



Science & Global Security: 30 years on, still a big mission

Science & Global Security marks its 30th anniversary this year. Discussions leading to the journal began in the mid-1980s between Roald Sagdeev, Vitali Goldanski and Sergei Kapitza on the Soviet side and the two of us on the U.S. side. The objectives of the journal from the beginning were to publish high quality technical papers on arms control, international security, and global environmental issues; to open communication between western and Soviet scientists and arms control analysts; and above all, to develop a shared understanding of the technical basis for new policy initiatives to reduce the dangers from nuclear weapons. The journal was to be guided by a board of editors consisting of both western and Soviet scientists and arms control experts.

The Soviet scientists were there to get the journal going. Sagdeev was director of the Soviet Academy of Sciences' Space Research Institute (IKI). Stanislav Rodionov and Oleg Prilutsky, physicists on the staff of IKI, took over from Sagdeev when the journal finally launched in 1989, and they—and now Prilutsky alone since Rodionov's death in 2014—have translated the journal to Russian. The original publisher was Gordon and Breach Science Publishers, which had worked with these Soviet scientists in the past. Martin Gordon was an early advocate of the journal.

The first editor of the journal was Feiveson, with Rodionov and Prilutsky responsible for the Russian edition. The cochairmen were Sagdeev and von Hippel, and the initial board members included John Holdren (later to become President Obama's science advisor); Theodore Postol and George Rathjens from M.I.T; and Goldanski, Kapitza, Andrei Kokoshin and Evgeny Velikhov on the Soviet side. Velikhov, Sagdeev, Kapitza and Kokoshin constituted the leadership of the Committee of Soviet Scientists for Peace and Against the Nuclear Threat, which was established within the Soviet Academy of Sciences in 1983 after President Reagan's Star War speech. All four were heavily involved in Mikhail Gorbachev's daring unilateral initiatives to end the nuclear arms race and the Cold War.

Articles published in the journal over the past 30 years reflect enduring concerns and commitments to advance the technical basis for global security. After Andrei Sakharov died in December 1989, the journal reprinted his little-known article of 1958 arguing against atmospheric testing of high-yield nuclear weapons because of the huge quantities of radioactive carbon-14 they were producing and mixing into the biosphere. This was the analytical basis for Sakharov's first venture into political activism. He was rebuffed but, in 1963, the Soviet Union joined the United States and United Kingdom in the atmospheric test ban.

Some articles have served to inform key technical and policy debates and decisions. Early issues of the journal included articles on the verification of nuclear disarmament, nuclear archeology, the verifiability of a proposal to ban nuclear reactors from earth orbit, the hazard from plutonium dispersal by nuclear warhead accidents, how to dispose of separated weapon-grade plutonium, on the fact that reactor-grade plutonium

could be used for weapons, and a way to blend down weapon-grade uranium recovered from weapons to use in nuclear reactor fuel, and a critical analysis of the performance of the Patriot missile system in the 1991 Gulf War.

Later analyses focused on verification of a Comprehensive Test Ban Treaty, the susceptibility of gas centrifuge technology to proliferation, and many other articles exploring policies to prevent nuclear proliferation. A recent article analyzing contemporary Soviet documents finds that the U.S. Star Wars program did not contribute to the end of the Cold War. Another essay made a case for an International Scientific Network to provide technical support for initiatives to free the world of nuclear weapons.

Over these 30 years, there has been some progress in that direction, including a reduction of global nuclear-warhead stockpiles from about 60,000 nuclear warheads at the end of the Cold War to about 10,000 today, and an end to almost all nuclear tests despite the fact that the Comprehensive Test Ban Treaty has not come into force, and despite the tests conducted by North Korea. And, in 2017, at the United Nations, 122 countries approved the landmark Treaty on the Prohibition of Nuclear Weapons that reinforces the Nonproliferation Treaty despite the failure of the nuclear-weapon states to make more progress toward nuclear disarmament since the end of the Cold War.

Nuclear power has also been a much less potent engine driving nuclear-weapon proliferation than we feared. Thanks to the invisible hand of economics, the separation and recycle of plutonium is receding and, despite gas centrifuges putting enrichment within in the reach of all countries, enrichment has spread only slowly. Since 11 September 2001, concerns about nuclear terrorism have resulted in a dramatic reduction in the use of highly-enriched uranium as a research-reactor fuel. There has been no movement on a Fissile Material Cutoff Treaty, however, which we would expand to encompass a ban on *all* production of highly enriched uranium and separated plutonium, not just for weapons.


This is a depressing time for nuclear arms control, however. The Bush Administration's 2002 withdrawal of the United States from the ABM Treaty is resulting in new Russian weapon systems and a Chinese buildup to assure their abilities to retaliate after a U.S. first strike. The United States and Russia have withdrawn from the 1987 treaty that eliminated their land-based missiles in Europe. The Trump Administration also appears uninterested in extending New START, which verifiably limits Russian and U.S. strategic forces. The Trump administration also has withdrawn the United States from the 2015 nonproliferation agreement with Iran and has been pressuring China, Europe and Russia to not fulfill their commitments under that agreement. Finally, there has been little progress in diplomatic efforts to achieve the denuclearization of North Korea.

Looking forward, just as the nuclear arms race during the Cold War was driven by the mutual demonization of the United States and Soviet Union, the economic rise of China is increasing efforts by the United States to maintain its economic and military dominance. This is fueling growing political, economic and military tensions. *Science & Global Security* can play a role as a forum for Chinese and U.S. scientists interested in preventing a nuclear arms race between our two countries, perhaps starting with a no-nuclear-first-use agreement. The journal has already translated some important articles into Chinese, and published arms-control research by researchers from China's nuclear-weapon laboratory as well as by young Chinese scholars working on arms control issues. Chinese scientists are also now on the journal's editorial board.

The journal has also expanded its coverage in other regions of potential conflict. It has published articles on the nuclear arms race in South Asia and now includes South

Asian scientists on the editorial board. It also has published articles on Iran and North Korea that could contribute respectively to nonproliferation and disarmament diplomacy with those countries.

We are grateful that editorial responsibility has been picked up by such an able and committed group and hope that *Science & Global Security* will continue to play an important role at the interface between technical analysis and policy to reduce global and societal risks, especially from nuclear weapons and nuclear power. It can be a home for a new generation of activist scientists willing to put their shoulders to the wheel and cross geopolitical divides to chart a shared path toward a more peaceful world.

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