Asymmetric Response vs. the Strategic Defense Initiative

A. Kokoshin

Andrei Kokoshin, Member of the Russian Academy of Sciences.

The "asymmetric response" to the US Strategic Defense Initiative (SDI), put forward by US President Ronald Reagan in 1983, was one of the most interesting examples of complex politico-military strategy (comprising diplomatic, political and propaganda activity, as well as concrete programs for the development of weapon systems and an appropriate scientific and technical base).

On March 23, 1983, R. Reagan proposed creating a system that would have capability to intercept and destroy incoming nuclear ballistic missiles to prevent detonation over the US or the territory of US allies. R. Reagan urged American scientists to develop a system that would make nuclear weapons obsolete and unnecessary. Two days later the White House issued National Security Decision Directive 85 ("Eliminating the Threat from Ballistic Missiles") that made provisions for administrative and financial support for the SDI program. This document established a Defensive Technologies Executive Committee chaired by Paul Thayer.

On January 16, 1984, Ronald Reagan issued Presidential National Security Decision Directive 119 establishing the Strategic Defense Initiative (SDI) to explore the possibility of developing missile defenses as an alternative means of deterring nuclear war. On March 27 of the same year, U.S. Secretary of Defense Caspar Weinberger, following recommendations from a special committee, established the Strategic Defense Initiative Organization (SDIO) to oversee the program, which was headed by Lt. General James Alan Abrahamson, USAF. It included the following areas of research: creation of systems to detect and track strategic missiles at any stage of their flight amid decoys and jamming; development of interceptor missiles to counter enemy strategic intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs); research into directed energy weapons; space based ICBM and SLBM interceptor satellites; development of fundamentally new command and control systems; creation of electromagnetic guns; and creation of an effective space transport and delivery system surpassing the shuttle program.

Before long, this R&D program began to be implemented intensively, especially in so far as concerned all sorts of demonstration tests.*

Components of the Soviet "asymmetric strategy" were being developed at a number of scientific research centers, both at the USSR Academy of Sciences and at departmental facilities (e.g., the Central Scientific Research Institute of Machine Building (TsNIIMASh) at the USSR Ministry of General Machine Building, led by Iu.A. Mozzhorin and V.M. Surikov; the TsNIIMASh worked in close interaction with the Fourth Central Scientific Research Institute of the Defense Ministry and a number of other scientific research institutes of the USSR Defense Ministry and research centers affiliated with the USSR Academy of Sciences).

Substantial work on formulating the "asymmetric response" concept and strategy was conducted on an inter-disciplinary basis by a group of scientists and specialists led by Academician E. P. Velikhov, vice president of the USSR Academy of Sciences. Some of that work was classified, while some of it was available in the public domain. It was a unique inter-disciplinarian community, comprising physicists, mathematicians, chemists, rocket scientists, space engineers, political analysts, economists and career military officers.**

It must be said that at the time, there were quite a few influential advocates of a "symmetric" approach to the SDI program in the USSR. That was why it took some time before an underlying "ideology" and specific forms of the "asymmetric response" were adopted.

The essence of the "asymmetric response" was to ensure the infliction of "unacceptable damage" even in the context of a multi-tier missile defense system deployed by the US (including space based components), with a variety of "exotic" missile defense systems (directed energy weapons, neutral particle accelerators, free electron lasers, excimer lasers, X-ray lasers, electro-dynamic mass accelerators, electromagnetic guns, etc.). Various scenarios were considered for a massive use of nuclear weapons first to deliver effective disabling strikes, incapacitating the adversary's nuclear strategic and command and control

---

* On June 10, 1984, an ICBM was intercepted over the Pacific at an altitude of 160 km.

On September 6, the Mid-Infrared Advanced Chemical Laser destroyed a Titan booster rigged to simulate the conditions of a thrusting rocket booster. Some US scientists expressed doubts about the practical value of the experiment, suggesting it was, rather, a propaganda stunt.

On June 27, 1986, an imitation warhead was intercepted in the atmosphere.

On September 11, 1986, SDIO completed what was the first equivalent of a boost phase intercept of a target. On November 4, 1987, a Patriot with the PAC-2 modifications successfully destroyed another Patriot missile that was simulating the flight of an SS-23 missile.

** At the early stages of research it included a number of members of the USSR Academy of Sciences, such as Z.I. Alferov, Iu.V. Guliaev, V.I. Gol'danskii, N.V. Karlov, G.A. Nikolaev, Iu.A. Osip'ian, N.A. Plate, B.V. Raushenbakh, K. Rebane, R.Z. Sagdeev, and V.E. Fortov, as well as other scientists.

systems. Computer simulation played an important role there.

The strategy of "asymmetric response" to the SDI program stipulated a broad array of measures to enhance the combat effectiveness and survivability of the Soviet strategic nuclear forces (the invulnerability of ICBMs, strategic missile carrying submarines, strategic aviation, the reliability of the nuclear forces command and control system, as well as of the state command and control system as a whole), and on the other hand, their ability to overcome multi-tier missile defenses.

The military strategic, operational and tactical assets and procedures were integrated into a single complex, ensuring a sufficiently powerful retaliatory strike even under the most unfavorable circumstances created as a result of massive pre-emptive strikes against the Soviet Union (including the use of the so-called Dead Hand system, an ICBM launch system that, in the event of a decapitation of the top leadership after the first strike, will provide for an automatic retaliatory launch of all missiles non-destroyed by the attacker). It was very important not simply to develop all that "for a rainy day" (which could become the last day for both sides), but also to demonstrate it to the opponent at a certain moment in a carefully dosed degree, using the art of the "strategic shield." Furthermore, it had to be done in such a way as to make it credible both for the "political elite" of the opposing side and for its specialists, including top notch experts on strategic stability as a whole, as well as on its specific technical and operational and strategic components, who would have immediately spotted any tricks, elements of deception, etc. (It should be noted that the American expert community greatly exceeded the Soviet in terms of personnel numbers and resources; we had to compensate for that with a greater intensity of work.)

The US had a big head start in interdisciplinary studies on those issues, a substantial part of which were published in the scientific and expert community and were generally available in the public domain. Closely attached to that community was also a group of reporters writing on the subject at hand, who played a significant role in shaping public opinion. On the Soviet side, however, such journalists were few and far between. The Soviet Union had almost no tradition in open publications on such subjects, revealing the results of its own scientific and research projects. There were only a few studies of US views on problems of nuclear deterrence and strategic stability (above all, works by A.G. Arbatov and a team of researchers at the Russian Academy of Sciences World Economics and International Relations Institute, who worked under his general supervision).

Meanwhile, classified studies on problems of nuclear deterrence (institutes under the General Staff of the USSR Armed Forces, the Strategic Missile Forces, TsNIIMASh, the section of applied problems at the USSR Academy of Sciences, Arzamas 16, in the town of Nezhinsk, etc.) rarely addressed politico-psychological aspects.

Measures under the "asymmetric response" strategy also included special assets and methods of countering enemy missile defense systems. A number of especially vulnerable components of the US's potential missile defense system were identified (primarily in space based elements), which could be disabled not only through direct physical destruction, but also by means of electronic warfare (EW). These included a variety of ground, sea, air and space based assets using kinetic energy (missiles and shells), laser and other forms of high-energy emission as a damage producing element. It was noted that active counter measures were especially effective against elements of space based components of the missile defense system, which had for a long time been in orbit with known parameters, which substantially simplified the task of their neutralization, suppression and even complete physical elimination.

For example, the system of space based battle stations was especially exposed to impact from a broad array of active counter-measures. In so far as space stations were designed to effectively engage strategic ballistic missiles, specially created small missiles of various basing types, which would be used in combination with various means of concealment and deception, were regarded as an effective means of destroying such stations. Those small missiles were to feature a high thrust to weight ratio to pass through the atmosphere as quickly as possible and to minimize the active section of the flight path. They were also to be protected against laser radiation. It was noted that prototypes of such systems already existed in the USSR.

Another potentially effective means of actively countering and neutralizing a large number of space based combat stations could be the so-called space mines, or satellites put into orbits close to the orbits of the adversary's space based combat stations and armed with a sufficiently powerful explosive charge, which could be set off by remote command from ground control. Such "mines" could be equipped with various types of detonators, in particular thermal or mechanical impact detonators.

High power ground-based lasers were also regarded as potentially effective means of active counteraction. Such lasers are considerably easier to build than those used in space battle stations, which are designed to destroy ballistic missiles in flight. In the "laser vs. missile" and "laser vs. space platform" confrontation, the latter has an obvious advantage. This is due to a number of reasons. First, space based combat stations are physically larger than ICBMs (SLBMs), which makes it easier to aim the laser beam and effectively engage them. Second, the number of such stations would be considerably smaller than the number of targets (ICMBs, SLBMs or their warheads) to be effectively engaged during their massive launch or in flight. This virtually eliminates the problem of super quick re-targeting of the laser beam. Third, space based combat stations remain within the field of vision of a ground-based laser system for a relatively long time, which makes it possible to considerably increase the time of exposure (to 103 s), and therefore, lower the requirements for its power. Furthermore, weight, dimension, energy, efficiency and other limitations, characteristic of space based combat systems, are far less substantial with respect to ground-based systems.

One of the reports presented by a group of Soviet scientists and researchers led by E.P. Velikhov, also said that combat stations could be effectively countered with obstacles in their orbits, created by a cloud of tiny objects ("shrapnel") moving at a substantially higher speed in relation to the station. The most appropriate targets for this form of counteraction are such vulnerable elements of combat laser stations as fuel tanks, power systems, and reflecting mirrors. Dispersion in orbit of a small cloud of even microscopic particles can create defects on the surface of a reflecting mirror, preventing the focusing of the laser beam of the adversary's space based combat stations.

It was noted that weapons including ground based excimer lasers with mirrors deployed in geo-stationary and low earth orbits could be effectively disabled by dispersing light materials with a high capacity to absorb laser radiation in close proximity to the mirror or laser deployment area.

As for possible measures of countering the deployment in space of nuclear pumped X-ray lasers, it is important to note the following. In accordance with one of the SDI concepts, the US side proposed putting them into orbit at the very last moment, with the help of submarine launched ballistic missiles. Such SLBMs would have to be deployed in seas and oceans, close to USSR borders (putting lasers into orbit from US soil could be ineffective since it would require considerable time to deliver them to altitudes ensuring optimal impact on ICBMs in flight). Calculations showed that, if launched from US soil, even booster rockets with the highest thrust to weight ratio could not lift a laser to the necessary altitude (up to 3,000 km) before the end of the active phase of ICBMs (SLBMs) launched by the opposite side. Therefore, SDI planners were considering schemes for the deployment of X-ray lasers aboard submarines in the northern part of the Indian Ocean or the Norwegian Sea.

It was noted that the most vulnerable elements of space based systems would be missile defense detection, aiming and guidance systems. They could be "blinded" by a nuclear explosion in the upper reaches of the atmosphere, among other things. Finally, traditional EW methods, used against space based missile defense elements, could substantially affect the system's effectiveness.

In a special report, Soviet scientists concluded: "A brief overview of possible measures to neutralize and suppress a large scale missile defense system with space based offensive weapons shows that it is not at all necessary to put forward the task of destroying it completely. It is enough to weaken such a missile defense system by impacting on its most vulnerable elements, making a 'breach' in it to ensure the infliction of unacceptable damage in a retaliatory strike."

Alongside the work on the "asymmetric response" to the SDI program, this group of Soviet scientists and researchers also studied climatic and medico-biological consequences of nuclear war, as well as measures to effectively monitor nuclear underground tests. This research was conducted in parallel with what was being done during that period by US and West European scientists who were seriously concerned by President Reagan's bellicose rhetoric and the general worsening of the Soviet-US relations after a period of d?tente, when through their joint efforts, the Russian and US sides had managed to achieve a substantial strengthening of strategic stability. A substantial scientific study on mathematical simulation of the possible climatic consequences of a nuclear war was accomplished by a team of scientists and researchers at the USSR Academy of Sciences Computing Center, led by V.A. Aleksandrov (under the supervision of Academician N.N. Moiseev, director of the Computing Center).

Significant research on the climatic consequences of nuclear war with on-site experiments was done by scientists at the USSR Academy of Sciences Institute of Earth Physics (G.S. Golitsyn, A.S. Ginzburg, and others). The medico-biological consequences of nuclear war were analyzed by a group of researchers led by Academician E.I. Chazov. 1

The authors of the "asymmetric response" concept acted on the assumption that the confrontation of the two strategies in this major sphere of Soviet and US national security was one of a politico-psychological character (the term "virtual" has been commonly used in the past few years).

One of the most important goals was to convince the SDI advocates in the US that any scenario for building a large scale, multi-tier missile defense system would not give the United States any significant military or political advantage. Therefore, the task was to impact on the US "political class," the American "national security establishment" in such a way as to prevent the US's withdrawal from the 1972 Soviet-US Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty), which had by that time already proven itself as a corner stone of strategic stability in the political, psychological, military and strategic respects. Among other things, it played an important role in averting the arms race in space, imposing significant limitations on the creation of systems that could be used as anti-satellite weapons.

Consideration of a specific political situation always involves an element of simplification, in which an opposing side is regarded as a single whole, as a monolith. This was especially characteristic of Soviet political consciousness, which was under the influence of ideological conceptions about its own as well as the US political system.

But by that time, considerable progress had been made in US studies. Research involved analysis of the relevant works by US specialists, among other things, including experts at the National Academy of Sciences (NAS), the Federation of American Scientists (FAS), the Union of Concerned Scientists (UCS), and a number of other authoritative research centers. Many studies provided well substantiated arguments (based on serious calculations and expert estimates) against the creation of a multi-tier missile defense system. US research was actively used by both opponents and advocates of the SDI in the ongoing political struggle on the issue in the United States.

The architects of the "asymmetric response" strategy and their supporters operated on the premise that SDI proponents in the United States were striving to open a new front in the Soviet-US arms race, assuming that with symmetric efforts by the sides in building a missile defense system, the loser in the economic realm would be the Soviet Union which had a considerably weaker economy. Detailed analysis of the economic aspect of the issue at hand was seriously complicated by the convoluted system of prices for military-technical products that existed in the Soviet Union.

By the time the SDI was officially announced, the sides had 10,000 to 12,000 nuclear warheads on strategic delivery systems each, plus many thousands of warheads on operational tactical and tactical missiles (including the so-called theater assets - 152- and 155-mm munitions for tube artillery on both sides).

It was also a period of the intensive development of precision guided long range conventional weapon systems and high yield non-nuclear warheads, as noted by Army Gen. V.M. Shabanov, at the time deputy defense minister of the USSR (for arms procurement). 2

At the time, the US brought up the question of arming not only long range cruise missiles but also ICBMs and SLBMs with non-nuclear warheads. Both sides had by that time achieved considerable progress in enhancing the accuracy of ICBMs and making the warheads more invulnerable to interception. The higher accuracy of missile warheads once again raised the question of the vulnerability of some components of the Strategic Nuclear Forces, as well as of the command and control system.

Huge resources were being funneled to the development of anti-submarine warfare (ASW) assets, but the development of strategic missile carrying submarines was constantly advancing (the 1970s had seen a sharp increase in the effective range of SLBMs, which greatly expanded the patrolling area for nuclear propelled missile carrying submarines).

It was generally assumed that parity had been achieved by the early 1970s, when the USSR and the US had approximately the same number of intercontinental delivery systems. Having started to equip its ICBMs and SLBMs with multiple warheads a few years earlier, the US had a huge superiority over the USSR in the number of warheads deployed on strategic delivery systems.

In the 1980s, the Soviet Union started modernizing its medium range (intermediate range) and shorter range delivery systems (both in Europe and in the East, primarily in the "Chinese" direction). At the same time, medium range ballistic missiles with single warheads were being replaced with the Pioneer (SS-20) system with three independently targeted warheads. In response, the US and NATO decided to deploy ground based Pershing II medium range ballistic missiles and cruise missiles. The Pershing's short flight approach time, high accuracy and capacity to effectively engage well protected targets (including underground command and control centers) increased the level of threat to the entire state and military command and control system in the USSR.

General N.V. Ogarkov was against the principle of the numerical equality on ICBM warheads, suggesting that it was sufficient for the USSR to have 2,000 to 2,500 nuclear warheads. That number, in his estimate, was sufficient for resisting a preemptive strike and inflicting "unacceptable damage" in a retaliatory strike. The issue was a source of conflict that he had with Defense Minister D.F. Ustinov, a member of the Politburo. N.V. Ogarkov even pushed for a "more restrained" approach toward the creation of new strategic weapon systems only because they were being created by the United States. In conversations with the present author in the early 1990s, N.V. Ogarkov said that in his view, military strategic equilibrium with the United States in the late 1970s-the first half of the 1980s (and later) could have been ensured even without creating certain weapon complexes. N.V. Ogarkov sought optimal solutions in developing the Strategic Nuclear Forces, specifically creating advanced communication, command and control systems, in particular "smart weapons," whose appearance was regarded in the United States as a revolution in the military sphere.*

Unfortunately, N.V. Ogarkov lost in the standoff on these fundamental issues of military strategic and force development to his immediate superior, USSR Defense Minister D.F. Ustinov (L.I. Brezhnev bestowed the rank of the marshal of the Soviet Union on this essentially civilian official), as well as to his first deputy, Marshal of the Soviet Union S.F. Akhromeev, who actively supported D.F. Ustinov.** That loss by N.V. Ogarkov to D.F. Ustinov came at a heavy price to the Soviet Union, which continued the arms race, competing with the United States on all lines while possessing at least half the resources that the US had. The wearing out of the USSR in that arms race (including in the nuclear sphere) became one of the major factors in the collapse of the Soviet economy by the late 1980s and the disintegration of the Soviet state.

Eventually, the "asymmetric response" strategy was formally adopted

---

*"Smart weapons" became a symbol of the American triumph in the war in the Persian Gulf, during Operation Desert Storm in 1991, although its real contribution to the performance of combat missions was substantially smaller than the media claimed. The scale of the use of "smart weapons" increased sharply in the war that the US started in Iraq in 2003. The foundations of the triumph achieved by the United States and its allies had been laid long before the 1991 events, back in the 1970s, immediately after the war in Vietnam. The second half of the 1970s was the most dynamic period in the development and testing of new weapon systems in the United States. The main breakthroughs in this field are generally associated with the activity of Deputy Secretary of Defense William Perry, a civilian scientist and engineer who enjoyed great trust and respect among both leading US congressmen and Secretary of Defense Harold Brown, a well-known physicist.

**It is also essential to take into account the deep conflict that existed between D.F. Ustinov and N.V. Ogarkov over the introduction of Soviet troops to Afghanistan in 1979, which N.V. Ogarkov had strongly opposed - a very courageous stance on his part by contemporary standards.

by the Soviet leadership and declared publicly. But that did not happen all of a sudden, requiring, as mentioned earlier, considerable efforts to convince it about the appropriateness of such a course. In practice, it was followed in a way that was far from consistent: As it turned out later, many things were done, in effect, "symmetrically."

The SDI as proposed by President Reagan evoked not simply a negative reaction from a substantial part of the Soviet leadership (as it well deserved) but a rather nervous and almost hysterical one.3 The SDI was destroying a perception of the world that had just emerged - one of strategic stability that had come to the country's far from young leadership with great difficulty. The level of technical competence in the upper reaches of the state apparatus (except for the Military Industrial Commission of the USSR Council of Ministers, a part of the State Planning Agency, or Gosplan, and the defense industry department at the CPSU Central Committee) was rather low. (Remember that the Soviet leadership also had trouble understanding the destabilizing role of the missile defense systems 4 in the late 1960s-early 1970s, as was evident at the Soviet-US summit in Glassboro in 1967, when A.N. Kosygin, chairman of the USSR Council of Ministers, rejected the logic and proposals by US Secretary of Defense R. McNamara.) Reagan's comments about the Soviet Union as "an evil empire" and the US's active support for the mujaheddin in Afghanistan* were also a factor there. Instinctively, many state, party and military leaders, as in previous years, were more inclined to respond in kind, adopting symmetric measures (although at the time there was a growing understanding that the next round of the arms race involving the development and production of super-costly systems using new physical principles would be beyond the USSR's means).

A number of Soviet specialists (including military experts) were saying off the record that the SDI was a lot of bluff, but few dared say that loud and clear even at conferences on the problem that were held behind closed doors.

On the whole, the "asymmetric response" strategy did have the political effect it was designed to produce. The Americans chose not to pull out of the ABM Treaty at the time, while funding for the SDI program was not pro-

---

*Another contributory factor was that despite the apparent prevalence of McNamara's ideas about "mutual assured destruction," both sides in reality were intensively developing systems to effectively engage the adversary's strategic nuclear forces and the capability for nuclear war, which meant primarily disabling the opposite side, neutralizing its nuclear capability. Today there is every reason for saying that while Soviet representatives sometimes outdid the US in rhetoric with respect to the possibility of "victory" in a full-fledged nuclear war, the US was, as a general rule, ahead in developing a variety of destabilizing systems of preemptive strikes. In the early 1980s, there were numerous "leaks" in the US media about various options for US disabling strikes against the USSR.

vided on the scale that its advocates had hoped for.

During B. Clinton's first term in office, the SDI was quietly removed from the list of DoD programs although many R&D projects on missile defense continued.

In the course of their presentations in the United States, visiting Soviet scientists and military experts were often asked the question: If you are so sure that you can neutralize a multi-tier missile defense system with your asymmetric measures, why then are you so opposed to the system? The answer was usually along the following lines: First, we do not want an arms race even in the asymmetric option, since it is also rather burdensome; second, due to the special importance of the politico-psychological factors (especially in crisis), even the illusion of invulnerability (to a weakened retaliatory strike) within the leadership of a country possessing a large scale missile defense system can be extremely dangerous.* In crisis, such illusions can dangerously escalate nuclear confrontation with attempts to ensure military superiority.

This issue has once again become relevant in light of attempts by the administration of George Bush Jr. to create a multi-component missile defense system and at the same time develop strategic offensive weapons so as to weaken Russia's retaliatory capability (let alone China, which has a considerably smaller nuclear capability).5

NOTES

1 Chazov E. I., Ilin L. A., Gus'kova A. Iadernaia voina: mediko biologicheskie posledstviia. Tochka zreniia sovetskikh uchenykh medikov. M., 1984; Klimaticheskie i biologicheskie posledstviia iadernoi voiny (pod. red. E. P. Belikov). M., 1986.

2 Kokoshin A.A.. V poiskakh vykhoda. Voenno politicheskie problemy mezhdunarodnoi bezopasnosti. M., 1989.

3 As Academician G. A. Arbatov writes in his memoirs, US President R. Reagan, in assessing the reaction of Soviet leaders, believed that weapons against which the Russians were so strongly protesting could not be all bad. According to G. A. Arbatov, such a surge in hysteria on the Soviet side only convinced Washington that "we are afraid of the SDI" (Arbatov G. A. Chelovek sistemy. M., 2002, p. 265).

---

* The prospects for building a grouping of Russian strategic nuclear forces and other nuclear deterrence systems depend, among other things, on the structure and composition of the missile defense system that the United States intends to develop in the foreseeable future. What is especially important here is a serious scientific, multi-variant forecast for the development of missile defense systems in the United States in the next 20 to 30 years. Various official and semi official documents suggest a return to the idea of creating a space based platform (multiple tiers) of a missile defense system in addition to ground, sea and air components. The main task of space based assets is to ensure the interception of ground and sea launched ballistic missiles at the initial, boost phase of their flight, when they constitute the most vulnerable target. Such vulnerabilities are minimized in ballistic missiles with a shortened boost phase (e.g. the advanced Russian missiles Topol-M and RS-24.

4 In the late 1950s-early 1960s, both the US and the USSR were conducting intensive work to develop missile defense systems, including with the use of nuclear warhead interceptors. That was, in particular, a priority project at the well known Design Bureau 11 in the town of Sarov (later VNIIEF). At the same time, Soviet nuclear arms specialists were developing warheads for strategic ballistic missiles capable of surviving the impact of a nuclear explosion caused by the adversary's missile defense systems (Kulichkov G. D. VNIIEF. Istoricheskii ocherk. 1946-1992. Sarov: RFIaTs - VNIIEF, 1998, p. 92).

It should be noted that alongside the creation of "classic" missile defense systems, in the late 1960s-early 1970s, a number of Soviet scientists came up with the idea of using non-traditional types of weapons, for example, charges and charged particle beams to destroy warheads at the approach to target. Work in this area began but was later deemed unviable and scaled down. Mute witnesses to these efforts are the abandoned installations at a test site near Lake Balkhash, which later became a source of regular complaints from the United States.

Approximately at the same time, i.e., about 10 years before the SDI was announced, first space based missile defense concepts emerged in the USSR under the impact of space technological achievements. This idea was first put forward by Academician G. Budker, but it drew criticism from Academicians L. Artsimovich and B. Konstantinov, and was rejected. Another space based missile defense plan (using space based interceptor missiles) was proposed by Academician V. Chelomei. He presented his concept to L. I. Brezhnev, but after a top level discussion and heated debate, that idea was also rejected. In Academician E. Velikhov's apt comment, these discussions made the Soviet scientific community somewhat immune to "Star Wars" ideas.

5 It is important to note the "trial balloons" flown by the US side with respect to the status of nuclear strategic balance, which, according to some experts, is shifting radically in favor of the United States. (See: Lieber K.A., Press D.G. "The End of MAD? The Nuclear Dimension of US Primacy." International Security, Spring 2006, vol. 4, pp. 7-44). Such trial balloons must not be underestimated.