Russia and the US in the Cold War arms race

Frank von Hippel's invaluable first-hand account (PHYSICS TODAY, September 2013, page 41)—about the influence of nongovernment organizations (NGOs) on defusing the Cold War arms race—deservedly reflects the leadership and influence that he and others contributed. With regard to supportive and complementary activities involving other American and European NGOs, his focused chronicle is unavoidably incomplete. A supplement to the backstage narrative can be found in reference 1, especially its first volume.

When the original Federation of American Scientists (FAS) chapter at the University of Chicago migrated in the 1950s to Argonne National Laboratory, additional experienced physicists and nuclear engineers joined the group, which continued its public-interest activities. The chapter provided indispensable technical credibility to various NGOs, ultimately including the multifaceted arms-control collaborations of volunteer professionals. Because of the intimidating Cold War cultural atmosphere for untenured scientists, that conscientious support often resulted in personal and occupational sacrifice in professional employment, promotion, prospective funding, and security clearances.

Active and retired national laboratory scientists who worked on nuclear weapons and reactors also provided unsanctioned professional contributions through voluntary technical consultation and advice, partly reflected in von Hippel's reference 9.

In addition, there were contributions by specialists from other disciplines and by eminent political figures, professional organizations, segments of the media, venturesome academics, and benevolent funding sources. Peace movements in the West, along with Soviet refuseniks and high-level apparatchiks, were important standard-bearers, often arrayed against entrenched defense establishments and national-defense hardliners who relied on worst-case analysis and political intractability. The Natural Resources Defense Council, under the leadership of Thomas Cochran and Christopher Paine, was an American NGO that indeed had a sustained groundbreaking role, along with the FAS.

Amplification of unofficial American collaboration with the Committee of Soviet Scientists came about as European NGOs gradually expanded their own multilateral activities related to aspects of both nuclear and nonnuclear weapons during the Cold War confrontation and its post-Soviet aftermath.

These remarks augment von Hippel's article and do not detract from his widely recognized leadership.

Reference

1. A. DeVolpi, *Nuclear Insights: The Cold War Legacy*, Amazon.com, 2009.

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■ **Frank von Hippel** would have us believe that the Soviet Union did not have a substantial antiballistic missile (ABM) program comparable to the US Strategic Defense Initiative. That is far from the truth. ABM work started in the Soviet Union in the 1950s and was substantially accelerated in the 1970s.

One of von Hippel's points is that the lasers in the Sary Shagan facility were only 100 W and 20 kW. Yet on 15 May 1987, a 1-MW carbon dioxide laser called Polyus, with a mass of 80 tons, was launched[1] on the Energya rocket. Mikhail Gorbachev himself witnessed the launch. It was a test of a laser battle station and was far in advance of anything the US was able or planning to do at the time. The von Hippel group's inspection of the Sary Shagan facility in 1989, two years after a visit was proposed, only means that any facilities the Soviets did not want seen could have been removed in the years in between.

These omissions distort the record.

Reference

1. B. Hendrickx, *J. Br. Interplanet. Soc.* **55**, 242 (2002).

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■ **The engaging history** by Frank von Hippel of the second Reagan administration's interactions with the USSR gets that part right but neglects how the policy was set up. The US carried out a deliberate campaign to shift power within the Politburo from the dominant army faction to the Communist Party, because President Ronald Reagan wanted "someone I can talk to" that would be less rigid than the ossified clique of Leonid Brezhnev.

Three steps undermined the influence of the Soviet Army. First, on the first day of the Reagan administration, the US sold Saudi Arabia thousands of shoulder-to-air missiles, which were deployed immediately to Afghanistan. That deployment tilted the war there against the USSR. Second, Reagan pushed deployment of the Pershing missiles in Europe. Third, the Strategic Defense Initiative (SDI) speech in 1983 overturned our policy of mutual assured destruction and relied on the US's vast technical reputation to daunt the Soviet army faction and many Soviet scientists. (The Reagan administration encouraged Saudi Arabia to lower the price of oil, too, which cut the USSR's hard cash reserves by lowering their oil sales income.)

In 1983 and 1984, I and others personally carried an optimistic message about SDI to some of the physicists von Hippel cites and to others. We spoke about defense aspects, including interception from orbit during missile boost phase (lasers, Brilliant Pebbles), plus midcourse methods, and even defenses close to the target zones. I hinted at capabilities we had and the Soviets didn't—partly smoke and mirrors, partly quite solid.

The message was a deliberate psychological campaign to show US confidence and to use SDI as a bargaining chip for arms-control talks. We thought that by abandoning a nascent SDI, the US could secure more important Soviet concessions. Others in the Pentagon envisioned not the shelter Reagan imagined for the American people, but a limited system designed to defend just US silo missiles and thus preserve the option of a wartime counterattack. That system was developed and may be deployed now.

American technical credibility was a crucial step toward unleashing the social forces of perestroika, glasnost, and

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arms control. The strategic stage von Hippel saw in 1985 did not just accidentally appear.

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■ **The article by** Frank von Hippel about the last decades of the Cold War illustrates how first-person retellings can be incomplete and ultimately inaccurate attempts at history.

I see three problems with the account. First, von Hippel prioritizes the danger of nuclear weapons over the threat posed by the Soviet political–economic system. The influence of the four Soviet experts he cites was valuable, but we are fortunate that their advocacy did not short-circuit the achievement of Cold War victory, for both the West and the East. Second, von Hippel sometimes fails to look beyond the "trees" of those men to see the forbidding forest of Soviet Communism. Third, he does not give credit to the administrations of Ronald Reagan and George H. W. Bush or to the failure of post–Cold War promises by Bush, Mikhail Gorbachev, and Boris Yeltsin to eliminate, for example, Russian nuclear-armed short-range missiles.

In addition, I offer some examples of apparent incompleteness:

Perhaps von Hippel, with Harold Feiveson, set the record straight on the Pershing II and MX missiles (PHYSICS TODAY, January 1983, page 36). However, he neglects to note that the Pershing II was a response to the Soviets' fearsome SS-20 intermediate-range ballistic missile—records show NATO's "dual-track" strategy to counter the threat and negotiate reductions—and that the elimination of all such missiles can be credited to Reagan's "zero option" for total removal. With regard to the MX, the evidence is that Reagan retained it as a bargaining chip to attempt to negotiate reductions or removal of the 10-warhead SS-18s.

Similarly, von Hippel comments on the US refusal to halt nuclear testing during the Reagan administration, but he fails to provide the full context of the SS-18 deployment; testing of new US warheads was partly in response to that missile.

Von Hippel's discussion of seismic detection of nuclear testing is also incomplete; he mentions only the detection of a half-kiloton chemical explosion at Semipalatinsk. However, what is too frequently ignored is that remote seismic sensing alone, without accompanying onsite inspections, will never fully verify a zero-yield test ban in the face of determined seismic-evasion techniques.

There are some serious shortcomings in von Hippel's personalized account of ballistic-missile-defense issues. Although he mentions the Krasnoyarsk radar, he does not emphasize that it was a willful, knowing violation of the antiballistic missile treaty. In that context, a lack of US confidence might seem the more understandable motivation in subsequent dealings with the Soviet Union. Von Hippel writes, "The following year, the Soviet government offered to dismantle it." Perhaps one should be grateful that the Soviets offered to walk back from a purposeful treaty violation.

The article's "gotcha" surrounding the Sary Shagan laser facility is beside the point. Indeed, it was a point von Hippel himself made: The Soviets did have a missile defense program, and at some point, a combination of funding shortages and technical deficiency, likely coupled with doubts about feasibility, conspired to shift Soviet efforts toward arms control measures to inhibit US R&D. That the Soviets would shift their focus in that way is completely understandable and reasonable, but von Hippel fails to acknowledge that and paints US pursuits as somehow less peaceable.

Ronald Reagan clearly saw missile defense as a moral response to the threat of nuclear weapons. However, at the Reykjavik summit, Gorbachev rejected Reagan's offer of disarmament in favor of his own need to end the Strategic Defense Initiative. One can argue that Gorbachev could not trust Reagan on disarmament, but it seems reasonable to argue conversely that to Reagan, missile defense without nuclear missiles was a prudent hedge.

In von Hippel's worthy pursuit to remind readers of four good men on the Soviet side, his tone does a disservice to the people in the Reagan and Bush administrations who did the heavy lifting of ending the Cold War.

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■ **The perspectives** Frank von Hippel gives on the end of the Cold War are illuminating, but I was surprised to learn (page 45) of an experiment conducted to detect "gamma rays from a warhead by means of a liquid-nitrogen-cooled high-purity germanium scintillation counter." As is common knowledge in radiation detection and nuclear physics, high-purity germanium (HPGe) detectors are not scintillators, they are semiconductors. If one examines von Hippel's reference 10, it's clear the confusion may have arisen because, in addition to the use of both HPGe and lithium-drifted Ge, thallium-doped sodium iodide scintillators were also employed for gamma-ray detection. However, the principal analyses were based on measurements made with the Ge semiconductor detectors.

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■ **Von Hippel replies:** As Alex DeVolpi states, many more physicists than I could mention worked in the US and Europe to try to unwind the extraordinarily dangerous nuclear confrontation created by the Cold War. And the task sometimes required considerable courage. The McCarthy period in the 1950s was notable in that connection. For those interested in learning more about that period, I recommend Jessica Wang's book *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (University of North Carolina Press, 1999), which is based in part on 23 partially declassified volumes of files from the Federal Bureau of Investigation's probes of the Federation of American Scientists. For a good overview of the history of the global anti–nuclear weapons movement, see Lawrence Wittner's book, *Confronting the Bomb* (Stanford University Press, 2009).

James Benford is correct that the Soviet Union had a major program in ballistic missile defense. However, although the Reagan administration's Department of Defense refused to believe it, the program had pretty much ended by the time we visited the Sary Shagan ballistic missile defense R&D test site in 1989. A number of histories have been written about the program and Mikhail Gorbachev's role in ending it with advice from Evgeny Velikhov. One of those histories, in the book *The Dead Hand: The Untold Story of the Cold War Arms Race and Its Dangerous Legacy* (Doubleday, 2009), by former *Washington Post* Moscow bureau chief David Hoffman, is based in part on Soviet Central Committee files. According to Hoffman, the 1987 Polyus launch did not contain an actual laser but rather a mockup, and the effort to put the mockup into orbit failed. That apparently was the end of the Soviet program on space-based lasers.

Gregory Benford (James's brother) argues that the Reagan administration's