s, from the National Security Council, the US position was:

- 1) to agree with the fabrication of fuel from US nuclear materials in Iran;
- 2) to agree with the construction of a factory for nuclear waste processing in Iran, but dependent on multinational participation in factory operation;
- 3) to suggest to Iran to allow participation by Pakistan in management and operation of the processing plant in exchange for Islamabad's guarantee not to construct its own factory.<sup>20</sup>

Full of realization of the power supply diversification project was planned to be completed by 1994. The first two power units in Bushehr were supposed to start in 1980 and 1981, and in Ahvaz, by the end of 1983

and 1984.<sup>21</sup> Expenditures were expected to be about 30 billion dollars.<sup>22</sup>

The Iranian nuclear power program entirely depended on foreign partners, thus implementation was dependent not only on Iran's financial resources, but also on the level of partnership relations with the nuclear exporters, mainly, the US, Germany, France, Canada and the USSR.

During the "Islamic revolution" of 1979, in Iran, the policies of Khomeini, the new Iranian leader, were directed at eliminating dependence on foreign countries. Breaking diplomatic relations with a number of countries, including the US, resulted in freezing the construction program for the nuclear power plants.

By 1979, there was no significant progress achieved in implementing the Iranian nuclear power program; the country's nuclear infrastructure was still an embryonic (see Table 1). When the construction of the first power unit in Bushehr was stopped, the construction of an internal hermetically sealed steel cover had been completed (the external ferro-concrete dome had not been completed). The construction of the plant's second loop was almost completed: pumps, pipelines, electromechanical equipment, the foundation for the steam turbine had been installed.<sup>23</sup> The first power unit was estimated at 70 to 90% complete. The second power unit 40 to 75% finished.<sup>24</sup> The French experts had prepared the construction site for the nuclear power plant in Ahvaz by the beginning of 1979. While the uranium enrichment factory in Tricastan had just started to operate in 1979,

the secrets of gas-diffusion technology for enrichment used at the factory had not been delivered to Iran, nor had any radioactive materials been transferred.

Iran had to forget about its nuclear power program until the end of 1980s, with the end of an eight-year bloody and expensive war with Iraq. Additionally, Iran's financial resources had sharply decreased since 1974, from the moment of adopting a comprehensive program of construction of nuclear power plants to the end of 1980s, because world prices for oil, the main source of Iran's revenues, had more than halved.

During the war between Iran and Iraq, the nuclear power plant in Bushehr was bombed from the air nine times. The most serious damage resulted from airstrikes in November, 1987.<sup>25</sup> Iran informed the IAEA about the bombardment of the Bushehr nuclear power plant. Tehran requested that the IAEA send experts on nuclear safety and radiological protection. However, the Director General of the IAEA declared that the amount and status of the nuclear materials in Bushehr would not lead to radiation threats to the population.<sup>26</sup> After that, as it became known from US government sources, Iran planned to deliver 22.4 kg of uranium hexafluoride to Bushehr in order to draw IAEA's attention to the bombardments and also to prevent new air strikes from Iraq. That plan, however, was never carried out.

Starting in the middle of 1980s, Iran began to attempt completing the nuclear power plant in Bushehr. According to Mohammed Ayatollahi, Iran's representative in the IAEA,

Table 1

***Iran's Nuclear Infrastructure at the time of the "Islamic Revolution"***

Facility	Type of installation	Exporter	Condition
Bushehr nuclear power plant	Two PWR-1300 reactors	Germany	The first unit was 70 to 90% completed, the second was 40 to 75% complete
Ahvaz nuclear power plant	Two PWR-950 reactors	France	Construction site was ready
Nuclear Research Center in Tehran	5 MW research reactor	US	In operation
	Hot cells	US	Unknown
Uranium enrichment plant in Tricastan (France), Iran is a co-owner*	Enrichment facilities (using gas-diffusion technology)	-	In operation

\* France, Belgium, Italy, and Spain are also co-owners of this factory.

the decision to complete the nuclear power plant and restart the nuclear power program was the result of the following factors:

- several billion dollars had already been invested in the construction of the Bushehr nuclear power plant (5.3 billion DM.<sup>27</sup> – A.K.);
- total dependence on petroleum fuels may cause an energy crisis in the future if its use will cause environmental problems or it will be impossible for safety reasons;
- by 2010, the level of electric power consumption in Iran will increase to a point that all extracted oil will be needed for domestic needs, and oil exporting will become impossible.<sup>28</sup>

As one of the possible options, completing the construction of the power plant with participation of an international consortium consisting of companies from Argentina, Spain and Germany was considered. In 1987, a commission of German experts arrived in Bushehr to study the damage at the nuclear power plant. However after Iraqi aircraft bombarded the Bushehr nuclear power plant, killing at least one German expert and wounding several others,<sup>29</sup> cooperation of the consortium with Iran was suspended.<sup>30</sup> Within the first post-war years Tehran has again attempts to lure the German engineers back to Bushehr – considering Germany as the most promising contractor for completing the construction of the partially damaged reactors.

An alternative variant of completing the construction of the nuclear power plant was the purchase of the equipment from unfinished nuclear power plants in eastern Europe and South America. In particular, there were negotiations with Brazil to purchase an unfinished German PWR reactor (*Angra III*, similar to the Bushehr, with about 80% of the equipment installed).<sup>31</sup> Also, they considered the possibility of purchasing equipment from the nuclear power plant in Zarnowiec, Poland, where construction was stopped, in 1990, because of negative public attitude to nuclear power plants after the Chernobyl disaster. By then, Soviet experts has almost completed the construction of the first power unit with a VVER-440 reactor. There were reports that the US asked Germany not to allow the sale of components for the fifth unit (with a VVER-440 reactor)

for the “Nord” nuclear power plant, in Greisfald, which had been completed and was undergoing starting-up and adjustment works curtailed after German reunification. At the same time the US administration has asked the Czech Republic not to allow the sale of parts for by the Bushehr nuclear power plant by “Škoda.”<sup>32</sup>

In the second half of the 1980s, after attempts to renew contacts with the European countries failed, Iran actively started to develop a cooperative relationship with China in the field of nuclear energy.

In September, 1992, during the visit of Ali Akbar Hashemi Rafsanjani, president of Iran, to Beijing, a protocol on cooperation in the field of nuclear energy between the two countries was signed.<sup>33</sup> Under the agreement, China delivered equipment and nuclear installations for research work to the Isfahan nuclear research center:<sup>34</sup> two subcritical assemblies, that is, nuclear research assemblies not designed to allow a self-supporting chain reaction because of restrictions in the distribution and configuration of the nuclear material (in 1992), a miniature 27 kW neutron source (in 1994), a zero output heavy water research reactor (HWR) with a designed maximum plutonium output not exceeding 100 g per year and which cannot be modified to produce more than 100g of plutonium per year (in 1995).<sup>35</sup> Also, there was an agreement signed on the construction of two 300 MW light-water reactors at Bushehr (according to other sources, at Ahvaz, on the site prepared earlier by the French experts). Later, the US pressured China in cancelling the contract.<sup>36</sup> By the mid 1990s, under US pressure, practically all the countries, capable of exporting nuclear equipment and technologies, have refused to cooperate with Iran in the field of nuclear energy.

#### **Russian-Iranian Cooperation in the Nuclear Sphere**

After the overthrow of the pro-American regime in Iran, the bilateral Soviet-Iranian relations began to improve. Despite the “Neither East Nor West” policy of the new Iranian leadership, it was the Russian ambassador, who was the first foreign diplomat to meet with Ayatolla Khomeini in 1979.<sup>37</sup>

The Soviet Union considered the warming of mutual relations with Iran as an opportunity to strengthen its own economic and political positions in the region and as a guarantee that pro-American forces would not return to power in Iran. Addressing the delegates of the XXVI Congress of the Communist Party of the Soviet Union in February 1981, General Secretary Leonid Brezhnev emphasized the necessity of the developing relations with Iran "on a mutual basis."<sup>38</sup> However, the Soviet invasion of Afghanistan, large deliveries of Soviet arms to Iraq in 1982 (at the height of the Iran-Iraq war), the disbanding of the *Tudeh* communist party in Iran (with a subsequent "espionage scandal") and the expulsion of 18 Soviet diplomats from Tehran, noticeably delayed the normalization of Soviet-Iranian relations.

The bilateral contacts between the USSR and Iran were renewed shortly after July 20, 1987. Iran accepted the conditions of an armistice with Iraq under the aegis of the United Nations (the final peace accords between Baghdad and Tehran was established in August 1988). Vladimir Petrovsky, the Soviet deputy Minister of Foreign Affairs, took part in celebrating the ninth anniversary of "the Islamic revolution," in February 1988. During the visit, Mr. Petrovsky and Mr. Mir Hussein Mussavi, the Iranian Prime Minister, discussed renewing large-scale economic cooperation.

In February 1989, the first visit of the Minister of Foreign Affairs of the USSR to the Islamic Republic of Iran took place. The meeting, on February 26 1989, between the Soviet Minister of Foreign Affairs, Eduard Shevardnadze and the leader of Iran, Ayatollah Khomeini, marked the beginning of "a thaw" in relations between Iran and the Soviet Union. Mr. Shevardnadze himself referred to the visit as "a turning point" in relations between the two countries.<sup>39</sup>

The development of mutual relations continued, in June 1989, during the visit of a representative Iranian delegation to Moscow, led by Ali Akbar Hashemi Rafsandjani, speaker of the Iranian parliament.<sup>40</sup> On June 22, 1989, a long-term program on trade, economic, scientific and technical cooperation between the USSR and Iran until 2000 was signed, which provided, in particular, participation by

Russian experts in modernizing Iran's energy supplies.<sup>41</sup> Tehran also proposed that Soviet construction firms construct several 10 MW hydroelectric power plants on several rivers running into the Persian Gulf (Karun and others). However, the very first estimations showed that the water volume of these rivers was insufficient for the construction of even small hydroelectric power stations. It was decided then to focus on the development of cooperative projects in the field of nuclear energy.<sup>42</sup>

On August 25, 1992, Russia signed two agreements with Iran:<sup>43</sup> on the construction of a nuclear power plant (according to different sources, it was planned that two to four power units of moderate output would be built), and on cooperation in the field of peaceful use of nuclear energy. Thus an opportunity for delivering nuclear research reactors to Iran, teamwork in the field of scientific research, producing isotopes for medical purposes and engineering and training of Iranian experts was provided.<sup>44</sup>

According to the signed agreement, the Soviet experts were to estimate prospects for increasing the production of electric power. It was also supposed that Russia would construct a nuclear power plant in northern Iran, on the coast of the Caspian sea, near the city of Gorgan. After inspecting the area, the Russian experts concluded that it was unsuitable for the construction of the nuclear power plant because of the possibility of earthquakes. The geological data and materials from research, carried out earlier in this region by German and American experts, indicated that powerful earthquakes, up to 9 points on the Richter scale, were possible at that site. Russian domestic nuclear power plants were designed to survive no more than 8 points (i.e., the existing reactor design, serving units and systems would have to be upgraded). Besides, the transportation infrastructure for equipment delivery was limited – there being no suitable roads.<sup>45</sup>

The Iranian side has long pressed for the construction of a nuclear power plant in northern Iran. It was one of the reasons that the agreement, of August 25, 1992, received the further development only after more than two years. The other reason for the delay was

the need for Russian intelligence to study closely Iran's nuclear ambitions. Before Russia agreed to sign the contract on the construction of the nuclear power plant, Russian intelligence agencies studied the Iranian offer from a multitude of angles, including the prospect of Iran developing nuclear weapons.<sup>46</sup> The final decision to cooperate with Tehran was made only after Russian intelligence agencies unequivocally concluded that there were no signs of a military nuclear program in Iran.<sup>47</sup> At the same time, the Russian Foreign Intelligence Service report, published in January 1993, noted that "there is a program of applied military research in the nuclear sphere" in Iran.<sup>48</sup> The same year Russia suggested to the US that they jointly study Iran's nuclear ambitions. Washington, however, declined the offer.<sup>49</sup> Later, an official from Minatom, the Russian Ministry for Atomic Energy, declared that "from the strategic point of view, Iran is Russia's nearest neighbor and its is very important for us to know what is happening with their [Iranian] nuclear program. There is only one way to do that: carry out joint projects with them."<sup>50</sup>

After the Iranian leadership asked Russia to complete the Bushehr plant, Viktor Mikhailov, the Russian Minister of Nuclear Energy, suggested to Germany that they complete the nuclear power plant together (the letter was directed to the German Minister of Economy). However, Germany showed no interest.<sup>51</sup>

On January 5–8, 1995, Mr. Mikhailov visited Iran at the invitation of Reza Amrollahi, Vice President of the Islamic Republic of Iran and president of the AEOI. During the visit there were negotiations on cooperation in the use of nuclear energy for peaceful purposes. A number of documents were signed which more closely detailed the cooperation referred to in the 1992 agreement. One of the results was that the program of training Iranian experts was considerably reduced.

The documents signed during the visit included:

- a contract for completing construction on the first unit of the Bushehr nuclear power plant;
- a protocol for negotiations which was signed by Viktor Mikhailov, the Russian Minister of Nuclear Energy and Reza

Amrollahi, Vice President of the Islamic Republic of Iran and president of AEOI.

The protocol concludes that both sides have agreed:

- to jointly construct low output research reactors (under 1 MW) in Iran for the purpose of training Iranian experts (the Russian side promised, within 6 months, to give the Iranian side a technical and economic feasibility study on this question);
- to consider cooperating in the construction of desalination plants in Iran;
- to make maximal use of the Iranian personnel on the cooperative projects, especially in constructing the first unit of the nuclear power plant at Bushehr;
- to carry out deliveries of fuel for first unit of the Bushehr nuclear power plant at terms and prices established by the world market;
- to have meetings not less often than once a year, at the Russian Minatom – AEOI Ministerial level, for directing the course of cooperation, especially over the construction of the first unit of the Bushehr nuclear power plant.

Both sides have also charged their respective responsible organizations to prepare and sign:<sup>52</sup>

- a contract for the delivery of a 30–50 MW Russian light-water reactor for research purposes within three months;
- a contract for the delivery of 2,000 tons of natural uranium from Russia within the first quarter 1995;
- the preparation of a contract, within the first quarter of 1995, for the training of Iranian students at Russian educational institutions (10 to 20 students annually, both master and Ph.D. students);
- the preparation of a contract, within 6 months, for the construction of a uranium mine in Iran, after which negotiations would be held on a contract for constructing a centrifuge factory for uranium enrichment according to contract conditions similar to those stipulated by Russian organizations in contracts with firms in foreign countries.

According to the signed contract, Iran was to pay 80% of the amount in cash, and the rest 20% in delivered goods.<sup>53</sup> It was planned that

the Russian side would finish its work within 55 months.<sup>54,55</sup>

In August 1995, during a visit by Reza Amrollahi to Moscow, a contract, valued at 300 million dollars, on the delivery of nuclear fuel for a built reactor in Bushehr in 2001–2011 was signed.<sup>56</sup> The contract provided that the spent fuel was to be returned to Russia.<sup>57</sup>

The development of the Russian–Iranian relations was highly valued by both sides. According to Mr. Tretiakov, the Russian Ambassador to Iran, “cooperation with Iran is very important to us both from the economic and political points of view. [Iran] is a big country, rich in natural resources, one of leaders of the Muslim world, the country with which we should establish long-term good-neighbor relations. While the West is interested only in the country’s raw materials, we can sell our high technologies to the Muslim countries and thus support the scientific and technological potential of Russia.”<sup>58</sup>

At the same time, despite the increased number of bilateral intergovernmental contacts, the relations between the countries were not stable in the second half of the 1990s. It first of all speaks of the absence of precise and coordinated policies among the Russian ministries and departments. As a result, signed agreements, contracts and protocols were often not approved by the government. At hearings on Russian–Iranian cooperation, at a session of the Committee on International Affairs of the State Duma of the Russian Federation, in May 1995, Andrei Kozyrev, the Russian Minister of Foreign Affairs, declared that the Ministry of Foreign Affairs has “its own approach” to the deliveries of nuclear technologies to Iran, and “the nuclear minister” expresses only his individual point of view.<sup>59</sup> The different ministries frequently held opposing positions in relation to expanding military, technical and other kinds of cooperation with Iran. In December 1996, during Russian Prime Minister Yevgeny Primakov's visit to Iran, for the initialing of an agreement on cooperation, in the field of the export controls and for confirming Russia’s and Iran’s adherence to the international norms of the control of exports of military technologies, Igor Rodionov, the Russian Minister of Defense, stated that Iran

represented a potential military threat to Russia.<sup>60</sup> Other similar, uncoordinated statements and actions by Russian politicians seriously complicated the development of improved relations with Iran.

Also it is necessary to recognize that US pressure on Russia regarding “the Iranian issue,” has, in many respects, promoted instability in the mutual relations between Moscow and Tehran. In particular, the refusal of the Russian president to make a trip to Iran, planned for the end of 1995 or the beginning of 1996, after the summit of the US and Russian presidents, in May 1995, in Moscow, and Moscow’s unilateral commitment to restricted cooperation with Iran in the nuclear sphere, were the results of this pressure.

Iran's limited purchasing power had an effect on the character of mutual relations between the two countries. The eight-year war between Iraq and Iran seriously undermined Iran's economy. Additionally, oil prices had drastically fallen. All this has resulted in the desires of the Iranian leadership surpassing the financial resources of the country. In September 1994, Russia suspended sending Iran the last of the three diesel-powered submarines constructed for Tehran and also suspended the construction of an assembly tank factory because of a 120 million dollar non-payment for previous arms deliveries.

An intergovernmental protocol, on the settlement of mutual financial obligations, was signed at the end of December 1995, during Russian Minister for External Economic Relations, Oleg Davydov’s visit to Iran. According to the protocol, Iran promised to pay off the debt by 230 million dollars worth of oil and by paying 150 million dollars in cash.<sup>61</sup> It was only in 1997, that the last diesel-powered submarine was delivered to Iran.

One more problem was that during the most part of the 1990s, there were no intergovernmental documents that regulated trade relations between the countries. In March 1993, a political document regarding the foundation of the mutual relations and principles of good-neighborhood cooperation between Russia and Iran was initialed. However, the treaty on the foundation of mutual relations and principles of cooperation between the Russian Federation and Islamic

Republic of Iran itself was signed only on March 12, 2001, during a visit by Mohammad Khatami, President of Iran, to Moscow. The agreement on the long-term economic cooperation was initiated in December 1995, and signed only on April 14, 1997.

Since western countries have restricted their economic relations with Iran, in many respects Tehran would not, probably, be against reorienting with Russia – which has technologies and resources needed by Iran. However, because of the problems mentioned above and a lack of coordination, it did not happen, and the volume of trade between the two countries was low in the 1990s (see figure 1).

All these problems had even greater effect on the cooperation of the two countries in the field of nuclear energy. The question regarding the delivery of a research reactor to Iran was examined by the Ministry for Atomic Energy for several years. According to Yevgeny Adamov, the newly appointed minister of nuclear energy,<sup>62</sup> the draft contract was ready in April 1998,<sup>63</sup> however, the Russian government did not authorize the deal.<sup>64</sup> In 1992–97, Russian experts prepared a draft proposal for the uranium mine project.<sup>65</sup> However, cooperation was suspended at that stage. Negotiations on the delivery of natural uranium to Iran were suspended after the sides could not agree on the price.<sup>66</sup> Thus, the only item of the Russian–Iranian agreement which has reached the stage of practical implementation, is the construction of the

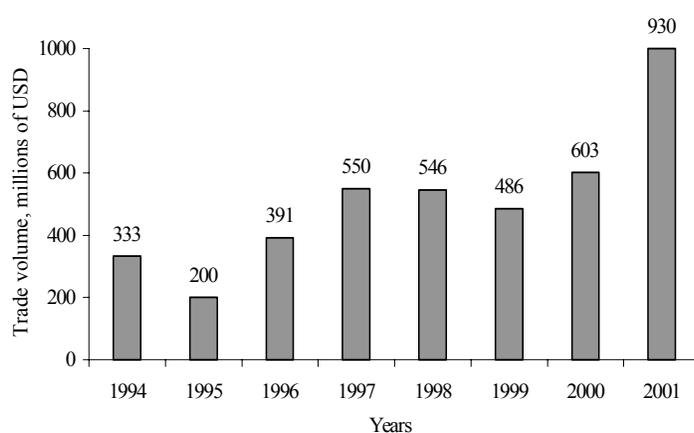
first power unit of the nuclear power plant in Bushehr.

According to the initial plan for completing the nuclear power plant in Bushehr, the work was divided into three stages. The first stage was inspection of the nuclear power plant, estimation of the condition the building, equipment and the type of damage suffered by the containment building and the preparation of a contract for its reconstruction. The second stage entailed repairing the containment building according to the approved contract design. The third stage involved delivery and installation of equipment.<sup>67</sup>

It was planned that, in 1995, 200 Russian experts would conduct a pilot survey of damages to the nuclear power plant and would finish that task within the same year. The inspection was completed by July 1996, at a cost of 2 million USD,<sup>68</sup> but the final project for reconstruction of the nuclear power plant was not approved. No decision was made as to what already on-site equipment should be completely replaced and not repaired.<sup>69</sup>

There was a delay in the work because of partially missing documentation for 80 thousand pieces of equipment and design elements, which had been shipped by the German firm “Siemens,” at the end of the 1970s, and stored in warehouses for more than 20 years. The inspection of the German equipment continued for several years. Of the total, 47 thousand pieces of equipment were considered usable and 11 thousand

Figure 1. Trade volume between Russia and Iran in 1994–2001 (special deliveries excluded)



Note: The data are taken from the official web site of the Russian Ministry of Foreign Affairs: “The Russian–Iranian relations”, April 5, 2002; “Trade and Economic Relations”, March 5, 2001.

more pieces of mechanical and electric equipment were found to be in the working order – but missing their documentation. The restoration of the documentation was entrusted to Russian experts from the Nizhny Novgorod Special Design Machine-Building Bureau (SDMBB) and *Gidropress* Experimental Design Bureau (EDB *Gidropress*, city of Podolsk). Iran approved the final contract for construction of the first power unit only in December 1999.<sup>70</sup>

Another problem for VPO *Zarubezhatomenergostroi*, the general contractor for the construction of the Bushehr nuclear power plant, was searching for credits to pay for the equipment manufactured by Russian enterprises. According to existing practice, the foreign customer pays a 5% advance payment. Another 85% is wired after the equipment delivery, and the remaining 10% is paid after the start-up of the power unit.<sup>71</sup> While by March 1997, AEOI had paid \$60 million USD,<sup>72</sup> this was insufficient to pay for the equipment manufactured by the Russian subcontractors. Russian banks grant only small loans, and the interest is exorbitant by world standards – from 13% to 15%. The Russian government does not give out credits for the construction of nuclear power plants at all. For the comparison: in a similar situation, the French government gives out a soft loan at 0.5%, under state guarantee, from the *Export-Import* bank.<sup>73</sup> The problems with finding credit for the Iranian projects resulted, for example, in an order for expanding a steel plant in Isfahan (constructed by the USSR) being granted to Italy and not to Russia; an order for the construction of a subway in Tehran going to China.<sup>74</sup> The situation concerning payment for work by contract organizations was, in part, resolved after *Alpha-bank* supplied *Atomstroieksport*<sup>75</sup> with \$50 million USD in credit.<sup>76</sup>

The third reason for the delay in work, according to Viktor Mikhailov, was a reassessment, by the Russian side, of the skill level of the Iranian construction workers who, according to the negotiation protocol of 1995, were to have shared in the construction and installation work.<sup>77</sup> The real volume of work done by the Iranian experts over the years 1995–97 was equivalent to one year.<sup>78</sup>

With a view toward accelerating the tempo of construction at the Bushehr nuclear power plant, it was decided during a visit of the delegation of the Russian Ministry for Atomic Energy to Tehran, in January 1998, that Russia would complete the first power unit of the nuclear power plant on its own. On August 29 1998, the Russian corporation *Atomstroieksport* and the AEOI signed an additional protocol to the main contract, having undertaken to finish the construction of the nuclear power plant in Bushehr in 52 months.<sup>79</sup> According to the revised protocol, the Russian experts were to complete the work, which was originally allocated to the Iranians. Joint-stock Company *Atomstroieksport* was delegated responsibility for the quality of the equipment, terms of its delivery, installation, start-up, adjustments and putting the plant into operation. *Atomstroieksport*'s share of the contract cost is approximately 10%. The rest of the money is distributed between other participants of the project.<sup>80</sup>

Starting in the third quarter of 1999, *Atomstroieksport* started to sign contracts with Russian enterprises on the delivery of equipment for the Bushehr nuclear power plant. The *Atom mash* corporation (city of Volgodonsk, Rostov region) became one of the subcontractors. It was responsible for nuclear fuel transportation casks, regulating meters, the biological protection system, the pressure equalizer<sup>81</sup> and other equipment – in all 59 items overall totaling \$18.5 million USD.<sup>82</sup> On February 12 2001, the enterprise started shipping to Iran the support structure<sup>83</sup> and water storage containers for the emergency cooling system of the active reactor zone (which provides heat removal from the reactor active zone in case of a failure accompanied by the loss of heat-carrier from a coolant loop).<sup>84</sup>

According to a contract signed by *Atomstroieksport* and *Izhorskie Zavody*, the latter is responsible for the main equipment for the Bushehr nuclear power plant. These plants were to manufacture the reactor vessel and cover, equipment for the reactors, the main circulation system, the casings for the steam generators and transport equipment.<sup>85</sup> The reactor vessel was shipped to Iran at the end of November 2001.<sup>86</sup>

On September 23, 1999, the Leningrad metal plant (LMP) and *Atomstroieexport* signed a contract for the delivery of a 1000 MW turbine. The contract was valued at \$38 million USD.<sup>87</sup>

In November 1999, *Atomstroieexport* and *Electrosila* signed a contract on the delivery of a 1000 MW turbogenerator for the Bushehr nuclear power plant and began its construction in April 2000. Exactly one year later the plant tested the turbogenerator.<sup>88</sup> The contract was for \$15 million USD.<sup>89</sup>

The *Central Design Machine-Building* bureau (CDMBB), another machine-building enterprise from Saint-Petersburg, will deliver circulating pumps to Bushehr.<sup>90</sup> The *Instrument-Making* plant (city of Tryokhgornyy, Chelyabinsk region) will produce automated radiation control systems.<sup>91</sup> *Machine works* from Electrostal will deliver fuel for the nuclear power plant.<sup>92</sup>

In total, there are about three hundred Russian enterprises participating in the construction of the Bushehr nuclear power plant. According to some estimates, the contract for the construction of the nuclear reactor in Iran has created about 20,000 jobs.<sup>93</sup>

It was planned originally that experts from Ukraine and the Czech Republic would participate in completing the construction of the first power unit of the Bushehr nuclear power plant. *Turboatom* from Kharkov was to have delivered the steam turbine. However, on March 6, 1998, during US Secretary of State, Madeleine Albright's visit to Kiev, Ukraine cancelled delivery of the turbines in exchange for the Washington's support for its membership in the Missile Technology Control Regime (MCTR) and a US promise to increase the amount of assistance to the Ukrainian energy sector, and first of all, to the Kharkov region.<sup>94</sup> According to Ukrainian estimations, direct enterprise's losses amounted to \$5.1 million USD. This is the amount spent for the development of the turbine. As a result of the decision not to participate in the Bushehr project, *Turboatom* lost out on about \$40 million USD worth of projects.<sup>95</sup>

The Czech company *ZVVZ Milevsko* was to have delivered the ventilating and air-conditioning equipment. In March 2000, just

before the visit of Madeleine Albright to Prague, the Czech government nullified the contract, and a corresponding law was adopted by the Czech parliament. The missed company profit has amounted to over \$5 million USD.<sup>96</sup>

According to the latest data, the first power unit is planned to be ready by September 2003.<sup>97</sup>

During a meeting between Hans Blix, IAEA Director General and Reza Amrollahi, the AEOI president, on October 3 1997, the AEOI president declared that, in the near future, Iran is planning to satisfy about 20% of its energy needs with nuclear power. Also, he announced that Russian experts would assist in constructing three more power nuclear reactors; two VVER-440 reactors and one VVER-1000 reactor, which would be adapted to fit the German design constructed in Bushehr earlier.<sup>98</sup>

After visiting Iran, in November 1998, Mr. Adamov, the Russian Minister of Nuclear Energy, confirmed that Iran had asked Russia to prepare engineering specifications for the three reactors, having added that the sum of the contract is about \$3 to \$4.5 billion.<sup>99</sup> Russian Vice Premier Klebanov confirmed it early 2000.<sup>100</sup>

During a visit by Mohammad Khatami, the president of Iran, to Moscow in March 2001, the Russian media, referring to sources in the Russian presidential administration, speculated about possible Russian participation in the construction of "5, 10 or even 11 power units" in Iran.<sup>101</sup> However, this information hardly is based on Tehran's real needs - it was intended to demonstrate the readiness of the Russian leadership to construct - without delay - as many reactors in Iran as the customer is ready to pay for at that moment. In the first quarter of 2001, the Ministry of Atomic Energy prepared a feasibility report on the construction of the second facility of the Iranian nuclear power plant in Bushehr,<sup>102</sup> but, according to Mr. Romyantsev, Minister of Nuclear Energy, "no documents have been signed yet."<sup>103</sup>

The governmental experts are leaning to the conclusion that the final decision on whether Russian-Iranian cooperation in constructing

nuclear power plants is expanded will be made only after the first block of the Bushehr nuclear power plant is completed and entered into operation.<sup>104</sup> Russian President Vladimir Putin speaking at the press-conference, on the results of negotiations with Mohammad Khatami, the Iranian president, has noted that "Iran has plans for expanding its nuclear energy program, and the Russian Federation, according to international rules, is interested and will be ready to take part in appropriate tenders to participate in this work."<sup>105</sup>

It is necessary to note that for several years Russia will be unable to construct the three more power units for the Bushehr nuclear power plant. The four largest suppliers of equipment for nuclear power plants, Leningrad metal plant, *Electrosila*, *Izhorskie Zavody* and *CMBBB*, already have orders for manufacturing equipment for five power units (two for the Chinese *Lianyungang* nuclear power plant, one for the Iranian nuclear power plant in Bushehr and two for the Indian *Kudankulam* nuclear power plant). If Russia signs a contract on the construction of one more power unit in Iran, then the work on these six power plant units will last about six years.

At the same time, it is possible that European companies will return to Iran with offers in the field of nuclear energy. Iran's relations with EU countries are becoming more and more close. In 2000, the trade turnover between the EU and Iran has grown 64% - to \$12 billion.<sup>106</sup> Germany, Italy and France are leading with a trade turnover of \$3 billion, \$2.6 billion and \$1.8 billion respectively. Russia, on the other hand, was only in twelfth place in 2000, with \$603 million. Arrangements are made to open credit lines for Iranian goods with Italy for \$2.2 billion, with Spain for \$1 billion USD. Negotiations are under way with Japan, Germany and Italy to grant Iran a credit limit of \$3 billion USD.<sup>107</sup>

In 1998, despite a German court stating a year earlier that the Iranian secret service was connected to the assassination of the Iranian Kurds' leaders in Berlin and the subsequent recall of EU ambassadors from Tehran, Germany initiated consideration of the issue of renewing cooperation with Iran in the field of nuclear energy. Informal consultations with Tehran were conducted, and the Iranian

representatives have expressed their interest in the prompt renewing of the cooperation. This topic was discussed at the meeting of the EU working group on nonproliferation issues after Mohammad Khatami was elected the president of Iran. A number of countries (Austria, Belgium, and Finland) have supported Germany's idea. The discussion of this issue was suspended when Joschka Fischer from the Green party replaced Klaus Kinkel as the German Minister of Foreign Affairs.<sup>108</sup> Nevertheless, freezing of some of the national programs for the construction of nuclear power plants in the European countries, and also high profitability of this type of business will inevitably make interested European companies go hunting on the Iranian market.

Besides the contract on completing the second power unit in Bushehr, the other promising direction for Russian-Iranian nuclear cooperation is the joint construction of a desalinization plant. This is especially true if one takes into account the shortage of fresh water in Iran and in the Middle East as a whole, and the protocol of the Russian-Iranian negotiations of 1995. It is possible that in the near future there will be a tender for the construction of two power units in Ahvaz - the construction site was prepared by French experts more than twenty years ago.

#### **Iran's Nuclear Program and the Issue of Nonproliferation**

For many years now Iran has been suspected of attempting to acquire nuclear weapons. According to a report by the US Department of Defence, "Iran has a well organized structure which was created for the development of nuclear weapons based on both plutonium and highly enriched uranium."<sup>109</sup>

Until now, IAEA has no direct evidence, suggesting that Iran is manufacturing or attempting to acquire nuclear weapons. Neither have IAEA inspections detected any diversion of nuclear materials for military programs.

Unofficially, the US states that it has evidence of Iran developing nuclear weapons; however the evidence cannot be disclosed because of the possible loss of sources of information.<sup>110</sup> This argument is not very compelling. As far back as 1977, Washington

succeeded in convincing Paris to abort cooperation with Islamabad in the field of nuclear energy after sharing intelligence data with France on the Pakistani program to develop nuclear weapons. Since 1991, the US has shared its CIA information with the IAEA, and it was used to destroy Iraq's nuclear potential. US intelligence data also played a crucial role in revealing the sites of classified North Korean nuclear facilities.<sup>111</sup>

In January 2000, the CIA presented the Clinton administration with a report according to which "it is possible that already now Iran is capable of developing nuclear weapons."<sup>112</sup> Thus, most likely, the report was based not on the direct evidence of the existence of a military nuclear program in Iran, but on the fact that the US is not able to fully monitor Iran's efforts to acquire nuclear technologies, and, hence, to some extent, assumes the worst scenario.<sup>113</sup>

For years, the CIA has provided different time estimates for Iran acquiring the technical capability to develop nuclear weapons (see table 2).

This change in the CIA point-of-view can be explained by the absence of objective data concerning the level of scientific and technical potential of Iran in the nuclear sphere. Besides, announcing specific dates of possible development of nuclear weapons serves as a convenient means to influence public opinion in the US on the existence of "real nuclear threat" and the necessity to expand the national missile defense system.

Iran has been a member of NPT since 1970 and a member of the IAEA since 1958. In 1974, an agreement on safeguards between Iran and the IAEA came into force. In 1981–89, because of the war with Iraq, contacts between Tehran and

the IAEA were terminated; while inspections in the conflicting states were still performed.

After the end of the war between Iran and Iraq, the IAEA renewed cooperation with Iran. In 1993, the IAEA spent \$800,000 for technical cooperation with Iran, most of the amount was spent on the development of a laboratory for the separation of isotopes at the Isfahan nuclear center (up until 1993, the IAEA had spent \$8.2 million in Iran; for the comparison, the largest share went to Egypt – \$24.7 million USD).<sup>114</sup> From 1995 to 1990, \$1.3 million was spent for the construction of the Bushehr power plant.<sup>115,116</sup> (Overall assistance totaled \$1.55 million at this time).<sup>117</sup> In 1999, Iran placed tenth on the list of the countries receiving technical assistance from the IAEA in terms of financial investments by the agency.<sup>118</sup> By the end of 2000, Iran participated in 12 joint projects with the IAEA.

At the present moment, all Iran's activity within the framework of the program of peaceful use of nuclear energy is under IAEA safeguards (see table 3).

The IAEA position concerning the Iranian program for development of nuclear energy is quite clear: the agency does not see reasons to suspect Iran of developing nuclear weapons. In May 2000, after visiting Iran, El Baradei, IAEA Director General, declared that "Iran's nuclear program pursues peaceful purposes and meets international requirements and standards."<sup>119</sup>

In providing technical assistance to Iran, IAEA is strongly pressured by the US, which contributes more than 25% to the regular IAEA budget and approximately 32%, or \$18.25 million USD, to the voluntary technical assistance and cooperation fund.<sup>120</sup>

Table 2

***CIA estimates of the time needed by Iran to acquire the technical capabilities to develop nuclear weapons***

CIA estimate, year	Forecasted year of acquiring the capability
1992	2000
1995	2003
1997	2005–2007
2000	2000

Note. Data are taken from: Cordesman Anthony. Weapons of Mass Destruction in Iran, Center for Strategic and International Studies, 28 April 1998, [www.csis.org/mideast/reports/WMDinIran4-28.html](http://www.csis.org/mideast/reports/WMDinIran4-28.html); Risen James, Miller Judith. "C.I.A. Tells Clinton an Iranian A-Bomb Can't Be Ruled Out." *New York Times*. 2000, 17 January.

*Iran's Contemporary Nuclear Infrastructure*

Facility	Type of installation	Exporter	IAEA safeguards
Bushehr nuclear power plant	Light-water VVER-1000 reactor	Russia	Yes*
Tehran nuclear research center	Pool type 5 MW research reactor	United States	Yes
	Hot cells	United States	Yes
	Experimental installation for "yellow cake" producing	China	Special IAEA inspections were conducted in 1992-1993
	Lasers	United States	Not subject to safeguards
Isfahan nuclear research center	Zero output heavy water research reactor	China	Yes
	A miniature 27 kW neutron source	China	Yes
	Two subcritical assemblies	China	Yes
Karaj agricultural and medical nuclear research center	Calutron	China	Special IAEA inspections were conducted in 1992-1993
	Cyclotron	Belgium	Special IAEA inspections were conducted in 1992-1993
Yezd province	Uranium deposits are estimated at least at 5000 tons	Czechoslovakia, Germany, China and Russia assisted	Special IAEA inspections were conducted in 1992-1993

\* Will be under IAEA safeguards after Russia delivers nuclear fuel to the facility.

In particular, Washington attempts to condition its membership dues with suspension of IAEA technical assistance to Iran. In 1999, the US Congress approved a bill reducing the amount contributed to the IAEA voluntary technical assistance and cooperation fund proportionate to the IAEA's assistance to Iran if the IAEA continued a program of technical assistance to Iran. That would happen unless the US Secretary of State presented letters to the committees on international affairs of the House of Representatives and the Senate confirming that this program did not contradict US nuclear non-proliferation and security policies.<sup>121</sup>

In reply to numerous charges, in 1991, the government of Iran invited IAEA experts to visit the country and conduct inspections at the facilities of their choice.<sup>122</sup>

During the week-long inspection in February 1992, IAEA experts visited six facilities: the uranium deposits in Yezd province, the Bushehr nuclear power plant (where construction was frozen at that moment), the Moalem Kalaya Center (where, according to Washington, Iran had been developing a

facility for uranium enrichment), and also nuclear centers in Tehran, Isfahan and Karaj. No activity contradicting Iran's obligations to the NPT was revealed. Based on the results of the inspections, John Jennings, the IAEA deputy Director General, declared, "we have visited all facilities we wanted without limitations. All of Iran's nuclear activities have exclusively peaceful purposes."<sup>123</sup>

In November 1993, a second similar inspection took place: the three largest Iranian research nuclear centers were inspected where, according to US intelligence, some elements of the nuclear program were developed. After inspecting the Tehran nuclear research center, Isfahan nuclear research center and Karaj agricultural and medical nuclear research center, the IAEA officially declared that it had not found "any activity which contradicts Iran's declarations on exclusively peaceful purposes of the nation's nuclear program."<sup>124</sup>

In 1995, IAEA representatives immediately reacted to declarations by the US and Israeli high-ranking officials that Iran is developing nuclear weapons. David Kydd, IAEA's

representative has categorically denied that international inspections had detected any grounds for the charges. "We [the IAEA] inspected Iran very carefully and came to the conclusion that its nuclear program pursues exclusively peaceful purposes," he concluded, having added that Iran is in full compliance with all obligations as a member of NPT.<sup>125</sup> Hans Friedrich Meyer, another IAEA representative, noted, that "Iran is very much open to IAEA monitoring and, at IAEA request, allows access to nuclear installations which are not included in the list of the sites subject to inspections." According to Meyer, "there are no indications Iran is involved in the covert nuclear program."<sup>126</sup>

From the point of view of the non-proliferation of nuclear weapons, the most sensitive stages in the nuclear fuel cycle are uranium enrichment and spent nuclear fuel processing, i.e., those stages at which weapon-grade materials can be produced.

Creation of a closed nuclear fuel cycle was planned by 1979, within the framework of the nuclear energy program. However, because of "the Islamic revolution," implementation of the program was curtailed. In the post-revolutionary period, effective development of the nuclear infrastructure has become impossible.

In 1985, in the Yezd province, uranium deposits were detected. The size of the deposit is about 100 to 150 square km and there is an estimated amount of about 5,000 tons of ore in the form of uranium oxide ( $U_3O_8$ ). However, the ore itself is considered low grade, there is less than 1% of uranium in it. According to Reza Amrollahi, AEOI President, smaller deposits of uranium have also been detected in provinces of Isfahan, Azerbaijan, Khorastan, and Sistan & Baluchestan.<sup>127</sup>

At different times, experts from Czechoslovakia, Germany, China and Russia were involved in the development of the Yezd deposit. Nevertheless, its practical operation has not begun yet.

According to the Russian experts, for ore production, it will be necessary to build a 300 m deep shaft, which along with low content of uranium in the ore, will make the price of the fuel prohibitively high. In addition, if a small

factory for separating ore from waste rock was to be built, this shaft might produce 50 tons of uranium-235 isotope annually. One VVER-1000 requires three times that amount.<sup>128</sup>

Thus, using the uranium deposit for a source of energy is economically unjustified; if a decision is made to use it in nuclear reactors, then the deposit will be exhausted in 20 years after operating two VVER-1000 reactors.

However, this amount of uranium is quite enough for the production of a nuclear arsenal comparable to that of France, Great Britain or China. For example, the Pakistani mine in Dera Ghazi Khan, where the uranium for the nuclear devices exploded, in May 1998 was extracted, contributes 30 tons of natural uranium annually.<sup>129</sup> Nevertheless, this fact does not make Iran a potential nuclear state (similar stocks of uranium are present in two to three dozen countries), but brings to the forefront the question of effective non-proliferation export controls over the most sensitive components of a nuclear fuel cycle to countries developing nuclear energy.

There are no authentic data on the deliveries of nuclear materials to Iran from abroad. There were reports in the press that that in 1967, the US delivered 1.2 kg of plutonium to Iran,<sup>130</sup> in the middle of 1970s, Iran bought 10 kg of highly enriched and 25 kg of natural uranium in Denmark and, in the 1980s, Iran bought uranium from one of Namibia's mines.

There is a facility for converting ore into uranium oxide, at the Tehran nuclear research center. In February 1992, IAEA inspectors examined the installation and concluded that it was not functional. There are no later data on this facility.

It was planned as well that Chinese experts would construct a facility to convert uranium oxide ( $U_3O_8$ ) into uranium hexafluoride ( $UF_6$ ) (which is a gas and is used in the centrifuge method enrichment process) at the Isfahan nuclear research center. Tehran had informed the IAEA about it in November 1996. The contract was cancelled a year later due to US pressure.

In 2000, the Scientific Technological Center of Microtechnologies, which is a part of the state enterprise, *D.V. Efremov* Scientific Research Institute of Electrophysical

Apparatus (NIIEFA), signed a number of contracts for the delivery of laser equipment to a Tehran University laboratory. According to the employees of the institute, the equipment planned for delivery to Iran is inapplicable for the separation of heavy isotopes. An indirect demonstration of this fact is that laser equipment of this capacity is not on the Nuclear Suppliers Group trigger list. But, because of infringements in the rules for the export of dual-use technologies, the Russian government vetoed the contract.

The laser isotope separation method for uranium enrichment is the most dangerous in terms of non-proliferation of nuclear weapons. Its basic advantages are a high fusing ability and low energy demand. The method was developed at the beginning of 1970s. However, a full-scale industrial facility for laser isotope separation has not been constructed yet, in part because it is technically difficult and expensive to implement the physical principle this method of enrichment is based on, though the possibility was demonstrated in the laboratory.

The United States started to develop this method in the 1970s, at the Livermore National Laboratory and invested \$2 billion USD. However, in 1999, the United States officially declared that the project closed because the method was too expensive for industrial application. Probably, this situation will not change.<sup>131</sup>

The only known case of exported laser equipment to Iran is the US delivery of lasers in October 1978,<sup>132</sup> unsuitable, as the suppliers stated, for uranium enrichment.<sup>133</sup> Their present condition is unknown.

The Karaj Agriculture and Medicine Nuclear Research center has a 1 mA calutron, which is used for the electromagnetic separation of isotopes. The Chinese delivery of a calutron at the beginning of the 1990s caused energetic protests from the US. Suspiciousness increased after it was found that there is a hydroelectric power station near the center capable of satisfying the energy needs for electromagnetic isotope separation of uranium,<sup>134</sup> in which a calutron is used. The Iranians have offered assurances that the calutron is used only to produce stable isotopes.<sup>135</sup> During inspections, in 1992–1993, IAEA experts have confirmed this fact, and also have expressed their opinion

that it is impossible to use the calutron for the electromagnetic separation of radioactive elements, as there was no ventilation system.<sup>136</sup> According to IAEA document INFCIRC/254/Rev.4/Part 2, 50 mA calutrons are subject to export control. According to IAEA experts, such a calutron would not be able to produce more than 3 grams of highly enriched uranium annually.<sup>137</sup> At the same time, a 1 mA calutron was used by Iraq in research development to master the technology needed for electromagnetic isotope separation.

Nuclear waste reprocessing is another sensitive stage of a nuclear fuel cycle. Plutonium production is the key component in creating nuclear weapons in India and Israel. In all cases, graphite heavy water reactors were used to produce the plutonium. Its nuclear waste is the most attractive because of its isotopic structure.

Iran has neither similar reactors nor the technology needed to produce plutonium. It is known that, in 1967, several hot cells were imported from the US. These cells are able to produce several grams of plutonium.

Referring to the technical feasibility of creating a nuclear device from power plant plutonium, the US insists that Iran may diverge nuclear waste from the VVER-1000 reactor to its military program. However, this threat is largely exaggerated by the United States.

First, as soon as the Bushehr nuclear power plant receives nuclear fuel, it immediately becomes subject to IAEA safeguards. Second, according to the agreement, signed by Russia and Iran, nuclear waste will be returned back to Russia for reprocessing. Thirdly, Iran has neither the means, nor the infrastructure and scientific know-how to create a nuclear device. The only example when a power plant plutonium device was created and tested is dated back to 1962. After 15 years of research and 62 tests, the US managed to develop and successfully test a nuclear device made from plutonium, produced from nuclear waste from a British magnox reactor.<sup>138</sup> However, the reactor used natural uranium, which makes the isotopic structure of the resultant plutonium much more similar to that of weapons grade plutonium, than plutonium produced in light water reactors.<sup>139</sup>

A nuclear device made with power plant plutonium is also unsuitable for long-term storage because of its physical properties. Handling this type of plutonium requires much more sensitive protection measures for the staff because of its high radioactivity – even in comparison with weapons-grade plutonium.

At the same time, it is troubling that Iran is seeking to acquire a heavy water reactor. In middle of the 1980s, Iran looked into the possibility of constructing an Indian-type, 10 MW research reactor based on heavy water. In the beginning of the 1990s, Iran acquired a heavy water zero output reactor from China that is unsuitable for producing plutonium, but allows for the simulation of heavy water high-power reactor processes. In the second half of the 1990s, the AEOI negotiated the purchase of a heavy water research reactor (40 MW capacity, according to some estimates) from Russia. Iranian arguments that it is not interested in the development or purchase of enrichment technologies and merely wants to purchase a heavy water reactor are not convincing if one takes into account the possible delivery of gas centrifuges to Iran as fixed in the negotiations protocol of between Mikhailov and Amrollahi, in January 1995.

Thus, it is not possible to speak about the existence of a complete nuclear fuel cycle in Iran (as most of the stages missing) and, hence, about the possibility of diverging materials and facilities from civilian to military purposes. Iran has different laboratory nuclear facilities, so, it is possible that they, after some modernization, may produce the uranium hexafluoride, used in centrifuge and gas diffusion enrichment. However, this is not forbidden by any international treaty or convention. The geographical dispersion of Iran's nuclear research centers, makes it very unlikely to produce enriched uranium latently from natural uranium extracted in the Yezd province.

Iran has three nuclear research centers. The Tehran nuclear research center is at Tehran University. The construction of the center was begun in 1959, on a direct order from the Shah and after the signing of the agreement between Iran and the US on cooperation within the framework of the *Atoms for Peace*

program. In accordance with the agreement, the US delivered a research reactor to the center containing 5.585 kg of uranium enriched to 93 percent, and hot cells capable of producing, according to some sources, up to 600 grams of plutonium from spent fuel.<sup>140</sup>

In 1992, according to the IAEA program to switch research reactors working with highly enriched uranium to low enriched uranium, the Atomic Energy Commission of Argentina delivered 115.8 kg of uranium enriched to 20 percent to an Iranian research reactor.

In 1984, during the heat of the war between Iran and Iraq, a nuclear research center was opened in Isfahan, where construction had begun before “the Islamic revolution” with the assistance of French experts and which was finished with the assistance of Chinese experts. Now the center is the largest in country. It has a zero output heavy water reactor, a miniature 27 kW neutron source and two subcritical assemblies.<sup>141</sup>

On May 11 1991, Hassan Habibi, the Vice President of Iran, opened the Agriculture and Medicine Nuclear Research Center in Karaj. The Center has a 1 mA calutron and a 30 MW cyclotron.

The primary goal of the center is to produce radioactive materials for medicine and produce agricultural hybrids.<sup>142</sup> The center actively cooperated with the IAEA and participates in joint projects.<sup>143</sup>

Since the creation of the AEOI, the program of personnel training, for work in the field of nuclear energy, has focused on training abroad. During the early years, the United States and Western Europe were preferred. In 1975, there about 150 staff nuclear physicists at the AEOI. About half of them were foreign experts and advisers - mostly from the United States and Great Britain. That same year, about 100 Iranians were sent abroad for training in nuclear physics.<sup>144</sup>

In the post-war period, in order to increase the number of nuclear physics scientists and experts, the AEOI undertook projects in two directions:

- 1) to bring back in the country experts who have left after “the Islamic revolution”;
- 2) to sign agreements with other countries, to train Iranian experts.

At the end of 1980s, Iranian experts had training preparation in Argentina; there are reports that 39 AEOI employees have visited Pakistan.<sup>145</sup> About 15 Iranian experts from the nuclear center, in Isfahan, have had been training in China from 1988 to 1992.<sup>146</sup> According to some estimates, at the end of 1980s, the total number of Iranian scientists, engineers and experts involved in the nuclear sciences was under 500 (for comparison, Iraq had 7,500).<sup>147</sup>

One of items of the Russian-Iranian agreement cooperation in peaceful nuclear energy uses, dated August 25 1992, concerned the training of Iranian experts in the Russian educational institutions and research centers. The Russian corporation *Zarubezhatomenergostroi* was responsible for signing and implementing the contract on the preparation of experts. It was planned that an IAEA program for the preparation of experts in the field of nuclear physics would be used as the basic program for the Iranians. It was suggested that the program would include:

- training of experts and engineers at specialized centers;
- internships for graduates from Iranian universities;
- graduate studies;
- undergraduate studies.

Up to a hundred Iranians were to have been trained in Russia annually.

By 1995, Russia had considerably reduced the training program for Iranians. The protocol of the Russian-Iranian negotiations in 1995 mentioned the training of only 10 to 20 experts (graduate students) annually. Some of the Russian universities and scientific research institutes had voluntarily refused to train Iranians, being afraid of the US imposing sanctions against them.

In May 1999, a group of 38 Iranian nuclear experts started training at the Novo-Voronezh Training Center.<sup>148</sup> On June 17 1999, *Rosenergoatom* signed an agreement with *Atomtechenenergo* to organize and implement on-site training for the staff of the Bushehr nuclear power plant with water-water power VVER reactor. The total cost of the plan, according to the contract, was \$740,000 USD. On August 3 1999, *Rosenergoatom* signed an agreement for

organizing internships for Iranian staff at the Balakovo and Kalinin nuclear power plants.<sup>149</sup> Starting in fall of the same year, the future personnel of the Bushehr nuclear power plant have interned at the Balakovo nuclear power plant, in the reactor and turbine departments. All in all, it is planned that 342 experts will have their internships at the Balakovo nuclear power plant.<sup>150</sup> The Obninsk Nuclear Energy Institute is the only Russian higher educational institution, which prepares experts for the AEOI.

Thus, given the present level of development of the Iranian nuclear industry and the limited possibilities for independent training of nuclear physics experts, it is at least groundless to speak about the possibilities that Iran can develop nuclear weapons.

However, it is necessary to note that there are data on Tehran's intent to illegally acquire high-tech equipment which, in particular, can be used for the development of weapons of mass destruction and their means of delivery. In 1997 and 1998, the Russian Security Service stopped a number of attempts to purchase missile technologies in violation of the export control system.<sup>151</sup> In January 1999, the management of the Energy Technologies Research and Design Institute (NIKIET) stopped non-authorized contact by several institute employees with Iranians.<sup>152</sup> It is possible to suggest that a number of similar contacts with employees of other Russian "nuclear" institutes were more successful for the Iranians. During a visit to the US, in September 1997, the Russian Minister for Foreign Affairs, Yevgeny Primakov, declared that it is impossible to guarantee that there are no experts from the former USSR in some of the Iranian nuclear laboratories.<sup>153</sup> At the same time, it is a well-known fact that in the middle of 1990s, many Russian and CIS missile technology experts ended up in Iran.<sup>154</sup>

It is important to emphasize that the threat of illegal deliveries to Iran of equipment and technologies is urgent not only for Russia and the CIS, but for United States and European countries as well. For example, the Isfahan Nuclear Research Center has a gamma-spectrometer manufactured by the US firm "Canberra;" the spectrometer is subject to export controls in the United States.<sup>155</sup> The

workplaces at the Isfahan Center are equipped with computers, which cannot be exported to Russia, according to US export legislation.<sup>156</sup> In June 1997, the US Department of Commerce recognized that Dell Corporation was guilty of illegally exporting computer equipment to Iran in March and June 1992, and imposed \$50,000 USD fine. One year later, the US Department of Commerce fined Gateway 2000 company \$402,000 USD for 87 cases of infringement of the US export legislation – which included illegal deliveries of computers to Libya and Iran.<sup>157</sup>

#### **“The Iranian Problem” in Russia–US Relations**

Russian-Iranian cooperation has been heavily criticized by the West, especially by the US and Israel, for a number of years. Already, during the Russian-Iranian negotiations, the US representatives officially and unofficially voiced concerns over the Russian nuclear products being shipped to a country that is covertly developing nuclear weapons and has, as the only goal for the Iranian nuclear energy program, the acquisition of technologies used to develop these weapons.<sup>158</sup>

Starting the mid 1994, the United States and Israel launched a massive information campaign in order to discredit the Russian-Iranian cooperation. The main accents was on Iran having a military-oriented nuclear program and lacking financial resources, as well as on inability of the Russian leadership to ensure comprehensive control over the nuclear materials and experts in nuclear weapons.

On September 26, 1994, just before the Russian-US summit in Washington, D.C., James Woolsey, director of the CIA, declared, “We pay particular attention to Iran's efforts to acquire nuclear and missile technology from the West in order to enable it to build its own nuclear weapons, despite being a signatory to the nuclear Non-Proliferation Treaty. We believe that Iran is eight to ten years away from building such weapons, and that help from the outside will be critical in reaching that timetable. Iran has been particularly active in trying to purchase nuclear materials or technology clandestinely from Russian sources. Iran is also looking to purchase fully-fabricated nuclear weapons in order to sharply accelerate its timetable.”<sup>159</sup>

Reports of Iran purchasing nuclear devices ifrom the former USSR were repeatedly published in the press in the 1990s. For example, it was reported that Iran acquired 4 nuclear explosive devices from Kazakhstan and Tajikistan 2 strategic warheads, a gravity bomb and an artillery shell.<sup>160</sup> According to another report, Iran purchased 2 tactical nuclear warheads from Kazakhstan for \$20 million USD. However, the White House doubted the authenticity of these reports. James Rubin, the US Department of State spokesman, declared that US believed this was false. He added that US looked into the matter in 1992, when reports first surfaced, and concluded “there was no evidence to substantiate such claims.”<sup>161</sup> James Woolsey, Director of the CIA, has also said that there is “no credible reporting” that nuclear weapons have left CIS territory.<sup>162</sup> However, despite the absence of any practical evidence for the rumors, they created an uncomfortable atmosphere for the Russian–Iranian cooperation.<sup>163</sup>

In the framework of the policy to isolate Iran, the US tried to stop not only the development of the nuclear cooperation between Moscow and Tehran, but the shipment of conventional weapons as well. For example, during an official visit Russian President Boris Yeltsin, to Washington, in September 1994, US President Bill Clinton succeeded in persuading Boris Yeltsin in announcing that Russia “would not sign new contracts to sell armaments to Iran.” Many Russian experts believed, at that time, that nuclear cooperation would have the same fate.

The pressure on Russia has increased after the contract on completing the first power unit in Bushehr, was signed in Tehran. The Republican majority in the US Congress threatened to discontinue Russian assistance, in the framework of the Cooperative Threat Reduction Program, if Russian continued to cooperate with Tehran.<sup>164</sup> The presidential administration held a similar view concerning the danger of selling nuclear technologies to Iran, however, it conducted a more flexible assistance policy to Russia. On the one hand, the administration officials stated that the US should not reduce assistance to Russia, as the funds are used to dismantle the Soviet nuclear arsenal. On the other hand, the US administration started more active

consultations in order to persuade the Russian leadership to cancel nuclear cooperation with Iran.<sup>165</sup> "The Iranian issue" became one of the most discussed issues at different Russian-US meetings.

The issue was discussed by the US Secretary of State Warren Christopher and the Russian Minister of Foreign Affairs Andrei Kozyrev, in Geneva, in late March 1995. However, the sides did not reach any understanding. Besides the Iranian problem, NATO enlargement and Chechnya were major irritants as well. So, the Russian-US relations had accumulated a critical mass of difficult problems, each of which complicated the other.<sup>166</sup>

A week after the meeting with Andrei Kozyrev, while speaking at Indiana University, Warren Christopher delivered a "program speech" (as it was labeled the leading US newspapers) which was broadcasted live by the US Department of State. Mr. Christopher said, "Russia is a neighbor of Iran. It will rue the day it cooperated with this terrorist state if Iran builds nuclear weapons with the benefit of Russian expertise and equipment. It is simply too dangerous to be permitted."<sup>167</sup> Mr. Christopher linked Russia's continued cooperation with Iran, in nuclear sphere, and the level of Russia's participation in the G-8 meetings, suggesting that "Russia should take note that no major industrial democracy cooperates with Iran on nuclear matters."<sup>168</sup>

At the end of April, 1995, US Secretary of Defense, William Perry, attempting to persuade Moscow to support the US position, discussed the issue of Russian-Iranian cooperation during meetings with the Prime Minister Viktor Chernomyrdin and Minister of Defense Pavel Grachev.<sup>169</sup>

In the middle of 1995, it became known that the Israeli military did not reject the idea of an attack to prevent the completion of the power plant; in particular, there was a distinct possibility of a missile strike against the Bushehr power plant. For the first time Iran requested that Russia ship S-300 anti-missile systems to Iran to defend the power plant.<sup>170,171</sup>

The situation over the Russian-Iranian cooperation deteriorated after the contents of

the negotiations protocol between Mikhailov and Amrollahi became widely known at the end of March and early April, 1995. The reference to gas centrifuge uranium enrichment, which potentially is able to produce HEU, made the Russian and Minatom's positions (irreproachable before that) vulnerable. Moreover, Iran's interest in the centrifuge equipment, while lacking reactors for the commercial production of electricity, immediately raised questions about the expediency of the Russian-Iranian cooperation even in the Russian government.

The Russian Federal Nuclear and Radioactive Safety Inspectorate (Gosatomnadzor) vigorously protested the shipment of nuclear technology to Iran. A report was delivered to the Russian president. According to Dr. Vishnevsky, the head of Gosatomnadzor, "Iran is a poor country, its external debt is \$33 billion USD, and it is unclear, what kind of profit Russia can make there." His opinion was that it was unlikely that Iran would be able, in the near future, to pay for the work done according to the contract for the power plant construction and which amounted to \$800 million USD.<sup>172</sup>

Representatives of the Interagency Commission on Environmental Safety of the Federation Council opposed nuclear cooperation with Iran. According to Mr. Menschikov, a commission member, the Russian Ministry of Atomic Energy "makes a mistake assisting Iran in constructing a nuclear power plant." Mr. Menschikov stressed that the Iranians will produce plutonium at the Bushehr power plant, and this plutonium will be used to develop a nuclear bomb, while arguments that Iran conforms to the NPT and is cooperating the IAEA "should not calm down anyone. If Iran does play by the rules, then Russia would have a neighboring nuclear power."<sup>173</sup> According to Dr. Yablokov, another representative of this agency, "the knowledge gained in nuclear materials processing technology and handling of radioactive materials itself will constitute a real breakthrough in the development of nuclear weapons for Iran."<sup>174,175</sup>

The Russian government experts, who had analyzed the situation in Iran and approved the construction of the Bushehr nuclear

power plant, were strongly against the shipment of gas centrifuges to Iran.<sup>176</sup> It was decided to drop the centrifuge issue and not to conduct any negotiations with Iran on this topic.<sup>177</sup> The US Department of State was informed about the decision.<sup>178</sup>

The question of constructing the Bushehr nuclear power plant was delayed until the Russia-US summit in May 1995. It was planned that the Russian-Iranian cooperation would take a lion's share of time during the discussions between the presidents.

The Russian and US positions were 180 degrees apart before the summit. A report prepared by the Russian External Intelligence Service and published just before the nuclear non-proliferation treaty conference in April 1995, stated, "There is no compelling evidence that, at present, Iran has a single coordinated nuclear military program. The Iran's present industrial potential precludes the Islamic Republic of Iran from continuing with the development of weapon grade nuclear materials."<sup>179</sup>

Explaining the US position 10 days before the summit, Warren Christopher noted that "based upon a wide variety of data, we know that since the mid-1980s, Iran has had an organized structure dedicated to acquiring and developing nuclear weapons." According to the US Secretary of State, in terms of its "organization, programs, procurement, and covert activities, Iran is pursuing the same classic route for obtaining nuclear weapons, which has been followed by almost all states that have recently sought a nuclear capability."<sup>180</sup>

In contrast to numerous statements by official Russian representatives that nuclear energy cooperation with Iran is in fulfillment of article IV of the NPT, Moscow's position was more flexible and Russia was ready for serious concessions to the US on this topic.

In preparing for the summit, the Russian side talked about its readiness to compromise with the US and cancel some of the articles of the agreement with Iran, signed in 1992, and in the negotiations protocol of 1995.

Sergei Medvedev, the Russian President's Press Secretary, talked about the necessity to look for mutually acceptable solutions before the

summit, stating that "in order to help the US side to get rid of all doubts on this issue (construction of the power plant in Iran - A.K.), we have to look for a compromise." Sergei Medvedev expressed hope that a compromise could be found during the personal meeting between the Russian and US presidents.<sup>181</sup>

Simultaneously, Minatom representatives declared that it was possible that Russia would cancel the training of Iranian experts in Russian higher education and research institutions, except for the training of personnel for the power plants. Also, Minatom representative indicated an intent to introduce stricter control from the international community over the power plant construction and ensure "maximum transparency" for inspections. The possibility of enhancing the system of accounting and control over the nuclear materials at the Bushehr power plant was considered as well.<sup>182</sup>

A high ranking representative of the Russian Ministry of Foreign Affairs also spoke of the possibility of taking additional control measures over the Bushehr power plant. He emphasized that, "as an option, we could, for example, suspend the contract, if during its implementation, any facts undermining the peaceful nature of Iran's nuclear program surface." Also, according to him, "there are reasons to thoroughly analyze Minatom's plans to assist Iran in training nuclear experts. (...) One should not hurry with the implementation of these plans. (...) If these plans contradict Russia's national and state interests, they would be changed accordingly."<sup>183</sup>

Just before the summit, it became evident that for the US the contract on the completion of the Bushehr nuclear power plant meant much more than the simple construction of a nuclear power plant on the coast of the Persian Gulf. The US opposed the whole idea of Russian-Iranian cooperation in the nuclear sphere. The US representatives put forward varying arguments, from diverting nuclear waste from the light water reactor for military purposes to possible illegal contacts, by Iran, with Russian nuclear weapons experts in the framework of nuclear energy cooperation between the two countries.

An official representative of the US administration, commenting on the possibility

of a compromise concerning Russian-Iranian cooperation in the form of Russia canceling the delivery of some of the equipment and the US not opposing the construction of the power plant in Bushehr, said "We are not willing or interested in making a deal on one and not making a deal on the other. We think both of them should be discontinued. We are not interested in a compromise."<sup>184</sup>

Some high ranking Russian officials and politicians did not exclude the possibility of canceling the contract for the power plant in Bushehr if the US was ready to compensate Russia for its losses. For example, answering the question on what might entice Russia to cancel the deliveries to Iran, Andrei Kozyrev, the Russian Minister of Foreign Affairs, said, "about \$1.5 billion USD."<sup>185</sup> Vladimir Lukin, a State Duma Deputy, held a similar position. "The contract with Iran is valued at, let us say, \$1 billion USD. If the US is ready to compensate by giving Russia this amount, then it is possible. If not, then there is no ground for the conversation, as US assistance to Russia is considerably less than the value of the Iranian contract."<sup>186</sup>

Simultaneously, there were reports that Russia suggested delivering nuclear reactors to the People's Democratic Republic of Korea instead of implementing the contract for the construction of the power plant in Bushehr. According to one of the variants, Russia was supposed to build a nuclear reactor in DPRK as payment for a debt to South Korea,<sup>187</sup> which was about \$1.5 billion USD.<sup>188</sup> During a visit to Israel in early May 1995, Madeleine Albright, the then US permanent representative to the UN, said that Russia indicated its readiness to cancel the delivery of a light water nuclear reactors to Iran "in exchange for appropriate compensation."<sup>189</sup>

The issue of Russia possibly canceling the construction of a power plant in Bushehr was closed a week before the summit. At a briefing in the Russian Ministry of Foreign Affairs, Mr. Karasin, the Head of the Department of Information and Press, said that "Russia (...) is not considering canceling the delivery of nuclear reactors to Iran. The Russian Federation would not change its decision even if there were threats from foreign countries." However, he underscored that "Russia would

not take steps that would give Iran – or any other country – the possibility to develop military nuclear programs. Our readiness to take all necessary measures, on the basis of transparency and to exclude the possibility of facilitating the creation of a nuclear potential in Iran is unchanged."<sup>190</sup>

The meeting of the two presidents, which lasted for about four hours, did not change the positions of the countries. Even a comprehensive report, prepared on the basis of the data of the US intelligence and devoted to Iran's attempts to acquire nuclear technologies in the former USSR and purchase equipment in Western Europe necessary for the development of nuclear weapons did not change the Russian position. US President Bill Clinton personally handed this report to Russian President Boris Yeltsin during their meeting in Moscow. Simultaneously, however, the US refused to present this information to the IAEA.<sup>191</sup> According to Mr. Mikhailov, the Russian Minister of Nuclear Energy, the report had no concrete facts that demonstrated Iran's intentions to acquire nuclear weapons.<sup>192</sup> The topic of the construction of a power plant in Bushehr was directed to the Commission on Technical and Economic Cooperation (Gore-Chernomyrdin Commission). As a result of the summit, it was decided to announce that Russia was canceling the delivery of centrifuges to Iran.

At the press conference, following the meeting, the Russian President said that an accord was reached on separating "military" and "peaceful" parts of the Russian-Iranian contract. "As far as the military part is concerned – nuclear fuel, the centrifuge – we decided to exclude these questions, that means the military part falls away and only the peaceful part remains."<sup>193</sup> Bill Clinton confirmed that he handed his Russian colleague "some data acquired by the US intelligence" and tried to convince him that all deliveries according to the Russian-Iranian nuclear contract were not expedient. "We went further on this way than I hoped," the US President said.<sup>194</sup> At the same time, Warren Christopher said that the US administration "did not succeed in everything it wanted on the issue of the nuclear contract between Russian and Iran, but it managed to make important progress."<sup>195</sup>

The statement by the Russian President on the presence of a "military" component in the Russian-Iranian cooperation caused a stormy reaction. Boris Yeltsin's "inaccuracy" in wording was a reason to blame Russia for the secret "military" cooperation with Iran in the nuclear sphere, at the same time giving the opportunity to Russian officials to interpret differently obligations taken during the summit. For example, Viktor Mikhailov, the head of Minatom, said that the military component of the Russian-Iranian nuclear cooperation, mentioned by the president, was exclusively for the delivery of armaments and military equipment to Iran, hoping that in the future Russia would be able to deliver the centrifuge equipment to Iran.<sup>196</sup>

Since 1995, "the Iranian issue" was finally the prism through which the US leadership viewed practically the whole set of Russian-US relations, especially high-tech cooperation.

Despite the Russian refusal to cancel nuclear cooperative programs with Iran, Warren Christopher, the US Secretary of State, while speaking at the hearings of the Budget Appropriations Committee of the US Senate, called for the legislators not to decrease the level of US assistance to Russia. He said, "I know that it is very tempting to discontinue or cut these programs in order to punish Russia for doing something that we are against. I am in favor of increasing pressure to the maximum extent. However, I have studied our assistance programs and me to a conclusion that it is senseless to cut them."<sup>197</sup>

On June 29 and 30, 1995, in Moscow the Gore-Chernomyrdin commission discussed not only the nuclear aspect of the Russian-Iranian cooperation, but the topic of Russian deliveries of conventional weapons to Iran as well. The Russian Prime Minister promised that Russia would stop further deliveries of modern weaponry to Iran, having already honored the obligations of the contracts signed on December 31, 1999. While the members of the commission agreed that cooperation with Iran should not lead to Iran acquiring the technological capability to develop its own nuclear weapons, no concrete decisions were made. The US representatives repeatedly stressed that the very fact the Russian-Iranian cooperation existed was dangerous and

promised to hand over more intelligence data documenting its concerns over Russia's intentions at the following meeting.<sup>198</sup>

In December 1995, a month before a meeting of the Gore-Chernomyrdin Commission, Russia agreed to limit its nuclear cooperation with Iran to the delivery of one reactor with fuel to the Bushehr power plant and the training of power plant personnel (later this obligation was termed "Bushehr only"). Russia's obligation became an element in a more broad network of economic and political agreements, one of which was the obligation of the Clinton administration not to introduce sanctions for nuclear cooperation with Iran,<sup>199</sup> stipulated by the *Iran-Iraq Arms Nonproliferation Act*.<sup>200</sup> Despite the confidential character of the Gore-Chernomyrdin agreement, this fact was known both to some Russian Duma deputies and the representatives of the US Congress.<sup>201</sup>

The Iran-Iraq Nonproliferation Act, effective since October 1992,<sup>202</sup> presumed imposing of sanctions against firms and countries delivering "destabilizing numbers and types of advanced conventional weapons,"<sup>203</sup> however, it failed to define this concept and that gave the US president an opportunity to interpret it and decide whether sanctions should be imposed. To a large extent, this made the law a bargaining chip for the US administration and a lever to pressure Russia, which could have obliged Russia to limit cooperation with Iran.<sup>204</sup>

Unilateral economic sanctions became an inalienable part of the US diplomacy since the end of the cold war. During Clinton's first term as president (1993-1996), he introduced sanctions against 35 countries containing about 42% of the world's population.<sup>205</sup> In October 1998, unilateral US sanctions were in effect against 73 countries.<sup>206</sup>

Different economic sanctions against Iran were in place since the "Islamic revolution" of 1979. In the early 1990s, US sanctions started to be extra-territorial: the Iran-Iraq Arms Nonproliferation Act was adopted in 1992, the Iran-Lybia Sanctions Act, stipulating the imposition of sanctions against foreign companies investing in oil and gas industries in Iran and Libya was adopted in 1996, the Iran Nonproliferation Act was adopted in 2000, which stipulated the

introduction of US administrative, financial and economic sanctions against foreign individuals and legal entities, if there was "credible information" that they transferred technologies for the production of weapons of mass destruction to Iran.

After Russia took an obligation to limit its cooperation with Iran, the topic of the Russian-Iranian nuclear cooperation virtually disappeared from Washington's official declarations. The US government preferred that the public not focus on this before the presidential elections, still putting the topic on the agenda of bilateral meetings and meetings of the Gore-Chernomyrdin Commission. Simultaneously, according to the formal agreement between the Russian Prime Minister and the US Vice President, Bill Clinton's administration vetoed any attempts by the Congress to terminate or cut economic assistance to Russia or impose sanctions for continuing military and technical cooperation and nuclear energy cooperation with Iran.

In February 1996, the US Congress adopted a law linking the amount of economic assistance to Russia and the President's conclusion on whether Russia "terminated implementation of arrangements to provide Iran with technical expertise, training, technology, or equipment to develop a nuclear reactor, related nuclear research facilities or programs." The law stipulated the withholding of half of the amount of assistance to Russia until the president submitted a written conclusion to the Congress, but gave a veto power as well. According to this rule, in May and November, 1996, May and November, 1997, the president decided not to decrease the level of economic assistance to Russia.<sup>207,208</sup>

In September, 1997, during the meeting of the Gore-Chernomyrdin Commission, Viktor Mikhailov, the Russian Minister of Nuclear Energy, suggested that the US develop a joint control system for the Bushehr power plant, so that there would be no suspicion of nuclear materials diversion for military purposes during the fuel reloading or reactor operation.<sup>209</sup> The Russian suggestion was not coordinated with the AEOI and it caused extreme dissatisfaction in Iran. Later the new Minister of Nuclear Energy, Mr. Adamov,

confirmed the suggestion "to jointly control the Iranian cooperation." However, the US declined the Russian offer.<sup>210</sup>

On July 28 1998, a week after Iran tested the *Shihab-3* missile with a 1,200 km range, Bill Clinton signed Executive Order 13094 amending Executive Order 12938 of November 14 1994. This Executive Order broadened the framework of cooperation with Iran subject to sanctions. "Nuclear and missile exports" were added to exports of goods and services used in developing chemical and biological weapons. Also, the number of sanctions was increased: denial of the US government assistance, a ban on the importing of goods, technologies and services from a foreign legal entity facilitating proliferation of nuclear weapons.

According to the approved Executive Order, in July 1998, sanctions were imposed on seven Russian institutes and companies, suspected in exporting missile components and technologies to Iran.<sup>211</sup>

In November 1999, during bilateral meeting in Kuala-Lumpur (Malaysia) held simultaneously with the OPEC summit, Albert Gore, the US Vice President, informed Russian prime minister, Yevgeny Primakov, about the facts of illegal cooperation of two Russian institutes with Iran in the sphere of nuclear technologies: the Research and Development Institute of Power Engineering (NIKIET) and the Moscow Chemical and Technological Mendeleev University (RHTU). In the middle of December, the US officials declared that very soon sanctions might be imposed on these two institutes. According to these officials, NIKIET and RHTU were caught red-handed transferring technology for the production of heavy water and nuclear-grade graphite.<sup>212</sup> The issue of Russian technology deliveries to Iran was discussed on December 11-12, 1998, during a visit of Stroube Talbott, the US Deputy Secretary of State, to Moscow. According to Mr. Talbott, the problem of transfers of sensitive nuclear technology from Russia to Iran was "getting worse, not better."<sup>213</sup>

On January 12, 1999, Samuel Berger, the US President's National Security Advisor, declared that sanctions were being imposed

on three more institutes, including NIKIET and RHTU.<sup>214</sup> According to the sanctions:

- no department or agency of the United States Government may procure, or enter into any contract for the procurement of, any goods, technology, or services from any foreign person subject to the sanctions;
- no department or agency of the United States Government may provide any assistance to any foreign person or organizations subject to the sanctions; and no such foreign person shall be eligible to participate in any assistance program of the United States Government;
- the Secretary of the Treasury shall prohibit the importation into the United States of goods, technology, or services produced or provided by any foreign person subject to the sanctions.<sup>215</sup>

Robert Galucci, President Clinton's Special Envoy, refused to give examples of Russian organizations violating international non-proliferation agreements, according to which sanctions were imposed. Explaining his unwillingness to share his information, Mr. Galucci said that the Clinton administration conducts a dialogue with the Russian government through diplomatic channels. That is why, according to him, the US does not want to disclose the information gathered from different, including intelligence sources. At the same time, the official representative of the White House assured that Washington presented Moscow with concrete facts demonstrating illegal behavior of the three institutes.<sup>216</sup>

Robert Galucci gave to understand that in addition to the sanctions against private companies the US administration planned to use other levers against the Russian government. For example, he did not exclude that Washington may reconsider the agreement on the Russian quotas for commercial satellite launches with the Russian rocket boosters.<sup>217</sup> According to the US Department of State estimates, the Russian budget earned \$1.7 billion USD from commercial launches in the 1990s.<sup>218</sup>

The Iranian and Russian reactions to the sanctions were similar. The representative of the Iranian embassy in Moscow refuted categorically the assertions about nuclear

energy cooperation with the three Russian institutes. According to him, the Iranian side cooperates with RHTU only "in terms of student education." As for the other two institutes, which were on the US list as well, "Iran had no information about these organizations."<sup>219</sup> The representatives of the sanctioned institutes categorically denied accusations of violating Russia's international obligations in the sphere of missile and nuclear technologies nonproliferation.<sup>220</sup> Mr. Sarkisov, the RHTU rector, said, "The Russian Chemical and Technological Mendeleev University has never had and does not plan to have business contacts with Iran in the sphere of nuclear energy."<sup>221</sup> When the sanctions were imposed, there was one Iranian student at the university who was getting ready to defend his thesis on polystyrol synthesis. That has nothing to do with nuclear issues.<sup>222</sup>

The official statement of the Russian Ministry of Foreign Affairs concerning the sanctions imposed said that "a check made by the Russian intelligence services demonstrates that the accusations were not grounded at all. All activities of these legal entities are in full conformity with Russian legislation and its international obligations in the sphere of missile and nuclear nonproliferation. (...) Any attempts to speak with a language of sanctions and pressure are absolutely unacceptable. The present US actions can only complicate the Russian-US relations. Of course, they will not be left unanswered."<sup>223</sup>

The statement of the Center for Public Relations of the Russian Federal Security Service said that "We consider it necessary to announce that the necessary checks were conducted at all three organizations. As a result of thorough work, it was established that there are no violations of the requirements of international export control regimes over the proliferation of weapons of mass destruction and missile vehicles in these organizations. It is the Federal Security Service's opinion that the decision on the sanctions against these organizations demonstrates a biased attitude of the US side to the Russian state organizations cooperating with foreign countries, including the Islamic Republic of Iran. Simultaneously we hope that this situation is a misunderstanding or, perhaps, oversight of the US intelligence

agencies. This circumstance should not influence the process of making important decisions influencing the relations between Russia and the US."<sup>224</sup>

On January 20 1999, the Russian State Duma adopted a statement "On the US Imposing Sanctions Against Some of the Russian Research Centers and Higher Education Institutions." The statement said that "the State Duma declares its categorical disagreement with the US attempts to use the topic of nonproliferation of weapons of mass destruction as a means to exercise political pressure on particular states and voluntary limiting international economic and research relations. Washington's inability to normalize relations with Iran and a number of other states cannot be the basis to curtail Russia's friendly relations with these states. (...) The State Duma addresses the president of the Russian Federation and the Government of the Russian Federation with a suggestion to develop and implement measures to counteract the steps made by the United States of America which damage the interests of the Russian Federation."<sup>225</sup>

The reaction of the Russian government was more restrained and careful. Russian Prime Minister, Yevgeny Primakov, said that the position will be defined "after appropriate study." He refused to give more detailed comments, saying that he "has to study the information on the question."<sup>226</sup> This reaction meant that the prime minister does not exclude the possibility that the institutes violated the national export control regime. First Vice Prime Minister, Yury Maslyukov, (who oversaw export controls) was more direct, saying that accusations against Russia are not always fair,<sup>227</sup> however, some of the cases presented by the US were true.<sup>228</sup>

Later, high ranked representatives from Minatom recognized that both institutes cooperated with the AEOI. In 1996, NIKIET signed a contract with the AEOI to examine a plan to build a plant for producing heavy water.<sup>229</sup> Simultaneously, the institute was preparing contracts to deliver light water and heavy water research reactors to Iran,<sup>230</sup> however, the Russian government did not authorize the deal.<sup>231</sup> Mr. Nigmatullin, the Russian Vice Minister for Atomic Energy,

confirmed that "Russia conducted negotiations to construct a nuclear research center in Iran, also negotiations were underway to deliver heavy water and light water reactors. However, they were terminated." Mr. Nigmatullin named NIKIET as one of the negotiators.<sup>232</sup>

According to Mr. Adamov, Minister of Nuclear Energy, RHTU presented Iran with general nonclassified information on the heavy water production technology.<sup>233</sup>

At the moment of imposing sanctions, NIKIET was involved in a number of joint research projects with the US national laboratories within the framework of cooperation with the US Department of Energy. Beginning in 1992, the institute was funded for the renovation and modernization of the Russian RBMK nuclear reactors.<sup>234</sup> It was planned that, in 1999, international funds will be involved in deeper estimations and upgrading the safety of the Kursk nuclear power plant, where four power units with RBMK-1000 reactors are operating.<sup>235</sup> All in all in 1999 NIKIET planned to get \$5 million USD for the joint Russian-US projects. According to some estimates, termination of the funding from the US Department of Energy forced NIKIET to discontinue providing salaries to about 500 of its employees.<sup>236</sup>

The termination of the Russian-US cooperation, in which NIKIET was involved, turned to be painful not only for the Russian institute, but for some US national laboratories. The US Department of Energy asked the Department of State to exclude the program for upgrading reactor safety from the sanctions.<sup>237</sup> However, the decision to ban any joint project between NIKIET and any US organization was kept in place.

RHTU suffered from the sanctions less, however, it lost some of the programs and grants.<sup>238</sup> In January 1999, 15 RHTU students had internships in the US universities. As a result of the sanctions, the student exchange program was terminated.<sup>239</sup> Also, a number of RHTU students, graduate students and faculty members had grants from US organizations. These grants were terminated after the sanctions took effect. A number of contracts between RHTU and US organizations were terminated. According to

Mr. Sarkisov, the Rector of the Institute, "the damage to the university is significant."<sup>240</sup>

The introduced sanctions, despite their "unexpectedness" for Russian agencies, could have, nevertheless, been forecasted. The name NIKIET was repeatedly on the list of organizations, which could be the next "victim" of the sanctions. After economic sanctions were imposed on seven Russian enterprises, in July 1998, Mr. Adamov, the Minister of Nuclear Energy, trying to avoid sanctions against the institute, ordered the curtailment of all contacts with Iranians.<sup>241</sup>

On April 17, 1999, Mr. Adamov suggested the US to lift sanctions off NIKIET and RHTU in exchange for the institutes' refusal to cooperate with Iran.<sup>242</sup> It was planned that Russia and Iran would try to work out an agreement on this topic by the time Yevgeny Primakov, the Russian Prime Minister, visits Washington. Minatom has prepared their suggestions for the US side. However, the visit has been canceled. On April 24, 1999, on the way to the US the Russian Prime Minister ordered "a U-turn" after was informed that NATO started bombing Yugoslavia.

After Mr. Primakov's visit to the US was canceled, the Adamov-Holum commission was entrusted with regulating the situation. The commission held several meetings, however, no practical solutions were suggested. Urgent measures taken by the NIKIET leadership (for example, holding a seminar on export controls together with the US experts in September 1999, signing personal statements not to have unauthorized contacts with Iranians during employment with the institute and at least for five years after leaving the institute by all experts who had contacts with Iranian experts or who might be of interest for Iran) have not become the solution of the problem as well.<sup>243</sup>

In April 2000, the US Department of State has lifted sanctions off from *INOR* and *Polyus* (the sanctions were imposed in July 1998 because of the alleged deliveries of missile components). Sanctions against NIKIET and RHTU were left effective.<sup>244</sup>

NIKIET's cooperation with Iran has attracted the attention of not only the US side, but the Russian law enforcement agencies as well. The

Russian Prosecutor General has opened a case based on article 189 of the Criminal Code of the Russian Federation on the alleged illegal export to Iran in 1996–1997 by NIKIET's officials of scientific information which can be used to produce weapons of mass destruction. However, after Mr. Adamov resigned in March 2001, the criminal charges were dropped.<sup>245</sup>

The example of NIKIET and RHTU has demonstrated that despite the Russian government efforts to toughen control over the exports of dual technologies, the functioning of the export control system was not highly effective, and coordination of activities of the Russian agencies was low.

After the inauguration, Russian President Vladimir Putin suggested that Russia would have broader relations with the rest of the world than it was during his predecessor's presidency. Russia has initiated active steps to restore and enlarge the relations with traditional satellite countries of the Soviet period, as well as with some of the so called rogue states, which the US blames for assisting terrorism, or for the aspiration to have own weapons of mass destruction, or for both altogether.<sup>246</sup>

As a result of the fact that not all military equipment on the contracts signed in 1989–1991 was delivered to Iran by December 31, 1999, (which was stipulated by the Gore-Chernomyrdin agreement), these deliveries continued in 2000, despite Washington's extremely negative reaction.<sup>247</sup> On March 14, 2000, Secretary of Russian Security Council Sergei Ivanov announced that Russia would honor contracts with Iran to deliver weaponry, which were signed prior to 1995. It is true, however, that Mr. Ivanov clarified that Russia and the US achieved mutual understanding that for a time being Russia would not sign any new contract to deliver armaments to Iran, however, would continue to fulfill the contracts signed before the Gore-Chernomyrdin statement in 1995.<sup>248</sup>

In parallel, the Russian leadership started to rethink its views on limiting cooperation with Iran and sound a possible US reaction out on Russia's withdrawal from Gore-Chernomyrdin agreements. On March 31, 2000, Russian Acting President Vladimir Putin said, "Minister [Adamov] mentioned our

cooperation with Iran and accusations of the Ministry for alleged violations of particular state obligations. Here I would like to tell you: unconditionally, we will fight for the Russia's interests on the world markets. (...) But, on the other hand, if we took any obligations, we should follow them. If we don't like them, we should seek revoking them."<sup>249</sup>

It is interesting that the Russian leaders made these two statements about the cooperation with Iran as if "in passing."<sup>250</sup> In March 2000, Sergei Ivanov mentioned it in his speech to the MGIMO students, while Vladimir Putin made it in Snezhinsk.

After some doubts, sometime late spring and early summer 2000, the Russian leadership has finally decided to withdraw from the 1995 agreements. Speaking at the meeting in Nizhny Tagil on July 14, 2000, the Russian President announced that Russian has already informed the US partners that it does not consider itself confined by the obligations of the Gore-Chernomyrdin agreement. President Putin drew attention to the fact that "limiting the armaments trade, some other previous contracts signed by the previous leadership – is this useful for Russia? No, it is not. (...) They were signed on a lap. Basically, it is about Iran. I have to say that we have informed our partners that we do not consider ourselves confined by these obligations, as we think that they are used not in the interests of the world security, but in the interests of competition. (...) It is a pity that the agreements were signed."<sup>251</sup>

As a result of the consequent dialogue, the Russian and US foreign affairs agencies, seemingly, have reached an agreement that Russia will not officially announce its withdrawal from Gore-Chernomyrdin agreements on the eve of presidential elections in the US, and the US administration, in its turn, will not impose sanctions on Russian companies. There were a lot of formal reasons for Russia to withdraw from the agreement. Articles 5 and 7 of the Gore-Chernomyrdin agreement allowed it. Article 5 allowed reviewing the agreements if political situation in Iran changes, and this was recognized by both President Clinton and Secretary of State Madeleine Albright. Article 7 allowed it if the other members of the Wassenaar agreements

review their approach to Tehran.<sup>252</sup> However, after the US press reported on the details of the Gore-Chernomyrdin agreements, the Russian Minister of Foreign Affairs Igor Ivanov has officially announced Russia's withdrawal,<sup>253</sup> and in December 2000 the Russian Minister of Defense Igor Sergeev had negotiations in Tehran on enlarging the Russian-Iranian military and technical cooperation.

Igor Ivanov's announcement caused a resonance in the US, which was mainly due to three circumstances. First, there was electoral campaign in the US, second, the Middle East conflict escalated and a large scale war was about to break out, third, the Russian foreign policy in the South became more active. The main idea of the statement of the Russian Minister was that Russia announces the beginning of a new foreign policy that would be based on Russia's interests first, and not the US interests, as it was before.

In parallel with the Russian-US discussion on Moscow's withdrawal from the Gore-Chernomyrdin agreements, a sharp discussion over the delivery of the Russian laser equipment to Iran broke out.

Scientific and Technical Center for Microtechnologies which is a structural part of the state enterprise *Efremov* Electrophysical Equipment Scientific Research Institute, has signed a number of contracts on the delivery of laser equipment for the Tehran University laboratory. The equipment planned for delivery to Iran was not controlled by the lists of the Nuclear Suppliers Group (according to the lists, only lasers with over 40W capacity are subject to controls, whereas according to the contract, 15 to 20W lasers were to be delivered to Iran.<sup>254</sup>

In July 2000, during the G-8 meeting in Japan, Bill Clinton asked Vladimir Putin to terminate the deal on delivering laser equipment to Iran. According to President Clinton, there is a risk of using this equipment to enrich uranium up to weapon grade.<sup>255</sup> This question was discussed during the meetings between the US Energy Secretary Bill Richardson and the Russian minister of nuclear energy Evgeny Adamov, US Vice President Albert Gore and Russian Prime Minister Kasyanov, US President

Clinton and Russian President Putin at *the Millenium Meeting*. As a result, Russia has agreed to suspend the delivery. Mr. Bospalko, the Russian Ministry of Atomic Energy Press Secretary, said that since the question is sensitive, "especially for the US, two commissions, Russian and US, will consider whether this delivery is possible."<sup>256</sup>

The subsequent investigation demonstrated that the equipment that was planned to deliver to Iran couldn't be used to create nuclear weapons. At the same time, the institute has violated the Russian legislation while exporting the laser equipment. It was decided to ban the delivery of the laser equipment to Iran.

It is noteworthy, that the 2000 election in the US was not the first time when "an Iranian card" was played. In 1980, an unsuccessful operation to free employees of the US Embassy (who were held as hostages) in Iran has cost a second presidency to US President Carter.

The election of George W. Bush has not made the Russian-Iranian cooperation less important for the Russia-US relations. Already during the first meeting with the Russian President Vladimir Putin in June 2001, George W. Bush raised the issue of Russian-Iranian cooperation in the sphere of nuclear energy. Just before the meeting the US press reported about the details of the Russian-US consultations on the delivery to Iran of Russian highly durable aluminum used for planes and which, according to the US side, could be used to manufacture enriching centrifuges. According to the US officials, the aluminum is intended to manufacture rotating vanes of a centrifuge.<sup>257</sup>

The shipment of aluminum became the next step in a number of arguments around Iran. The issue of aluminum delivery was discussed repeatedly before the meeting of the presidents: during the meeting between the US National Security Adviser Condoleezza Rice and Russian Security Council Secretary Sergei Ivanov, and during the meeting between US Secretary of State Colin Powell and Russian Minister of Foreign Affairs Igor Ivanov.

The US pressure has increased significantly after the tragic events of September 11, 2001

in the US and the beginning of the antiterrorist operation in Afghanistan. The topic of nonproliferation became the main theme of discussions in Moscow during the visits in September and early December 2001 and in February 2002 of the US Undersecretary of State John Bolton and Secretary of State Colin Powell. The representatives of the new US administration trying to convince Russia to terminate its cooperation with Iran, put forward exactly the same arguments as Bill Clinton's administration over six years ago, "Iran is a lot closer to Russia than to the US."<sup>258</sup>

The situation of late 1994 and early 1995 started to develop again: broadening of the Russian-US cooperation in the hi-tech sphere and Russia's acceptance to international organizations were linked to Russia terminating its partnership with Iran in the nuclear sphere and military and technical cooperation.<sup>259</sup>

The Russian side once again, as it was before President Clinton's visit in May 1995, was ready for the compromise on the Iranian topic. In November 2001, in his interview to the US media Russian President Vladimir Putin signaled that he did not exclude the possibility of a deal according to which Russia would discontinue selling armaments to Iran, "If our Western partners have any suggestions to compensate our losses resulting from the termination of our activities in the sphere of military and technical cooperation, we may consider them."<sup>260</sup> That is why it is possible to suggest that, as it was six years ago, the Russian-Iranian cooperation may become an element in the broad network of economic and political agreements between Moscow and Washington.

As of now, despite the numerous statements of Russian leaders, including the President, Moscow's position with regard to broadening Russian-Iranian interaction remains unclear. It is hard to say whether the Russian leadership is ready to cancel multibillion cooperation with Iran - military, technical and nuclear energy - for the sake of improving relations and broadening economic partnership with the US. However, it is possible, if the US would suggest considerable enlargement of joint projects in the hi-tech sphere.

## Conclusion

At present the level of development of Iranian nuclear program excludes the possibility of developing nuclear weapons in this country. Despite the numerous statements of the US officials, until now there was no compelling evidence that Iran has military nuclear program. At the same time, Iran's numerous attempts to acquire installations which can be used to produce weapons grade nuclear materials are alarming. So, it looks rational to limit the Russian-Iranian cooperation in the sphere of nuclear energy to constructing light water reactors in Iran, which is, in fact, done now. Russia should link broadening of cooperation between the two countries with increased transparency of Iran's nuclear energy program, especially, with Iran signing an additional protocol on IAEA safeguards.

The Russian-US consultations and the work of different bilateral commissions did not result in mutually acceptable solutions on the Iranian issue, which seriously complicated relations between the two countries in the second half of 1990s, distracting time from joint work on more demanding issues. Nor acceptable level of trust was reached on the question of information exchange on Iran's "nuclear" file. Constant US pressure on Russia on the Iranian topic did not help to improve bilateral Russian-US relations and caused strong irritation in Moscow. However, it is noteworthy that sanctions imposed on the Russian institute and the consequent criminal charges against NIKIET и NIIEFA to a large extent increased discipline and selectivity of Russian enterprises exporting sensitive technologies.

<sup>1</sup> Scott Jones, Terell Austin. Rasprostranenie Sanktsiy: Iran i Rossiisko-Amerikanskii Otnosheniya. *Eksport vooruzhenii*. (Proliferating Sanctions: Iran and the Russian-US Relations. *Armaments Export*). 2001. №3, May-June.

<sup>2</sup> Anton Surikov and Igor Sutyagin. Yaderny Tabachok – Vroz. (Nuclear "Tobacco" Separately). *Segodnya*. 1995, June 30. P. 9.

<sup>3</sup> World Oil Market and Oil Price Chronologies: 1970–2000, [www.eia.doe.gov/emeu/cabs/chron.html](http://www.eia.doe.gov/emeu/cabs/chron.html).

<sup>4</sup> Ayatollahi Mohamed Sadegh. Iran Replies to the Risk Report; Denies It Wants the Bomb. *Risk Report*. 1996. Vol. 2, No. 1, January-February. P. 2-3. [www.wisconsinproject.org/countries/iran/denies.html](http://www.wisconsinproject.org/countries/iran/denies.html).

<sup>5</sup> Anthony Cordesman. Weapons of Mass Destruction in Iran. – In: Center for Strategic and International Studies. 1998, 28 April. P. 23.

<sup>6</sup> In 1977, Iranians were the largest foreign student community in the US. According to the US DOS estimates, somewhere between 30 to 40 thousand Iranians studied in the US colleges. Also, Iran's ambassador to the US, Iran's prime minister and 9

cabinet members had their education in the US universities (The US and Iran, An Increasing Partnership. Addressed by Sydney Sober, US State Dpt. – In: Washington D.C. Symposium on "Iran in the 80's.", [www.sedona.net/pahlavi/us-iran.html](http://www.sedona.net/pahlavi/us-iran.html)).

<sup>7</sup> The first AEOL president Akbar Etemad studied in France, at the National Nuclear and Technology Research Institute in Saklei; in Switzerland, at the Lozanna Polytechnical University and Federal Nuclear Research Institute (Iran's Atomic Energy Program, [www.iranbooks.com/atomener.htm](http://www.iranbooks.com/atomener.htm)). His successor Reza Amrollahi studied at Texas University specializing in nuclear physics, and then interned at Belgian Nuclear Research Center in Mol (Greg Gerardi, Aharinejad Maryam. An Assessment of Iran's Nuclear Facilities. *Nonproliferation Review*. 1995, Spring-Summer. Vol. 2, No. 3. P. 211, [cns.miis.edu/pubs/npr/iranuc23.htm](http://cns.miis.edu/pubs/npr/iranuc23.htm)).

<sup>8</sup> Iran's Nuclear Ambitions. *Jane's Intelligence Review*. 1995, 1 June.

<sup>9</sup> Ansari Mostafa Taqizadeh. A Glance at History of Transfer of Atomic Energy to Iran. *Iran (Morning Daily)*. 1995, 27 May, [www.netiran.com/Htdocs/Clipping/Deconomy950527XXDE02.html](http://www.netiran.com/Htdocs/Clipping/Deconomy950527XXDE02.html).

<sup>10</sup> Ibid.

<sup>11</sup> EURODIF Company Links, Shareholders of Eurodif SA. 1999, 9 May, [www.antenna.nl/wise/uranium/eceud.html](http://www.antenna.nl/wise/uranium/eceud.html).

<sup>12</sup> Timmerman Kenneth. Iran's Nuclear Program: Myth and Reality. *Iran Brief*. 1995, 30 September. P. 3, [www.iran.org/tib/krt/castigliocello.htm](http://www.iran.org/tib/krt/castigliocello.htm).

<sup>13</sup> Ibid.

<sup>14</sup> Roland Timerbaev. Gruppya Yadernykh Postavschikov: Istoriya Sozdaniya. (Nuclear Suppliers Group: Genesis) (1974–1978). Moscow, PIR Center, 2000. p. 65.

<sup>15</sup> Betsy Perabo. A Chronology of Iran's Nuclear Program. Monterey Institute of International Studies. 1995, 25 September. P. 5.

<sup>16</sup> Ibid.

<sup>17</sup> The US and Iran, An Increasing Partnership. Addressed by Sydney Sober, US State Dpt. – In: Washington D.C. Symposium on "Iran in the 80's.", [www.sedona.net/pahlavi/us-iran.html](http://www.sedona.net/pahlavi/us-iran.html).

<sup>18</sup> Betsy Perabo. A Chronology of Iran's Nuclear Program. Monterey Institute of International Studies. 1995, 25 September. P. 5.

<sup>19</sup> National Security Study Memorandum (NSSM) 219. National Security Council, 1975, March 14, [www.ford.utexas.edu/library/document/nsdmnssm/nssm219a.htm](http://www.ford.utexas.edu/library/document/nsdmnssm/nssm219a.htm).

<sup>20</sup> National Security Study Memorandum (NSSM) 219. National Security Council, 1975, March 14; NSSM 292. 1975, April 22; NSSM 324. 1976, April 20, [www.ford.utexas.edu/library/document/nsdmnssm/nsdm.htm](http://www.ford.utexas.edu/library/document/nsdmnssm/nsdm.htm).

<sup>21</sup> Pehlavi Mohamad Reza. Answer to History. N.Y.: Stain and Day, Publisher, 1980. P. 177.

<sup>22</sup> Ivan Safranchuk. Yadernye i Raketnye Programmy Irana i Bezopasnost' Rossii: Ramki Rossiisko-Iranskogo Sotrudnichestva. *Nauchnye Zapiski PIR-Tsentra*. (Iran's Nuclear and Missile Programs and Russia's Security: The Limits of the Russian-Iranian Cooperation. *PIR Center Scientific Notes*.) 1998. № 8. p. 6.

<sup>23</sup> Vladimir Kucherenko. AES – na Eksport (Nuclear Power Plants for Export). *Rossiiskaya Gazeta*. 2000, October 19.

<sup>24</sup> Data differ in this regard. According to Perabo Betsy (see endnote<sup>15</sup>), the first unit was completed at 75–85%, the second – at 40–70%; according to Koch Andrew, Wolf Jeanette (see endnote<sup>35</sup>), the first unit was ready at 90%, the second – at 50%; according to Cordesman Anthony (see endnote<sup>5</sup>), the first unit was ready at 75%, the second – at 60%.

<sup>25</sup> A letter from Dr. M.S. Ayatollahi, International Relations Advisor of Atomic Energy Organization of Islamic Republic of Iran to the editor of PPNN Newsbrief. *PPNN Newsbrief*. Winter 1990/1991. P. 11.

<sup>26</sup> *IAEA Newsbrief*. 1987. Vol. 2, No. 15, 25 November.

<sup>27</sup> We are still confident in Bushehr. "Atompress" interview with deputy minister Yevgeny Reshetnikov. *Atompressa*. 1999, December 8.

<sup>28</sup> Ayatollahi Mohamed Sadegh. Iran Replies to the Risk Report; Denies It Wants the Bomb. *Risk Report*. 1996. Vol. 2,

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- <sup>29</sup> Anthony Cordesman, Abraham Wagner. *Lessons of Modern War*. Vol. II: The Iran-Iraq War Boulder, CO: Westview Press, 1990. P. 520.
- <sup>30</sup> *Nuclear Engineering International*, April 1988.
- <sup>31</sup> *PPNN Newsbrief*. Winter 1991/92. P. 4.
- <sup>32</sup> *PPNN Newsbrief*. First Quarter 1995. P. 16.
- <sup>33</sup> Testimony of Paul Leventhal on the U.S.-China Nuclear Cooperation Agreement Presented to the Committee on International Relations U.S. House of Representatives, 7 October 1997, [www.nci.org/pl10797.htm](http://www.nci.org/pl10797.htm).
- <sup>34</sup> According to some data, China participated in the Center construction, which begun together with France (was open in 1984).
- <sup>35</sup> Koch Andrew, Wolf Jeanette. Iran's Nuclear Facilities: a Profile, 1998, [cns.miis.edu/pubs/reports/pdfs/iranrpt.pdf](http://cns.miis.edu/pubs/reports/pdfs/iranrpt.pdf).
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- <sup>37</sup> Abbas Maleki. Iran and Russia: Neighbors Without Common Borders. In: Gennady Chufirin (ed). *Russia and Asia. The Emerging Security Agenda*. SIPRI. 1999. P. 181.
- <sup>38</sup> Timmerman Kenneth. Iran Shows Its Soviet Sympathies. *Wall Street Journal*. 1989, 10 March.
- <sup>39</sup> Ibid.
- <sup>40</sup> On June 3, 1989, ayatollah Homeini, Iran's spiritual leader and an inspirer of the "Islamic revolution died after the heart stroke. During the visit to the USSR Ali Akbar Hashemi-Rafsanjani, in fact, was an acting head of the state. On July 28 he was elected president of the country. He had 95% of the votes.
- <sup>41</sup> Andrei Ivanov, Judith Perera. Russian-Iranian Nuclear Cooperation. 25 June 1998, [www.oneworld.org/ips2/june98/18\\_19\\_076.html](http://www.oneworld.org/ips2/june98/18_19_076.html).
- <sup>42</sup> Andrei Baranovski. Rossiiskie Energostroiteli Budut Dostraivat' Iranskuyu AES. Iran Reanimiruet Svoyu Energeticheskuyu Programmu (Russian Energy Construction Workers will Finish Iranian Nuclear Power Plant. Iran Revives Its Energy Program). *Segodnya*. 1995, June 10. P. 3.
- <sup>43</sup> Andrei Ivanov, Judith Perera. Russian-Iranian Nuclear Cooperation. 25 June 1998. [www.oneworld.org/ips2/june98/18\\_19\\_076.html](http://www.oneworld.org/ips2/june98/18_19_076.html).
- <sup>44</sup> PIR Center press conference "Russian-Iranian nuclear cooperation and export controls", National Press Institute, November 25, 1998.
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- <sup>53</sup> Olga Antonova. Velikiy Atomnyi Put' (The Great Nuclear Path). *Vremya Novosti*. 2000, October 16, [www.newstime.ru/cgi-bin/print/2000/147/2/1554.html](http://www.newstime.ru/cgi-bin/print/2000/147/2/1554.html).
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- <sup>60</sup> Scott Jones, Terell Austin. Rasprostranenie Sanktsii: Iran i Rossiisko-Amerikanskije Otnosheniya. *Eksport vooruzheniy (Proliferation of Sanctions: Iran and Russian-US Relations. Armaments Exports)*. 2001. № 3, May-June.
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- <sup>70</sup> We are confident in Bushehr. "Atompressa" interview with deputy minister Reshetnikov. *Atompressa*. 1999, 8 December.
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- <sup>75</sup> In agreement with Minatom, in 1998 "Zarubezhatomstroii" and "Atomenergoexport" have merged into one company, "Atomstroieksport" which assumed full responsibility for all contracts and agreements.
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  - Two employees of a defense research institute were convicted for attempting to sign a contract with a foreign firm to develop electronic equipment for self-guided missiles;
  - A member of the Iranian military delegation Aziz Masud was expelled from Russia for attempting to get technical materials on aircraft from a Russian citizen;
  - It was detected that Iranian industrial group "Sanam" intended to order the production of parts for a missile engine at NPO "Trud" under the guise of gas pumping equipment; "Sanam" is barred from any activities in Russian;
  - A group of specialists from one of the leading Moscow institutes stopped developing missile technology materials with a view to hand it later to Iran;
  - A shipment of contraband improved steel manufactured in Russia was stopped on the Azerbaijani-Iranian border.
- Russia strictly conforms to all international obligations, adopted in the framework of MTCR, Center for Public Relations of the Federal Security Service of the Russian Federation said. *ITAR-TASS*. 1998, 14 May.
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- <sup>161</sup> Steve Rodan. Iran Paid \$25m. For Nuclear Weapons, Documents Show. *Jerusalem Post*. 1998, 10 April, *www.jpost.co.il/com/Archive/10.Apr.1998/News/Article-2.htm*.
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- <sup>163</sup> Vladimir Orlov, Nikolai Sokov. (Eds.). *Yademoe nerasprostranenie (Nuclear Nonproliferation)*. Moscow, PIR Center, 2000. P. 179.
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- <sup>223</sup> Press center of the ministry of foreign affairs of the Russian Federation, 13 January 1999.
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- <sup>227</sup> Radio of Russia, 15 January 1999.
- <sup>228</sup> Howard Diamond. U.S. Sanctions Russian Entities for Iranian Dealings. *Arms Control Today*. 1999. Vol. 29, No. 1, January/February, [www.armscontrol.org/ACT/janfeb99/rufj99.htm](http://www.armscontrol.org/ACT/janfeb99/rufj99.htm).
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**Yaderny Kontrol (Nuclear Control)**  
**Journal of the**  
**PIR Center for Policy Studies**  
**Volume 8, No. 5,**  
**September–October, 2002**

**Vitaly Fedchenko** and **Dmitry Kovchegin** in their article «**The impact on global security of the decisions made in Kananaskis**» speculate on the importance of creation of the «Global Partnership Against the Spread of Weapons and Materials of Mass Destruction» declared on the G8 summit in Kananaskis, Canada. Authors analyze this general effort, its background and interrelations with the CTR program, which is already being implemented for a decade, and with the new initiative, «Global Coalition Against Catastrophic Terrorism», launched recently by the Sam Nunn and Richard Lugar. The study of the documents adopted in Kananaskis allows authors to conclude that, since Russia was recognized on the G8 summit as one of the major participants of the global antiterrorist effort, it has now to take the full responsibility for the dismantlement of the redundant Soviet Cold War arsenal and to earmark for this dismantlement as much resources as it possible under current conditions.

In the article by **Yekaterina Stepanova** «**The Illicit Drug Trafficking in Afghanistan and Central Asia Within the Context of the Anti-Terrorist Campaign**» the illicit trafficking of Afghani originated drugs is analyzed as a part of a more fundamental problem – that of formation of a regional shadow economic system with its center in Afghanistan and linked with it social & political structures, undermining the legal economy and formal institutions of the state power in the region's countries, including the states of Central Asia. Along with a sad state of the economy, distress of the population and corruptibility of the state machinery, the *vacuum of security*, having arisen in the region, is considered to be one of the main reasons of reorientation of a part of Afghani and Pakistani drug flows to the Central Asia. In the article an interdependence between the illicit drug trafficking and conflicts is investigated: on the one hand, the armed conflicts are becoming an auspicious medium for the growth of drug business (which is at the same time becoming an efficient economic means of adaptation of various groups of the population to unstable or conflict conditions), and on the other hand, at a certain stage the drug business itself becomes a source of non-stability.

**Vladimir Novikov** in his article «**Missile & Nuclear Non-Proliferation. The Issue of Iran**» states that Russia's cooperation with Iran in the nuclear field, the relatively close military &

technical relations between the two countries, on the one hand, present certain opportunities for consolidation of mutually advantageous bilateral economic ties, make for establishing of good-neighbor relations between the Russian Federation and Iran, one of the leading countries of the region. On the other hand, one should not forget of the potential of the conflict of interests around the Caspian oil. But in that case, too, it seems to be of importance to avoid drastic changes in the character of the two states' cooperation in aforementioned fields. A significant reduction of cooperation in the nuclear field (under the US pressure), without presenting any convincing evidence of military orientation of the nuclear program of Iran, could be considered by the state as a manifestation of hostile policy, as a threat to the country's national security. In their turn, the Iranian leaders might undertake unilateral asymmetric response measures (that would hardly meet Russia's national interests) and try to choose other partners. The latter could lead to complication of Russia's relations not only with the Islamic Republic of Iran peculiarly, but also with some other influential members of the world's community.

**Alexei Krasnov** in his commentary «**Iranian Issue in Russia-US Dialogue on Missile Non-Proliferation**» states that in 1996-1997 within the framework of bilateral contacts with the USA the Iranian theme began to sound more and more actively in connection with the anxiety caused by probable (or as if having taken place) cases of missile technologies leakage from Russia to Iran. In autumn 1997 a format of dialogue on this subject was authorized by a decision of the presidents of Russia and the USA. The Russian Space Agency was charged of carrying on the work from the Russian side. Since 2000 the Russia-US dialogue on the issues of export control has practically come to naught, although the Russian party, in spite of so essential negative consequences of the former experience, considers such a dialogue to be on the whole useful and necessary. One could hardly expect that the variance in interpretation of the MTCR requirements implemented through the prism of absolutely different (in Russia and the USA) approaches to commercial and economic relations with the Islamic Republic of Iran could be removed without working out of a compromise mutually acceptable to the both countries. The current situation with the absence of a dialogue for removing the tension linked with the subject does not give any reasons for a vital optimism. The paradox is that the attitudes of the leaders of both Russia and the USA, concerning the matter of non-proliferation, are identical. Russia reasonably considers the creation of MDW missile delivery systems by the Near and Middle East countries to

be at variance with our national interests, making a potential threat to our national security. The point does not concern Iran alone. It also relates to other states of the region, including Israel, which is engaged in active cooperation with the USA in the missile sphere, in spite of its refusal to join the international non-proliferation regimes. And at this point our attitudes diverge, because we don't cooperate with Israel, too, since the cooperation could make for creation or perfection of MDW missile delivery systems in that country.

**Vitaly Tsygichko** and **Vladimir Dyachenko** in their review «**The Non-Lethal Effect Weapons**» report that «today, along with conventional arsenal for armed fight, there is a need in means capable of carrying out of specific tasks in local conflicts, peace-making missions and police operations, etc. without causing, at the same time, of serious human losses and significant material damage to the enemy and especially to the peaceful population. The availability of such kind of means, called *the non-lethal effect weapons*, would allow the states to reach their goals in such case as the use of conventional arms is unacceptable by political and ethical reasons. Besides, the non-lethal effect weapons could be used as *an intensifier of fighting power*, being applied in military operations in combination with conventional arms, that could essentially change the correlation of forces between the combatants.»

**Roland Timerbaev** in his article «**Leo Szilard and the International Control for Atomic Energy**» tells about the role of a pioneer Leo Szilard in the development of international control for atomic energy. He went down in history not only as a great physicist of the XX century, who was at the cradle of discovery of the secrets of making nuclear weapons, but also as a man of keen intellect, who at the same time gave the humanity a key to solving the problem of getting rid of the weapons so that the atom could serve peaceful purposes alone. The exclusive role of Scillard in initiation of works on the uranium problem is acknowledged by everybody. One could say without any exaggeration that without the initiative of Szilard the atomic weapons would hardly appear during the World War II, and nobody knows when it could be made at all and what would be its first uses – military or peaceful.

In the post-war time Leo Szilard with indomitable energy went on pursuing his mission on advancement of the concepts of international control for atomic energy. The man, who was the first to agitate the world with his prediction of inevitable downfall of civilization, if the Hitlerite Germany takes the lead over the anti-Hitler coalition in making nuclear weapons, now just in the same way, consistently and vigorously, sought

after formation of a new situation in the world, so that the nuclear weapons would be outlawed and put under the strict international control.

Szilard had faith in the great power of cooperation between the scientists of the USA, USSR and other countries in solving the historic task. He took part in organization of the Pugwash movement, which made for signing the Limited Test Ban Treaty, the Nuclear Non-Proliferation Treaty and the Anti-Ballistic Missile Treaty.

**Yaderny Kontrol (Nuclear Control)**  
**Journal of the**  
**PIR Center for Policy Studies**  
**Volume 8, No. 6,**  
**November–December, 2002**

The head of the State Commission for Chemical Disarmament **Sergei Kirienko** in his interview **«Russia fulfills its obligations on the destruction of chemical weapon arsenals»** gives a short description of actions undertaken by the government for the disposal of chemical weapons under Russia's obligations to the Organization for the Prohibition of Chemical Weapons.

The chief of the Peter the Great Strategic Missile Forces Military Academy, **Yuri Kirillov** in his interview **«It is possible that the time has come to raise a question about legitimizing nuclear deterrence»** comments about the inevitability of continuing nuclear deterrence between the US and Russia. He suggests legitimizing the existence of deterrence in international documents to exclude any possible misunderstandings, in international relations, that could lead to a major international crisis, as well as to establish an effective system of control over the disarmament process in Russia and the US.

**Bobo Lo** in this analysis **«Evolution and Continuity: Russian Policy towards East Asia»** lays out his views on relations between Russia and East Asia and, particularly, with China. He draws attention to Russian arms exports to China and stresses that the arms, which Russia is exporting to the PRC, may later be used against its own forces.

However, within the last few years, Mr. Lo states, Russia has "reopened" relations with East Asian states. During this time, the idea that positive cooperation and not blind deterrence better answer Russian interests in the sphere of defense and foreign politics has been gradually winning in political debates. As the number of top-level visits to China has multiplied over the past decade, so has the number and scale of bilateral agreements. Warnings about the possibility that Russian-made weaponry might be used against Russian forces

have, in significant measure, moved to geopolitical and economic arguments. There are, as well, deep convictions that the Russian defense establishment is substantially superior to that of the Chinese. It can be expected that the military exports will increase because, in the estimation of the author, it is the best tool Russia has for expanding its influence in the Asian-Pacific region. That is a goal that President Putin will not abandon even if the greatly more optimistic scenario appears on the horizon of forming a partnership with the West.

**Elina Kirichenko** in her article **«The Missile Technology Control Regime: Challenges and Questions to Be Answered»** tells that export control and, specifically, the MTCR (being one of the components of the international regime of WMD non-proliferation), had a serious impact on the system of international relations, and particularly on Russia-US relations, in the second half of 1990s. The phenomenon can be explained by a number of factors, not the least of them being linked with the fact that national systems of export control cannot be unreceptive to the general economic and political situation in a specific country or worldwide. In these circumstances, a question arises on the efficiency of the missile technology control regime. There exist objective factors of economic, political and institutional character, that are undermining its efficiency.

Russia has developed its own national export control system and, over the last few years, the system has improved significantly. Like other countries, Russia is now facing a dilemma – how can it balance its international obligations for limiting exports of controlled items with its economic interest in promoting its aerospace products on the world market. The global system for the non-proliferation control of missiles and missile technologies, proposed by Russia, gives a basis for discussion.

**Dmitry Kovchegin** in his article **«The Taxation of Grant Funds Allotted In the Framework of the US/Russia Cooperation in the Field of Non-Proliferation»** points out that «the taxation of grant funds allotted to Russia in the framework of international programs of support, or their exemption from taxes, is one of the chief problems in carrying out international cooperation in the field of non-proliferation. This is especially true if one takes into account the significant scale of the aid allotted to Russia, its importance to the joint projects and the necessity of using the aid in the most efficient means possible.

The Russian legislation foresees a number of privileges, concerning taxation of funds allotted to the support programs, however, some of its provisions need amending or re-consideration. At

the same time the re-consideration of Russian legislation needs to be accompanied by redistribution of grant funds between Russia and the USA in order to remove the existing unbalance as, at present, more than a half of the allotted monetary resources are spent in the USA or for American participants of the cooperative projects.»

**Vladimir Orlov** in his commentary «**The UN gives the Go Ahead for Disarmament and Non-Proliferation (DNP) education**» states, that «in November 2000, the General Assembly, acting on the advice from the Advisory Board on Disarmament Matters, adopted unanimously the resolution entitled “United Nations Study on Disarmament and Non-Proliferation Education” (55/33 E of 20 November 2000). In it, the Assembly requested the Secretary General prepare a study, with the assistance of a group of qualified governmental experts, for consideration at its fifty-seventh session (in 2002).

During the last two years, a group of government representatives from Egypt, Hungary, India, Japan, Mexico, New Zealand, Peru, Poland, Senegal and Sweden discussed the project, which was prepared according to instructions from the General Secretary of the UN.

Following the session, the participants of the expert group analyzed the official information on DNP supplied by 25 UN member-states as well as information from 72 educational, research and non-governmental organizations, located in 41 different countries, which had responded to an unofficial survey circulated by the UN.

After two years of work of evaluating the problem of disarmament and nonproliferation education in the world, after many hours of debating about the correlation between “disarmament” and “nonproliferation” and lengthy revisions, on July 26 of this year, the final text of the document was agreed upon. In August, it was presented to UN Secretary General Kofi Annan.

The 30-page document contains 8 chapters:

- Introduction
- Definition of contemporary Disarmament and Non-Proliferation(DNP) education & training
- Assessment of existing experience in DNP education and training
- Education and training in DNP at all levels
- Ways to utilize evolving pedagogic methods, particularly the revolution in information and communications technology
- Ways to introduce DNP education and training into post-conflict situations as a contribution to peace building

- Coordination among the United Nations and other organizations with special competence in disarmament, non-proliferation and
- Promotion of disarmament and non-proliferation education and training; practical recommendations.

The first seven chapters have a strict analytical character and the eighth issue consists of 34 practical recommendations addressed to the UN, its institutes, member-states, journalists and non-governmental organizations.

The main conclusion of the report is that “There has never been a greater need for education in the areas of disarmament and non-proliferation.... Education and training remain important but underutilized tools for promoting peace, disarmament and non-proliferation”.»

**Mikhail Gerasim** in his commentary «**“Operation Vinca” as a new vector for Russia-US cooperation in nonproliferation**» states, that «Russia-US cooperation in the field of weapon-grade nuclear materials removal is one of the effective means by which both countries can achieve the goals of nonproliferation and confront the threat of nuclear terrorism. On August 22, 2002, the US Department of State, with support from Minatom and the US Department of Energy, succeeded in removing 5046 units of fresh nuclear fuel, containing 817 kilos of highly enriched uranium, from the “Vinca” Research Institute.

This operation is a shining example of successful international cooperation. The removal of the nuclear materials was conducted within the framework of a trilateral agreement between the US, the IAEA and Russia.»

Before the breakup of the Soviet Union All-Union Research Institute of Molecular Biology, which is known now as SRCVB “Vector,” studied extensively basic patterns of the structure and function of special viral pathogens, their pathogenesis and natural diversity. In his report «**The State Research Center of Virology and Biotechnology “Vector” and international nonproliferation assistance programs to Russia**» the director of SRCVB “Vector,” **Lev Sandakhchiev**, relates to our readers new facts on the activities of his Center, as well as on financial and organizational issues of his fundraising efforts. These efforts are substantially important, because they eventually help to prevent “brain drain” from the Center, and, therefore, prevent the spread of the information and expertise which could be useful for the terrorists or “states of concern” in obtaining of the biological weapons.

