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U.S.-RUSSIAN COOPERATION CAN REDUCE NUCLEAR RISKS OF SOVIET BREAKUP

INTRODUCTION

The backbone of the former Soviet Union was its military-scientific complex. Pampered and protected by the Soviet *ancien regime*, it remained largely intact as the empire and then the Union itself crumbled. Today the thousands of scientists, technicians, and bureaucrats of this vast weapons complex face drastically reduced funding and in many cases unemployment as Russia's democratic leaders turn their nation's resources away from weapons production and toward investment in consumer-oriented government services and a rapidly expanding private sector.

While this redirection of resources signals the end of a four-decade threat to America, it also creates a host of risks, ranging from Soviet nuclear scientists selling their services to outlaw states like Libya, to the prospect of a vast out-of-work army of influential technocrats seeking the overthrow of Russia's nascent democracy. Secretary of State James Baker reportedly took with him to Moscow last week proposals for alleviating these dangers, including an employment "clearinghouse" for top Soviet scientists. Baker's program, however, does not go far enough. With Russia's democracy facing serious challenges, this is no time for half-measures. George Bush should instruct Baker to push for a plan to employ tens of thousands of Russian scientists and technicians in cooperative scientific research and development programs with the United States. Bush should propose U.S.-Russian cooperation to track down and apprehend scientists who reject alternative employment and sell their services instead to hostile states.

There are good reasons to assist in the demilitarization of Russia through cooperative research and development.[1]

1 Former Reagan Undersecretary of Defense Fred Charles Iklé makes the general case for U.S.-Russian defense cooperation in "Comrades in Arms, the Case for a Russian-American Defense Community," *The National Interest*, Winter 1991/92, p. 22. William S. Lind foresaw U.S.-Russian defense cooperation in "Western Reunion: Our Coming Alliance with Russia?" *Policy Review*, Summer 1989, p. 18.

First, the consequences of a neo-Soviet regime returning to power in Moscow would be grave, perhaps setting the stage for a renewed Cold War and arms race.While cooperative projects with the former Soviet scientific-industrial complex cannot guarantee the success of Russia's democracy, they can help to keep Russia's military intelligentsia employed and occupied in constructive, non-political pursuits.

Second, the danger is real that Soviet nuclear weapons scientists will seek employment with outlaw states trying to develop nuclear weapons of their own. Employment on U.S.-Russian projects offers alternatives to scientists who otherwise might choose this path. A small number inevitably will do so anyway, and hunting down these renegades in fact is another area for possible U.S.-Russian cooperation.

Finally, the military technology sector was the most highly developed in the Soviet economy. It always received top priority in the allocation of resources and talent, and in many areas, such as space science, high-energy lasers, and nuclear propulsion, Soviet scientists led the world. Just as German scientists helped get America's space and ballistic missile programs off the ground after 1945, America could benefit tremendously by tapping the Russian science and technology base as a source of relatively inexpensive advanced technology and scientific talent. This especially is true at a time when such U.S. "big science" projects as space exploration and the Superconducting Supercollider face extinction as a result of federal budget cuts.

Cooperation carries risks. Should democracy fail and militarism return, cooperative efforts could strengthen neo-Soviet military industrial base. As a hedge against this, strict safeguards must be put in place to ensure that money is spent as intended and that the transfer of militarily-sensitive technology, particularly in the early months and years, is kept to a minimum.

Still, all risk cannot be eliminated, no matter what course America chooses. Given this, an attempt to guide the fate of Russia's military-scientific complex through an intensive cooperative program seems a better bet than what one M.I.T. analyst calls the "Yellowstone option"—simply allowing the former Soviet Union to burn and hoping for the best.[2]

Sensitive to the risks involved, bureaucrats in the Pentagon and at the National Security Council so far have managed to block any far-reaching cooperative ventures. But this is no time for timidity. Bush should push aside bureaucratic opposition and propose a program that includes:

Project #1: A U.S.-Russian "alliance-for-science" to put the former Soviet military-scientific complex to work to benefit both countries. This across-the-board program would put Russian research and development facilities to work on fusion energy research, America's Superconducting Supercollider program, joint space projects, and similar ventures;

2 Stephen Van Evera, "Managing the Eastern Crisis: Preventing War in the Former Soviet Empire," Defense and Arms Control Studies Program, Massachusetts Institute of Technology, January 6, 1992.

Project # 2: Cooperation on the Strategic Defense Initiative (SDI). This would allow the Pentagon to purchase from Russian laboratories space nuclear reactors and other hardware and technology and to contract with research and development facilities in the former Soviet Union to speed SDI development;

Project #3: A cooperative intelligence effort to track atomic scientists and prevent them from working for hostile states or terrorist organizations.

Project #4: Cooperative nuclear risk reduction projects. These would include a U.S.-Russian effort to develop the technologies and means to track and destroy atomic warheads in the hands of terrorists or hostile states; they also would include a joint program to develop technologies safely and quickly to decommission nuclear warheads scheduled for elimination.

RUSSIA'S MILITARY-SCIENTIFIC COMPLEX

According to Director of Central Intelligence Robert Gates, nearly one million former Soviet citizens are involved in the production of nuclear weapons. Of these, one or two thousand have the skills to design them.[3] Between three thousand and five thousand are estimated to be experienced in plutonium production or uranium enrichment.[4] Tens or even hundreds of thousands have skills that would be useful to countries trying to build ballistic missiles, and still others are experts in biological or chemical weapons.[5] With the breakdown of central authority in the former Soviet Union, old KGB controls on the movement of military scientists and engineers have grown slack, and press reports are rampant that Iran, Libya, and other countries are attempting to lure these experts into their employ.

Nuclear materials and weapons are produced at up to ten formerly "closed" cities within ex-Soviet borders with science fiction-sounding code names like Arzamas-16, Chelyabinsk-40 and Tomsk-7. None of the cities appeared on any official maps.

Within this former Soviet nuclear weapons complex, spanning six of the former republics, scientists and technicians continue going about their business of designing and fabricating nuclear weapons, producing nuclear materials, and working on safe means of storage and transport.[6] In addition, a vast network of laboratories and research and development centers continues to work on highly sophisticated conventional military technologies including stealth, radars and other detection devices to overcome stealth, and electronic warfare.

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3 U.S. Senate, Committee on Governmental Affairs, Testimony of Robert M. Gates, Director, Central Intelligence Agency, January 15, 1992.

4 Van Evera, *op. cit.* p. 2.

5 See Geralt F. Seib and John J. Fialka, "Scientists of Former Soviet Union Find the U.S. Slow in Putting Out the Welcome Mat for Them," *The Wall Street Journal*, February 3, 1992, p. A14.

6 Kurt Campbell, Ashton B. Carter, et al., *Soviet Nuclear Fission: Control of the Nuclear Arsenal in a Disintegrating Soviet Union* (Harvard University, Center for Science and International Affairs November 1991). See also Thomas B. Cochran and Robert S. Norris, "A first look at the Soviet bomb complex," *Bulletin of the Atomic Scientists*, May 1991.

Overall, Russian weapon procurement is due to be cut by 50 percent this year from the last Soviet budget, and U.S. intelligence officials expect that research and development funds will drop by about 30 percent.[7] This means that many denizens of the Soviet military-scientific complex soon will be scrambling for new means of support, if they are not doing so already. Indeed, there are signs that a number of laboratories are "freelancing." The Kurchatov design lab, not far from Moscow, last year put its *Topaz* space nuclear reactor up for sale in the U.S.[8] There is interest in the purchase within the Pentagon, particularly in the Strategic Defense Initiative Office (SDIO), but so far U.S. officials have not sanctioned the purchase. Last year as well, a consortium of Russian scientists attempted to market peaceful nuclear explosions, but so far have found no takers. American scientists have been approached directly by their Russian counterparts to sell or design and produce new satellites for environmental monitoring.

"Military Bazaar." Of greater concern is that scientists will begin to offer their services outside the West to such countries as Iran, Libya, or North Korea, or to terrorists like Yassir Arafat or Abu Nidal. Another fear is that hard currency-seeking scientists, engineers, or military officers with access to nuclear weapons or components will put them on the open market. While there have been scattered reports of sales of nuclear materials—Representative Les Aspin, the Wisconsin Democrat, called the former Soviet Union a military bazaar where anybody with "enough hard currency in a satchel can get what he wants"—the Central Intelligence Agency has not been able to verify that any sales of nuclear weapons or materials actually have taken place.[9]

Some of the fear undoubtedly is based on deliberate hype. Viktor Mikhailov, a Deputy Minister for Nuclear Power in Moscow, for example, warns that "in the near future we can expect hundreds of big and small Chernobyls," and that Soviet nuclear weapons stockpiles are so enormous that warheads are "sticking out of warehouse windows."[10] Mikhailov, however, has reasons to drum up nuclear fears in the West: he wants to gain exclusive control through his Ministry of the $400 million appropriated last year by the U.S. Congress to help Moscow consolidate and dismantle the Soviet arsenal, and has admitted as much to an American reporter.[11]

Nevertheless, increased risk exists, and indications are that the U.S. is beginning to take the risk seriously. In addition to the $400 million appropriated by Congress, the CIA is drawing up lists of top Soviet atomic scientists.[12] Bush last month dispatched Undersecretary of State Reginald Bartholomew to the Commonwealth of Independent States (CIS) to evaluate the nuclear risks associated with the Soviet breakup and to determine immediate CIS requirements for assistance to reduce risks. As a result, the

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7 U.S. Senate, Committee on Armed Services, Statement of Lt. General James R. Clapper, Jr., USAF, Director, Defense Intelligence Agency, January 22, 1992.

8 "SDIO Still Interested in Acquiring Soviet Space Nuclear Reactor," *Defense Daily*, December 19, 1991, p. 459.

9 Gates testimony, *op. cit.*

10 Fred Hiatt, "A-Arms Chief Says Russia Needs Help," *Washington Post*, February 5, 1992.

11 See William J. Broad, "In Russia, Secret Labs Struggle to Survive, *New York Times*, January 14, 1992. Authors downplaying the threat of nuclear proliferation from the disintegrating Soviet Union include Mark Kramer, "Warheads and Chaos: The Soviet Nuclear Threat in Perspective," *The National Interest*, Fall 1991. Kramer argues that all warheads are well under control.

12 Gates Testimony, *op. cit.*

U.S. will be sending to the CIS containers and rail cars for the safe transport and storage of nuclear weapons and materials.[13] And last week Baker was in the CIS with new proposals, reportedly including the establishment of a jobs "clearinghouse" to match Russian scientists with Western projects in related fields.

More still can be done.

FOUR COOPERATIVE PROJECTS

Through a series of cooperative steps undertaken with the Russians and other successor states to the Soviet Union, the U.S. can address the risks associated with the breakup of the Soviet scientific-industrial complex. These steps would be designed to: 1) alleviate the underlying problem of unemployed defense scientists and other technical workers by offering them alternative employment, 2) increase the ability of Washington and Moscow to track and apprehend dangerous renegade scientists and to respond effectively should nuclear weapons or material fall into the hands of terrorists or hostile states, and 3) help the U.S., Russia and other participating former Soviet states remain at the forefront of science and technology in an increasingly competitive global market. These measures should include:

Project #1: A U.S.-Russian "alliance-for-science" to put the former Soviet military-scientific complex to work to benefit both countries.

After Russia cuts defense procurement by 50 percent and research and development by 30 percent this year, the government plans simply to pay unemployment benefits to the thousands who will be thrown out of work, reasoning logically that paying these workers not to work is better than paying them to work on military projects that drain needed resources. The plan is bold and proper, although any proposal that creates a vast army of intelligent and politically powerful unemployed inherently poses risks to the survival of Russia's democratic government. Here, America can help.

America now is engaged in a wide variety of expensive scientific research and development programs. These include:

- **The Superconducting Supercollider Program**, an $8.2 billion physics research project in Waxahachie, Texas, designed to discover and study the basic building blocks of matter;
- **Fusion power research**, now a $337 million per year program that could grow to billions in coming years; the goal is to develop a commercially viable reactor that generates electricity by tapping the heat from fusing hydrogen and other light atoms, the same type of energy that powers the core of the sun;

13 U.S. Senate, Armed Services Committee, Testimony of Reginald Bartholomew, Undersecretary of State for International Security Affairs, February 5, 1992.

- **Space Exploration,** on which the U.S. could spend half a trillion dollars over the next 30 years, in addition to Space Station *Freedom* costs, to put a manned base on the Moon and astronauts on Mars.

Using only a fraction of the money already allocated for these and other programs, such as environmental monitoring satellites and nuclear-contaminated soil cleanup, the U.S. could contract with the laboratories, design bureaus, and factories of the former Soviet military-scientific complex to support these projects on a massive scale.

According to an unpublished study by scientists at a U.S. national laboratory, the strength of the dollar compared to the ruble makes it very reasonable to employ Russian scientists. The annual salary of a good American scientist, say $100,000 per year, could pay the salaries of roughly 1,000 highly skilled Russian technicians earning 10,000 rubles per year, a decent salary for them. The strong dollar similarly can purchase Russian hardware and the use of Russian facilities. Even assuming that the projections are optimistic, which they probably are since Russians quickly will demand more for their services if there is competitive bidding from various Western sources, Russian research and development services will remain a tremendous bargain compared to comparable Western services for the foreseeable future.

The implications of the national laboratory's study are astounding: for perhaps $5 million in funds already allocated to such U.S. national laboratories, the U.S. could buy from Russia the equivalent manpower and services it needs to fill a $1.5 billion budget gap in the Superconducting Supercollider project, possibly saving it from the congressional budget ax. Even if the real figure turns out to be $50 million, or $500 million, the U.S. would be getting an enormous value for its money. One way to guard against cost inflation would be to contract directly with the Russian laboratories rather than the Russian government. The laboratories are eager for any funding and cooperation with the West to preserve jobs and capabilities. Within the Russian government, however, already there is grumbling that Westerners are not willing to pay what bureaucrats consider "fair" prices for Russian goods and services.

Cheap and Reliable. A joint U.S.-Russian space exploration program offers a similar scale of economies for the U.S. and an opportunity to get America's lagging space program back on track. America's Space Shuttle, never having lived up to its advanced billing, remains an experimental vehicle which provides access to space only at the high cost of about $6,000 per pound. American spacecraft launched on cheap but reliable Russian boosters could reduce U.S. reliance on the expensive and problematic Space Shuttle, and bridge the gap until America's own advanced National Launch System, designed to provide the cheap and reliable access to space once expected of the Shuttle, is available a few years after the turn of the century. America's Space Station *Freedom,* for example, could be designed to be sent into space aboard perhaps four flights, or fewer, of Russia's powerful *Energia* booster instead of aboard seventeen flights of the Space Shuttle.

Using Russian space science expertise and launch systems, the U.S might be able to put its astronauts back on the moon by the end of the decade instead of 2010 or later and on Mars late next decade instead of around 2025.

A broad U.S.-Russian alliance-for-science would have tremendous benefits for both countries. Russia would receive the funds needed to remain a world leader in

science and technology while keeping employed its top scientists, managers, and engineers. America would help prevent instability in Russia and offer alternatives to Russian scientists seeking employment abroad, while obtaining at bargain basement prices the resources needed to complete major science projects that might otherwise be cut back or canceled.

Maintaining U.S. Jobs. By saving such projects as the Superconducting Supercollider and Space Exploration Initiative, a U.S-Russian alliance-for-science will help maintain and create science jobs in the U.S. It also could help the U.S. to outmaneuver Japan and the European Community in the race for global technological leadership.

Such a project, of course, would require the strictest safeguards, especially at first, to make sure that funds are spent as intended and to guard against potentially dangerous technology transfers. This could be accomplished in part by making each participating Russian lab or design bureau answerable directly to an American management team on site in Russia and by providing funds only for short periods at first on a "pay as you go" basis. And until the danger of a Russian counter-revolution dissipates, the transfer of militarily-sensitive technology will have to remain pretty much a one-way street, with America buying Russian technology and services, but keeping to a minimum the U.S. technology transferred to Russia. While politically difficult, this would have to be a cost that Russia accepts in return for America's investment.

Project # 2: Cooperation on the Strategic Defense Initiative (SDI).

With the U.S. and Russia both facing the prospect of missile threats from a lengthening list of countries, strategic defenses are an obvious area of military cooperation. Russian President Boris Yeltsin recognized this in his January 29 proposal for jointly developing and operating a U.S.-Russian global defense system.

Cooperation on SDI would benefit both sides. According to Pentagon sources, the acquisition by the U.S. of advanced technology from Russia and other CIS states could "rapidly advance, at minimum cost" the U.S. strategic defense program. An unclassified Pentagon document identifies 50 Russian technologies that would benefit America's SDI program, including high-speed electric switches known as "tacitrons," electric rocket thrusters, space nuclear power, and liquid fuel rocket engines.

Example: Cooperation on space electric propulsion systems, which could revolutionize space operations by lowering the weight and cost of maneuvering in orbit, could reduce U.S. development costs by 80 percent (from $125 million to $25 million), and halve development time from six or eight years to three or four years for a space electric rocket motor. A similar scale of cost and time savings would accrue from the other proposed cooperative programs. So far, proposals made by the Pentagon's Strategic Defense Initiative Organization to begin buying Russian technology have been stalled by opponents within the Pentagon and National Security Council who are concerned in part that ultimately U.S. military technology will be compromised by any cooperation with Moscow.

Project #3: A cooperative intelligence effort to track atomic scientists and prevent them from working for hostile states or terrorist organizations.

Despite the best efforts of the U.S. and Russia to offer alternative employment to thousands of former Soviet military scientists, some undoubtedly will think they can get a better deal by offering their services to other countries. Those who go to peaceful democratic states like Britain, Germany, or Japan may help those countries compete with the U.S. economically, but pose no security threat. Some former Soviet scientists, however, will be tempted to go to work for Iran, Iraq, Libya, Syria, or other states with which the Soviet Union had close military ties. The scientists could help these countries develop atomic, biological, and chemical weapons as well as ballistic missiles. These states harbor and support international terrorists and themselves pose regional security threats to their neighbors and to America and the West.

Already the CIA is compiling a list of Soviet scientists whose specialized knowledge of weapons of mass destruction would pose a proliferation threat if they were to sell their expertise abroad. If cooperation is possible from the new security services of Russia, which essentially took over the Soviet KGB, the CIA's job would be easier. With its vast international intelligence network, particularly in former Soviet client states where U.S. assets may be limited, Russian intelligence further could help the CIA track the global movements of potentially dangerous Russian scientists—or conceivably even American atomic scientists now out of work as a result of the end of the Cold War.

The CIA even could cooperate with Russian security services in covert operations to track down and apprehend scientists developing weapons of mass destruction for potentially hostile states. Such operations naturally first would have to be approved by the President and by Congress's intelligence oversight committees. If the first few atomic scientists who sell their services to hostile states are dealt with harshly, further such dangerous defections will be far less likely. While covert operations against defecting scientists are a last resort, the U.S. should not hesitate to undertake them, given that the alternative is to help put nuclear and other mass destruction weapons in the hands of the world's Saddam Husseins and Yassir Arafats.

Project #4: Cooperative nuclear risk reduction efforts.

Congress last year appropriated, but the Administration as yet has no firm plans to spend, $400 million to assist the former Soviet republics in dismantling nuclear warheads. The intent of the money is to reduce the risk that the former Soviet states will lose track of weapons, or that hazardous accidents would take place in the process of securing and destroying nuclear warheads. The Pentagon is considering spending some of the money on special warhead storage containers and high-security railroad cars to help Russia secure warheads and transport them safely to locations where they will be destroyed.

Other steps to reduce nuclear risks could include such cooperative actions as:

- **A joint program to develop new technologies for the safe and speedy destruction of nuclear warheads.** Neither side now has the technology in

place to destroy quickly the roughly 15,000 Soviet nuclear warheads promised to be decommissioned under the unratified Strategic Arms Reduction Treaty (START) and non-binding U.S.-Russian agreements to eliminate such tactical nuclear weapons as artillery shells and short-range rockets. Moscow now can destroy an estimated 1,500 warheads a year, at which rate currently planned reductions alone would take a decade. U.S. national laboratories have available about $400 million annually to develop new nuclear disarmament technologies. Joining forces with Russian scientists in this endeavor could cut the cost and time involved in developing new means to quickly and safely decommission the excess warheads of both nations.

- **A joint nuclear emergency response program.** With a heightened danger of nuclear theft and ultimately nuclear terrorism, Washington and Moscow have an interest in developing technologies and forces for rendering harmless nuclear terrorist threats. This would involve cooperation in developing the technologies to locate and destroy stolen or newly fabricated warheads in the hands of terrorists. Joint American-Russian nuclear emergency response teams also could train together and develop tactics for responding militarily to nuclear terrorist threats.

CONCLUSION

The dissolution of the Soviet Union is overwhelmingly in America's interest. Still, it carries undeniable risks. The most dangerous are those associated with the demise of Russia's military-scientific complex, much of which was dedicated to the production of nuclear and other weapons of mass destruction.

As Soviet military research and development programs are scaled back dramatically, thousands of scientists, engineers, technicians, and powerful bureaucrats will find themselves out of work. Incentives will be strong for them to sell their services abroad or to earn extra cash through the sale of sensitive technology or even weapons.

Among the likely bidders for former Soviet talent and technology are such outlaw states as Iran, Libya, and North Korea, and the terrorist organizations they support. In addition, the unemployed Russian military-scientific intelligentsia forms a powerful interest group that could align itself with hard-line communists, reactionary nationalists, and military officers to pose a threat to democracy in Russia and the other former Soviet republics.

Reducing Risks. America can reduce these risks through a series of cooperative projects to employ much of Russia's military-scientific complex in productive pursuits. These should include a broad "alliance-for-science" in such fields as fusion energy, America's Superconducting Supercollider project, environmental monitoring, and space exploration. Strategic defense programs are another natural area of U.S.-Russian cooperation, especially given Yeltsin's recent advocacy of a joint global missile defense system.

Since some Soviet, and perhaps American, scientists are likely to sell their services abroad despite America's best efforts to offer them alternatives, the U.S. and Russia could establish joint intelligence programs to track down and apprehend weapons scientists assisting outlaw states or terrorists. Cooperation in developing new technolo-

gies to decommission nuclear warheads and to respond to nuclear terrorist threats are other areas where the U.S. and Russia can work together.

Keeping Technological Edge. In addition to reducing the risks inherent in the demise of the Soviet Union, cooperative programs will help America reach some of its own scientific and technological objectives. By lowering costs dramatically and eliminating duplication of effort where Russia and the other republics already have made advances, America may be able to move forward with "big science" projects that otherwise might have been canceled. This will save U.S. science jobs and help keep America's technological edge over global economic rivals.

For Russia, cooperation offers the opportunity to remain a world leader in nuclear, space, and other technologies in which a tremendous investment already has been made. Cooperation of course will require strict oversight, including on-site management by Americans to ensure that U.S. dollars are spent as intended, and continued restrictions on the transfer from America to Russia of militarily-sensitive technology.

With these safeguards in place, U.S.-Russian scientific and technological cooperation offers clear advantages for both sides.

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