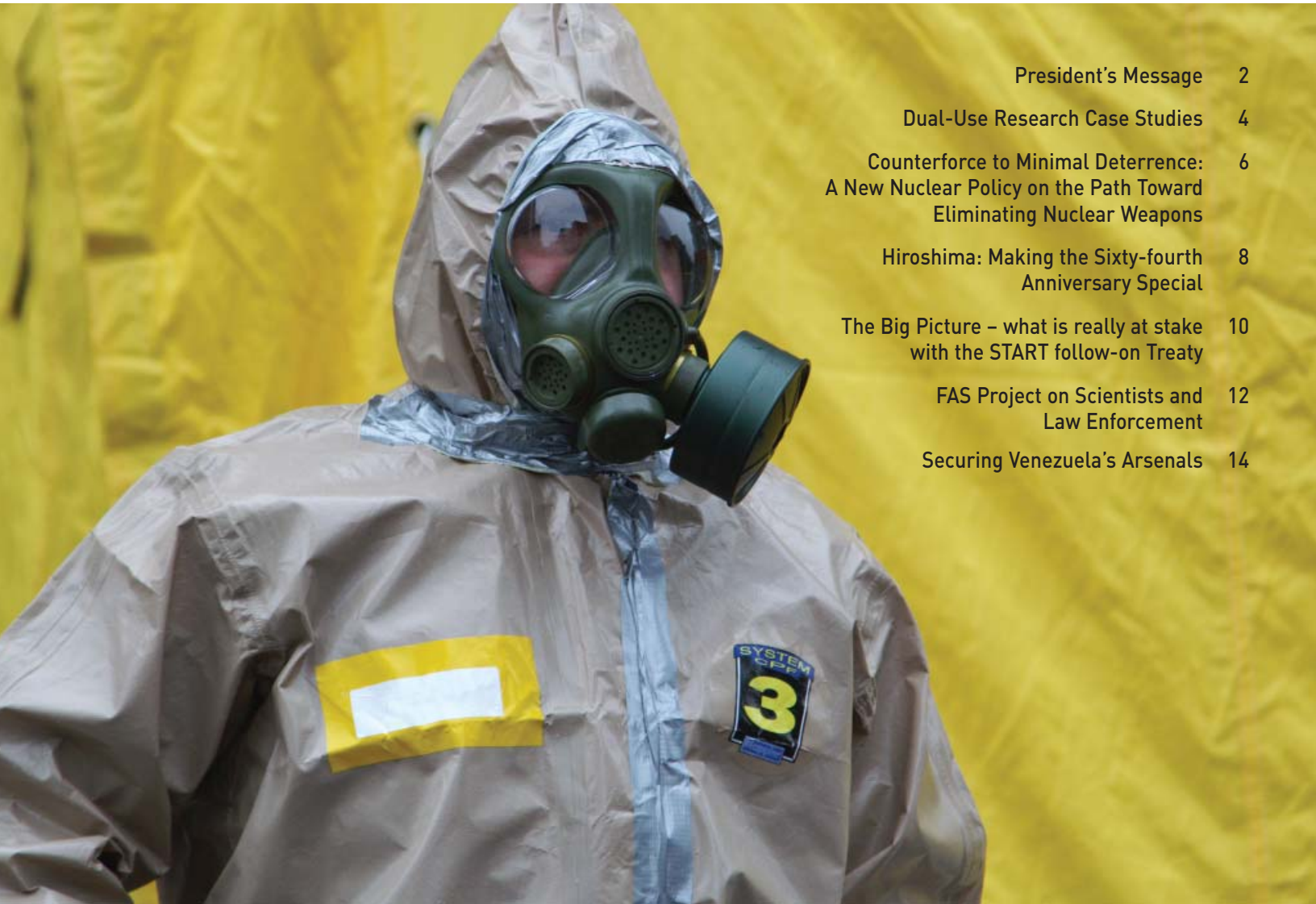


# Public Interest Report

THE FEDERATION OF AMERICAN SCIENTISTS

Volume 62, Number 2 Summer 2009



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## DUAL-USE RESEARCH CASE STUDIES

FAS launched a series of online case studies aimed at increasing awareness of the pitfalls of research that could potentially be used for malevolent purposes. The case studies profile scientists who have dealt with dual-use issues in their research.

*More on page 4.*

## 64TH ANNIVERSARY OF HIROSHIMA

The nuclear bombing of Hiroshima was one of the rare events that divides human history into a before and after. That day was the beginning of the nuclear age. There is a chance that people looking back on this anniversary will see the beginning of the end of the nuclear age.

*More on page 8.*

## SCIENTISTS AND LAW ENFORCEMENT

There is a clear benefit to having a strong relationship between law enforcement and the scientific community. Cooperation and consultation between these two groups would aid in threat assessment, investigation, intelligence gathering, and the recruitment of future personnel into these specialized fields.

*More on page 12.*

**About FAS**

The Federation of American Scientists (FAS), founded on 8 December 1945 as the Federation of Atomic Scientists by Manhattan Project scientists, works to ensure that advances in science are used to build a secure, rewarding, environmentally sustainable future for all people by conducting research and advocacy on science public policy issues. Current weapons nonproliferation issues range from nuclear disarmament to biological and chemical weapons control to monitoring conventional arms sales and space policy. FAS also promotes learning technologies and limits on government secrecy. FAS is a tax-exempt, tax-deductible 501(c)(3) organization.

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**PRESIDENT'S MESSAGE****The Biosecurity Project Takes  
Center Stage in This Issue of  
the Public Interest Report**

It is an honor and privilege to write my first president's letter for this issue of the Public Interest Report. Henry Kelly, the president of FAS until July 2009, resigned his position to become a Principal Deputy Assistant Secretary of Energy where he will be running the DOE's program in renewable energy and energy efficiency. This is a vital mission today and one of the largest programs at the DOE. Henry is an ideal person for the task. We all think Henry will love it, do a great job, and really help the country and the world from his new post. We wish him good luck.

The FAS board asked me to take over as acting president during the search for a successor, in addition to keeping my position as vice president for the Strategic Security Program. A search committee has been formed and they have made an aggressive effort from their first meeting. In the meantime, it is an honor to head such a talented, intelligent, diverse group of people.

This issue of the Public Interest Report focuses on the Biosecurity Project. The Biosecurity Project at FAS is part of my Strategic Security Program and I take special pride in it, even if I can't take very much credit. I have been at FAS not quite, but almost, as long as Henry Kelly and one of my first efforts at FAS was to redirect the Biosecurity Project.

In 2001, soon after the attacks of September 11, anthrax letters were mailed to journalists and congressional offices resulting in five deaths, and the nation was frightened. The potential for a biological attack was particularly unsettling because the nature of the threat was so amorphous. Militaries, at one time, expected to use biological agents and biological toxins as

wide-scale weapons. The United States had a biowarfare program during the Cold War and the Soviet bioweapons program was massive.

In the past, bioattacks by individuals or groups were not very effective. In 1984, a religious group in Oregon deliberately contaminated restaurants with salmonella, causing food poisoning that sickened hundreds, none of whom died fortunately, and that has been the largest non-military attack to date. The anthrax letter attacks were not as bad as they could have been: had the same amount of anthrax spore been released into the ventilation system of a building, for example, many more people could have died. At the other extreme, researchers warn of viruses that could be specifically engineered to be extremely contagious, lethal, and resistant to vaccination and treatment and could kill millions.

Faced with the frightening potential of biological weapons, the government looked for solutions to an ill-defined problem. Dating back to World War II and the Manhattan Project and the radar project, physicists and engineers have worked on problems vital to national security--work that required secrecy, security clearances, fences, and guards. The government understood this type of security and, at the time I began my work at FAS, Congress was talking about taking the physics/nuclear weapons model of security and applying it to the world of biology. I thought this had the potential to cripple biological research in the country and would not appreciably improve security.

Nuclear weapons do not provide a good analogy for security for biological research for several reasons. The physics of nuclear weapons is well understood, but how to

make a bomb work efficiently and, in particular, how to get the materials for a bomb, either uranium or plutonium, require some technical tricks. Keeping these technical details secret makes sense.

In the world of bioweapons, there are some technical tricks, for example, how to make anthrax spores just the right size and consistency so they do not clump to form an easily dispersed dust and get inhaled deeply into the lungs. But in many cases, contagious viruses and bacteria, for example, the machinery for making more of the deadly agent is the human body itself or lab procedures known to any graduate student. There is no “trick.”

Scientific knowledge, not know-how, is all important: The equipment needed to produce the DNA for a virus is widely available and costs a few hundred thousand dollars with prices dropping all the time. Moreover, the advances in our understanding of biology at the molecular and cellular level are truly mind-boggling. The rate of increase in our knowledge puts physics, indeed, every other science, to shame. The majority of the scientific knowledge that is being added to the storehouse of human understanding today is coming from biology. Any approach to security based on today’s technology and science will be outdated tomorrow.

A big problem, when I arrived at FAS, was that biologists did not seem concerned enough about security to take charge themselves of developing a new approach. With the federal government pouring billions into biosecurity, many followed the money. A few scientists were even accused of exaggerating the threat in the hopes of increasing federal dollars. But in general, biologists as a community were slow to publicly acknowledge that there was anything serious to worry about. They could not step up to take charge of improving security if they were reluctant to admit there was a security problem in the first place. Of course, if the American public and Congress believed

there was a security problem—and obviously they did—then this was a formula for having a solution imposed from the outside, with potentially disastrous results for biological research.

So what should be done? The first step, we felt, was education. FAS wanted to make biologists aware that there could be, at least in principle, a serious problem with the malicious use of biotechnology. The same technology and understanding that cures disease can be used to cause disease. When biologists design their experiments, they should at least be aware enough to stop and think: Could this knowledge be dangerous? Sometimes the answer is yes and the research should go ahead but with an eye to how ill effects might be mitigated.

to take a great job at Harvard, and was carried forward by Mike Stebbins, who left FAS to work at the White House in the Office of Science and Technology Policy. Clearly, the FAS Biosecurity Project has been a great launching pad. I expect the current manager of the project, Nishal Mohan from Princeton, to carry the FAS Biosecurity Project forward to new international prominence.

Frankly, after much attention following the anthrax attacks, support for biosecurity from the government and foundations has ebbed. Many centers have shut down. While we regret that the support for biosecurity in general has declined sharply, FAS is proud that the Carnegie Corporation chose to continue to fund only a single program—ours.

**“The rate of increase in our knowledge puts physics, indeed, every other science, to shame. The majority of the scientific knowledge that is being added to the storehouse of human understanding today is coming from biology. Any approach to security based on today’s technology and science will be outdated tomorrow..”**

With benefit and risk awareness as a goal, FAS designed a set of training modules directed at the Ph.D. student level, illustrating the potential dual-use, for good or ill, of important biological experiments over the last decade. For example, was reconstituting the deadly 1918 influenza virus a good idea because it allowed us to better prepare for the next pandemic or a grave risk that did nothing but satisfy scientific curiosity? The module contains background material to explain the context, and video interviews with the biologists who performed the work to explain why they thought the experiments were useful.

The current FAS Biosecurity Project was started by Stephanie Loranger, who left FAS

I hope, with support coming in part from the U.S. government, that FAS can greatly expand the Virtual Biosecurity Center, an international clearinghouse for biosecurity information that will be run in collaboration with the American Association for the Advancement of Science and the National Academy of Science. FAS has truly become an international player in the field and will continue to be on the forefront of the biosecurity policy debate.

FAS



# Dual-Use Research Case Studies

By Cheryl J. Vos, Director of Biology Policy

Through grants from the Carnegie Corporation of New York, the Federation of American Scientists launched a series of online case studies aimed at increasing awareness of the pitfalls of research that could potentially be used for malevolent purposes. The online *Case Studies in Dual-Use Biological Research*, profiles the experiences of scientists who have dealt with dual-use issues in their own research.

Since the anthrax letter attacks in 2001, concern has grown over “dual-use research”: legitimate scientific work that could be misused to threaten public health and national security. After the attacks, the U.S. dramatically increased its biodefense research activities and budget, and therefore, naturally increased the amount of dual-use research activities. The identification last year by the FBI of the alleged perpetrator of the anthrax mailings once again elevated the profile of biological material as a potential threat.

Then, in December of 2008, the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism released “World At Risk,” a report that suggested it is likely a weapon of mass destruction will be used in a terrorist attack somewhere in the world within the next five years. The commission also stated that “terrorists are more likely to be able to obtain and use a biological weapon than a nuclear weapon” and believes that “the U.S. government needs to move more aggressively to limit the proliferation of biological weapons and reduce the prospect of a bioterror attack.” As a result, there has been an increased spotlight on biosecurity and efforts to raise awareness of these issues within the scientific community.

The launch of the *Case Studies in Dual-*



*Use Biological Research* in 2004 included an introductory module that focused on the history of biological weapons and bioterrorism and the laws, regulations, and treaties that apply to biodefense research, as well as, three individual case studies featuring high profile dual-use experiments that had been conducted. The original modules were on the synthesis of polio virus, aerosol drug delivery, and the unexpected results of mousepox experiments.

Over the past two years, FAS researchers expanded the case studies and the new modules are applicable to a large number of scientists. For example, antibiotic resistance is used in nearly every biology lab on a daily basis and also represents a growing concern of the general public. RNA Interference (RNAi) is a relatively new technique, but it is incredibly powerful and its use and applications are rapidly expanding. Finally, the reconstruction of 1918 influenza was perhaps the most widely reported case of dual-use research to date. Even within the

scientific community, the publication of the 1918 influenza work ignited an intense debate about how to handle experiments that could pose a dual-use concern.

These new case studies feature video interviews with the scientists who did the experiments and short animations to illustrate how the experiments were done. The scientists interviewed all provided candid comments on what they thought about the dual-use implications of their work and how they would advise graduate students or other young scientists to think about and deal with these issues. Each case study includes a section on the implications or public response to the experiments and provides a set of questions as a base for discussion.

A new module was recently created with a different focus from the previous case studies. Instead of looking at a specific line of research, the Public Reaction module looks at how non-scientists view dual-use research and tackles the issue of why scientists should even care about dual-use research or what the public thinks of their work. The purpose is to demonstrate that besides having a moral responsibility to be aware of dual-use research, the public is very concerned by it. Scientists can ease the concerns of their local communities by carefully communicating the nature of their work and taking an active role in increasing awareness. To date, no one has addressed this important issue and by taking a proactive role in security and awareness, scientists will be able to allay the concerns of the public and improve community relations.

The new module discusses biosafety, biosecurity, and how scientists in the past have dealt with the potential hazards or other aspects of their work that required communication with the public. Recent

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biosafety incidents are addressed and ways for scientists to proactively engage the public on issues regarding their work is laid out. The accompanying video interview is with Susan Ehrlich, a former judge on the Arizona Court of Appeals and public member of the National Science Advisory Board (NSABB), a federal advisory body tasked with looking at dual-use. Judge Ehrlich has been involved in writing the NSABB draft framework for oversight in dual-use research and is familiar with the relevant issues, but as a sitting judge and member of the public, she also represents the views shared by many Americans on dual-use research. It is important for scientists to hear from a respected non-scientist, the concerns of the public about dual-use and the potential for misuse.

And because scientific research occurs worldwide, the series is being translated into a variety of languages. The material is already accessible online and to a large and diverse audience, so providing it in several languages serves to increase its scope and applicability. The Antibiotic Resistance module is available in Mandarin Chinese and the Synthesis of Poliovirus module was translated into French. All written material was translated into the respective languages with subtitle captions added into the video interviews and the animations.

In October 2009, the 1918 Influenza case study will be available in Spanish and the Antibiotic Resistance case study in Russian. The *Case Studies in Dual-Use Biological Research* is an integral part of the education center of a new major initiative called the Virtual Biosecurity Center (VBC).

To access the *Case Studies in Dual-Use Biological Research* homepage, please visit <http://www.fas.org/biosecurity/education/dualuse/index.html>.

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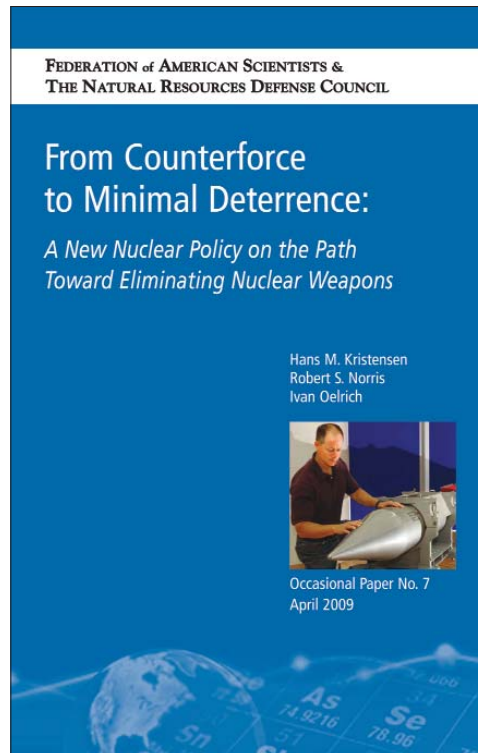
# From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Eliminating Nuclear Weapons

By Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich

## *Executive Summary and Introduction Excerpt from Occasional Paper No. 7 Published by FAS in April 2009*

To realize President Barack Obama's vision of "dramatic reductions" in the number of nuclear weapons, stopping development of new nuclear weapons, taking nuclear weapons off alert, and pursuing the goal of a world without nuclear weapons, radical changes are needed in the four types of U.S. policies that govern nuclear weapons: declaratory, acquisition, deployment, and employment. This report largely concerns itself with employment policy, that is, how the United States actually plans for the use of nuclear weapons, and argues that there should be fundamental changes to the current war plans and the process of how these are formulated and implemented. The logic, content, and procedures of the current employment policy are relics of the Cold War and, if not changed, will hinder the hoped-for deep cuts to the nuclear stockpile and the longer term goal of elimination.

This report argues that, as long as the United States continues these nuclear missions unjustifiably held over from the Cold War, nuclear weapons will contribute more to the nation's and the world's insecurity than they contribute to their security. And without those Cold War justifications, there is only one job left for nuclear weapons: to deter the use of nuclear weapons. For much of the Cold War — at least from the early 1960s — the dominant mission for U.S. strategic weapons has been counterforce, that is, the attack of military, mostly nuclear, targets and the enemy's leadership. The requirements for the counterforce mission perpetuate the most dangerous characteristics of nuclear forces, with weapons kept at high levels of alert, ready to launch upon warning of an enemy attack, and able to



preemptively attack enemy forces. This mission is no longer needed but it still exists because the current core policy guidance and directives that are issued to the combatant commanders are little different from their Cold War predecessors. General Kevin Chilton, head of U.S. Strategic Command (STRATCOM), recently took issue with President Obama's characterization of U.S. nuclear weapons being on "hair-trigger alert" but made our case for us by saying, "The alert postures that we are in today are appropriate, given our strategy and guidance and policy." [Emphasis added.] That is exactly right and, therefore, if President Obama wants General Chilton to do something different, he will have to provide the commander of U.S. nuclear forces with different

guidance and directives.

The counterforce mission, and all that goes with it, should be explicitly and publicly abandoned and replaced with a much less ambitious and qualitatively different doctrine. A new "minimal deterrence" mission will make retaliation after nuclear attack the sole mission for nuclear weapons. We believe that adopting this doctrine is an important step on the path to nuclear abolition because nuclear retaliation is the one mission for nuclear weapons that reduces the salience of nuclear weapons; it is the self-canceling mission. With just this one mission, the United States can have far fewer nuclear forces to use against a different set of targets. Almost all of the "requirements" for nuclear weapons' performance were established during the Cold War and derive from the counterforce mission. Under a minimal deterrence doctrine, appropriate needs for reliability, accuracy, response time, and all other performance characteristics, can be reevaluated and loosened.

In this analysis, we consider in detail an attack on a representative set of targets that might be appropriate under a minimal deterrence doctrine, including power plants and oil and metal refineries. We find that, even when carefully choosing targets to avoid cities, attack with a dozen typical nuclear weapons can result in more than a million casualties, although using far less powerful weapons can substantially reduce that number. Nuclear weapons are so destructive that much smaller forces, of initially 1,000 warheads, and later a few hundred warheads, are more than adequate to serve as a deterrent against anyone unwise enough to attack the United States with nuclear weapons.

The president will need to maintain keen oversight to insure that the new guidance is being carried out faithfully. We describe the many layers of bureaucracy between the president and those who develop the nuts-and-bolts plans for nuclear weapons employment to show how easily a president's intentions can be co-opted and diffused. We finally offer examples of what a presidential directive might look like.

## Introduction

The global elimination of nuclear weapons has recently regained public attention and is being seriously discussed by policy elites within the political mainstream. Several proposals have been made for immediate initial steps toward this goal. These include ratification of the Comprehensive Test Ban Treaty and negotiating a follow-on to the soon-to-expire START Treaty and the Moscow Treaty strategic arms reduction agreements with Russia. Other early steps include taking nuclear weapons off alert, retirement and verified elimination of non-deployed reserve stockpile weapons, verified declarations of existing stocks of fissile materials, and negotiation of a global agreement barring production of fissile material for weapons.

Proposals for unilateral or parallel reciprocal reductions typically cite some round number as a target for reduction. This can appear arbitrary but does, in fact, make sense. Nuclear weapons might have some transitional missions on the way toward zero, but the number needed to fulfill basic nuclear deterrence is not large and excess weapons increase the nuclear danger without contributing to national or the world's security. Even absent a detailed accounting of nuclear requirements indicating whether the United States needs tens or hundreds of nuclear weapons for deterrence, quick assessment can provide confidence that the number will not exceed one thousand. Therefore, immediate calls to reduce to a thousand weapons, pending further analysis

of when and how to go below a thousand, are valid.

This report examines in greater detail the next steps toward zero: how to reduce down to levels where the numbers of weapons might start to make a difference in meeting the core nuclear deterrent mission that will apply during the (possibly extended) transition to a nuclear weapons-free world. Our approach is somewhat different from most other studies. We do not start with a discussion of numerical goals for nuclear weapon arsenals. Advocates of a more robust nuclear

**"The enormous reductions in the numbers of nuclear weapons since their Cold War peak have been because nuclear missions were abandoned."**

posture argue that, with dramatically reduced nuclear arsenals, the United States military will not be able to fulfill this or that mission assigned to nuclear weapons. That is precisely the point; to move with any sincerity and effectiveness toward a nuclear weapons-free world, nuclear weapons must shed almost all of their current missions. Going forward, nuclear weapons should not be assigned any mission for which they are less than indispensable. That is why we believe that the focus ought to *begin* with a discussion of nuclear missions. As missions for nuclear weapons are, one-by-one, stripped away, the logic of reducing their numbers will be inescapable.

Nuclear weapons have many potential missions. The first ballistic missile defense system was nuclear. Both the United States and the Soviet Union once had nuclear torpedoes, nuclear air defense missiles, and

nuclear artillery, even nuclear landmines. It is important to recognize that the enormous reductions in the numbers of nuclear weapons since their Cold War peak has been because nuclear missions were abandoned as they proved infeasible or were displaced by militarily superior conventional alternatives. This ongoing process of nuclear obsolescence continues today.

Both advocates of a robust nuclear posture and nuclear disarmers would probably agree that the last mission of nuclear weapons should be to survive a nuclear attack in order to threaten retaliation against a nuclear aggressor, with the aim of deterring such an attack in the first place. We call this the "minimal deterrence" mission. This mission could be fulfilled by conventional alternatives but, even so, this mission is significant for this study because it is the only potential mission that can be assigned to nuclear weapons that actually reduces the salience of nuclear weapons; it is the self-canceling mission of nuclear weapons. We further assume that on the glide path down to zero, the United States and the rest of the world may pause at a certain point for some extended period of time to allow the world's nuclear powers to establish a stable equilibrium while they develop the international institutions and political confidence necessary for moving toward complete global nuclear disarmament. We hope that this transition period might be short, perhaps on the order of one or two decades.

The report focuses on some essential penultimate steps that must be taken to get to the stage of global elimination, sketching out one possible path. First, we review current U.S. nuclear doctrine, both what it is and how it is developed and implemented. Next, we describe how restricting the missions for nuclear weapons much more severely would enhance the security of the United States, and then show how these new limited missions would be implemented. From that position, a transition to nuclear elimination would be easier and safer. **FAS**

# Hiroshima: Making the Sixty-fourth Anniversary Special

By Ivan Oelrich, FAS Acting President

This year marks the sixty-fourth anniversary of the nuclear bombing of Hiroshima, which was one of those rare events that divides human history into a before and an after. That day was the beginning of the nuclear age. There is nothing special about sixty-four, not like a fiftieth or a centenary. But, years from now, the sixty-fourth anniversary of the Hiroshima bombing may be seen as special: there is a chance that people looking back on this anniversary will see this as the beginning of the end of the nuclear age.

The Cold War came to a close two decades ago but only now are national leaders seriously considering a world free of nuclear weapons. Even those who see a global ban as a long-term goal can see that making serious progress in the direction of that goal will enhance the security of the nation and the world.

The number of nuclear weapons in the world has fallen dramatically from their

frightening Cold War peaks. This decline is not due primarily to arms control treaties or any sudden rationality of national leaders. The numbers have gone down mostly because the missions for nuclear weapons—everything from nuclear torpedoes to nuclear land mines—have been taken over by militarily superior alternatives: advanced, guided, accurate conventional weapons. Nuclear weapons have gone away primarily because they are becoming technologically obsolete.

The end of the Cold War was important too. The Cold War was a stand-off between two implacable ideologies, each of which felt it had a historic mandate to guide the future of the world. Nuclear weapons, weapons of global destruction, might have seemed appropriate to an ideological struggle of global dimension. But today, the stakes in play are smaller. If ever there were a global political justification for nuclear weapons, it no longer applies. Nuclear weapons are

becoming politically obsolete.

Nuclear advocates, unwilling to admit that they are planning for the use of nuclear weapons, always talk in terms of deterrence, a term that has become so vague, misused, and overused that it barely means anything anymore. Those wanting a robust nuclear force, who want to think it is useful, even crucial, emphasize that deterring some action by threatening retaliation requires both the ability to retaliate and the willingness to do so. They make much of the need to constantly keep the perception of U.S. capability and willingness very high to deter any possible enemy.

There are at least three problems with this use of the latent power of nuclear weapons.

First, history shows it doesn't work. Whether the U.S. in Vietnam or the Soviet Union in Afghanistan or in a score of other cases, having nuclear weapons does not automatically deter wars between nuclear and non-nuclear adversaries or win them, if they are not deterred.

Second, nuclear weapons are so wildly destructive that the United States—and the other established nuclear powers—have destructive power at hand far in excess of any imaginable need. There is no reason to worry about the details of our nuclear capability.

Finally, some nuclear advocates argue that we need to have smaller nuclear weapons to make our willingness to use them more plausible, so they will deter more effectively. This is the sort of more-is-less upside-down logic that only nuclear theorists could hope to get away with. But all the tweaking and fine-tuning of the nuclear arsenal will not change the plausibility of







their use compared to one outstanding, and hopeful, fact: nuclear weapons have not been used in war for sixty-four years.

If they were not used in Korea, or Vietnam, or Afghanistan, or the Falklands, or Iraq, their use is going to be even less plausible in similar conflicts in the future. The logic is inescapable but nuclear advocates will not face it: the only thing that can make the use of nuclear weapons significantly more plausible (and, thus, they argue, a better deterrent) is to occasionally use them. If we want to frighten non-nuclear nations with our nuclear weapons, we have to bomb one of them every decade or so. Mercifully, after sixty-four years, no nuclear power has done this. Moreover, every year that passes without nuclear use further erodes the plausibility of future nuclear use for anything other than national survival. The strategic leverage provided by nuclear weapons continues to erode. Nuclear weapons are becoming strategically obsolete.

The moral question of nuclear weapons is often overlooked. They have been with us so long, we have stopped asking the hard ques-

tions. Nuclear weapons analysts, both pro and con, avoid the squishy problems of moral debate if they want to be taken seriously. Yet, nuclear weapons force many of the moral concerns about war into stark relief.

The customary laws of war are that violent action should be proportionate to the threat and should, to the extent possible, distinguish between combatants and non-combatants. Thus, what is moral depends in part on technology. If no alternatives exist, then an indiscriminant weapon might be justified. But today, alternatives do exist. Nuclear weapons are becoming morally obsolete.

Today's call for a world free of nuclear weapons is not a call for sacrifice. It is not a call to accept greater risk for our country to improve the security of the rest of the world. It is not a call to take a moral stand, rejecting something that is wrong, but admittedly useful.

The call for a nuclear free world is an acknowledgement that the curtain is starting to close on the nuclear age. Battleships, the very epitome of great nation power, ruled the

oceans for about the same length of time the Nuclear Age has lasted. They arose, they had their day, and then a combination of changes in technology and global politics displaced those awesome, powerful giants and they were retired. Nuclear advocates are fighting an aggressive and skillful rear-guard action, fueled by nostalgia for the certainties of the past and a lack of imagination about the future just as romantics wanted to keep battleships alive long after aircraft carriers, submarines, radar, and cruise missiles had made them obsolete.

Nuclear weapons are in the middle of this process of obsolescence. It is better to speed the process along and reduce the risk nuclear weapons pose to world civilization, to explicitly reject them and plan for their demise than to continue to bumble through the danger we daily face but have become inured to. For the first time since Hiroshima, the world seems ready to listen. It may be, a generation from now, that sixty-four will be seen as a special anniversary.

FAS

# The Big Picture – what is really at stake with the START follow-on Treaty

By Alicia Godsberg, Research Associate for the Strategic Security Program and UN Affairs

There is cause for cautious optimism after Presidents Obama and Medvedev signed their START follow-on Joint Understanding in Moscow – the goal of completing a legally binding bilateral nuclear disarmament agreement with verification measures is preferable to letting START expire without an agreement or without one that keeps some sort of verification protocol. The Joint Understanding leaves some familiar questions open, such as the lack of definition of a “strategic offensive weapon” and what to do about the thousands of nuclear warheads in reserve or awaiting dismantlement. But so far few analysts on either side of the nuclear debate have been talking about the big picture, what for the vast majority of the world (and therefore our own national security) is really at stake here – the viability of the nonproliferation regime itself.

Why will the follow-on treaty to START have such a great impact on the entire nonproliferation regime? The rest of the world is looking for the possessors of 95 percent of the global nuclear weapon stockpiles to show greater effort in working toward their nuclear disarmament obligation under the Treaty on the Nonproliferation of Nuclear Weapons (NPT).

The NPT is both a nonproliferation *and* disarmament treaty, and at the NPT Review Conferences (RC’s) and Preparatory Committees (PrepCom’s) the Non-Nuclear Weapons States Parties (NNWS) continue to voice their growing concern and anger over what they perceive to be lack of real progress on nuclear disarmament. At the PrepCom in May 2009 those voices – including many of our closest allies – spoke loudly, stating that continued failure by the NWS to work in good faith toward their nuclear disarmament obligation could eventually break

up the nonproliferation regime, spelling the end of the other part of the Treaty’s bargain: the nonproliferation of nuclear weapons.

To put things in perspective, NNWS are *every* country in the world except the five NWS (US, Russia, UK, France, and China) and the three countries that have never signed the NPT (Israel, India, and Pakistan – with a question now about the obligations of North Korea and without including Taiwan, which is not recognized by the United Nations). While the NPT has an elaborate mechanism to verify the compliance of NNWS with their nonproliferation obligations under the Treaty (i.e. the IAEA and its Safeguards Agreements), there are no institutionalized means to monitor or enforce compliance with the disarmament obligation of NWS under Article VI of the Treaty. And while some NWS are now proposing further restrictions on NNWS nuclear energy programs through preventing the spread of sensitive fuel-cycle technology, NNWS are increasingly voicing their frustration over nuclear trade restrictions while greater progress on nuclear disarmament remains in some distant future. Further fueling this distrust of the NWS and of new technology transfer restrictions was the Bush administration’s ill-advised U.S.-India nuclear cooperation deal, seen by many NNWS as “rewarding” India with an exception to nuclear trade laws and export controls while India continues to operate its nuclear programs largely outside the NPT’s nonproliferation regime and its oversight and restrictions.

A series of what are perceived as broken promises by NWS to NNWS has led the regime to approach what many have seen as a breaking point. Some of those promises include the ratification of the CTBT, strengthening of the ABM Treaty, and the

establishment of a Nuclear Weapon Free Zone in the Middle East. These promises have special significance, as they were part of political commitments made to get the indefinite extension of the NPT in 1995, thereby removing any small pressure NNWS might have been able to place on NWS to meet their disarmament obligation by threatening not to renew the Treaty at future RC’s.

The U.S. has a special role to play in this drama for two reasons. First, the U.S. is the second largest possessor of nuclear weapons in the world and as such needs to be at the forefront of nuclear disarmament for that goal to be taken seriously and eventually come to fruition. Second, President Obama has publicly reversed some positions of President George W. Bush on nuclear disarmament and the world is waiting to see if his vision will be translated into action by the U.S. For example, at the 2005 NPT RC the Bush administration stated it would not consider as binding any of the commitments made by prior U.S. administrations at previous RC’s, such as the commitment to the “unequivocal undertaking” to eliminate nuclear weapons and the commitment to work toward ratifying the CTBT. Contrast that with Obama’s policy speeches, especially the one in Prague on April 5, 2009 in which he placed a high priority on U.S. verification of the CTBT and on his vision of a world free of nuclear weapons, and you can begin to understand the feeling of hope surrounded by a continued atmosphere of mistrust that pervaded the United Nations in May.

A New York Times op-ed<sup>(1)</sup> pointed out that there is no guarantee the U.S. Senate is going to go along with President Obama’s nuclear policy vision, and he may in fact encounter difficulty ratifying the CTBT and

gaining support for the reductions outlined in last week's Joint Statement. In a June 30 op-ed in the *Wall Street Journal*,<sup>[6]</sup> Senator Kyl and Richard Perle voiced this side of the debate, stating:

*"There is a fashionable notion that if only we and the Russians reduced our nuclear forces, other nations would reduce their existing arsenals or abandon plans to acquire nuclear weapons altogether... this is dangerous, wishful thinking. If we were to approach zero nuclear weapons today, others would almost certainly try even harder to catapult to superpower status by acquiring a bomb or two. A robust American nuclear force is an essential discouragement to nuclear proliferators; a weak or uncertain force just the opposite."*

This fear mongering, unsupported by the facts, is the type of rhetoric that will confuse the debate once any START or CTBT-related issues hit the Senate floor. In a world where reductions would still leave actively deployed nuclear warheads in the thousands – with thousands more on reserve – "superpower status" will not be achieved by acquiring "a bomb or two." Think about North Korea – are they a "superpower" now that they have exploded two nuclear devices and we know they are continuing to work on their nuclear weapon program? Hardly. Instead, they are international outcasts, condemned even by China for their latest atomic experiment, and have become weaker still in their attempt to achieve international status.

And if the U.S., the country with the most powerful and advanced conventional forces, needs a "robust" nuclear force to protect its national security and fulfill security commitments, then it seems that any country with a weaker conventional force (which is everyone else) should *seek* nuclear weapons. So, I would argue exactly the opposite Senator Kyl and Mr. Perle, and say that a diminishing role for nuclear weapons in U.S. security actually *lessens* the case for other nations to develop their own nuclear weapons, which are more

costly both economically and politically than conventional forces.

Whether the U.S. can restore the faith of the rest of the world in our leadership on nuclear nonproliferation and disarmament by meeting previous political commitments and working toward fulfilling Treaty obligations remains to be seen. Rose Gottemoeller's remarks to the 2009 NPT PrepCom at the UN in May were well received by the global community, but NNWS also made clear that words need to be followed by concrete actions.

The U.S. needs the cooperation of the global community to continue the success of the nonproliferation regime, which has been

largely successful over the past 39 years minus the few notable failures. To do this, the U.S. must understand that the follow-on treaty to START will directly impact the perception the rest of our global community has about the seriousness of our commitment to the NPT. That is because the NPT is both a disarmament *and* nonproliferation treaty; if the U.S. recognizes and acts on this truth, it will be able to achieve the urgent goal of regaining its leadership position on the nonproliferation of nuclear weapons. **FAS**

## Notes

- 1 Taubman, Philip. "Obama's Big Missile Test." Editorial. *New York Times*, 8 July 2009.
- 2 Jon Kyl and Richard Perle. "Our Decaying Nuclear Deterrent." Editorial. *Wall Street Journal*, 30 June 2009.



# FAS Project on Scientists and Law Enforcement

By Cheryl J. Vos, Director of Biology Policy

There is a clear benefit to having a strong relationship between law enforcement (LE) and the scientific community. However, the cultural divide between the two has presented challenges to strengthening those ties. Many in the scientific community are uncomfortable with the very idea of interacting with law enforcement personnel, much less cooperating with them. At the same time, many in law enforcement do not have a good understanding of how the scientific community works. The divide is a serious liability to law enforcement in particular, as there is little doubt that cooperation and consultation between the two groups would aid in threat assessment, investigation, intelligence gathering, and the recruitment of future personnel with specialized skills. To address these problems, outreach to and education of the scientific community and training of law enforcement members could help each understand the other's methods and goals.

In early 2008, the Federation of American Scientists (FAS) conducted a survey of the scientific community, funded by the U.S. Federal Bureau of Investigation (FBI), to determine their attitudes towards law

enforcement. Anecdotal evidence has suggested that some scientists held negative views of law enforcement and this survey was designed to be the first step in recognizing the scope of the problem and addressing it directly.

FAS collaborated with the FBI, the American Association for the Advancement of Science (AAAS), and Greenberg Quinlan Rosner Research to develop the survey questions and distribute it to the scientific community. The survey contained a mix of multiple choice and open-ended questions and was distributed to 10,969 AAAS member scientists. One thousand three hundred and thirty two surveys were completed and the resulting data produced an average margin of error associated with the total data set of +/- 2.7 percent. The survey questions were designed to evaluate the working relationship between FBI field agents and scientists, and the results were published December 22, 2008 in *Science Progress*.

Our survey revealed that while scientists are disposed to assist in criminal investigations, they often fear working with law enforcement agencies and indicate a reluctance to discuss research and other issues

that are specific to the science community with them. Despite suspicions of the FBI and opposition to law agencies monitoring scientific research, scientists are willing to aid in certain situations, such as a criminal investigation. Scientists feel that the FBI does not work well with the scientific community, specifically that law enforcement officers do not understand their work (76 percent), that these agencies are more interested in restricting research for security purposes than they are in the scientific value of the work (71percent), that officers have an overzealous approach to security issues and an interest in censorship (63 percent), and that research will be restricted from publication (55 percent). We also found that only 15 percent of surveyed scientists indicated any personal past contact in a professional capacity, so these attitudes are likely based on stereotypes instead of actual experiences.

In addition to identifying some of the prevailing attitudes of scientists towards law enforcement, it also endeavored to provide some strategies to build and improve relationships between the communities. Scientists indicated that they would prefer it if law enforcement agents approached them in a professional manner by setting up an appointment or initiating contact through official channels such as the scientist's department head or supervisor. It was also suggested that increasing scientific literacy among agents and officers will ensure clearer communication since scientists are most comfortable talking about their work with others familiar with scientific concepts, possibly because they are less concerned that the research will be misunderstood.

The open ended questions in the survey gave scientists a chance to express their views and make suggestions. There were

## Call for Articles

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In our continuing effort to provide the FAS community with timely articles about national security policy, learning technologies, building technologies, and other areas of science and technology policy, we are inviting members to submit proposals for articles (maximum of 1,500 words).

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statements which reflected strongly held political views or a general mistrust of the government and the administration in charge at the time. There were also statements that expressed a general distrust of any law enforcement authority, but the majority of comments were very straightforward and helpful. When asked about what the best way for an agent to contact a scientist, one respondent commented, “ORGANIZATIONS SHOULD HAVE A PUBLISHED MECHANISM FOR OUTSIDERS TO MAKE CONTACT, WITH SPECIAL HANDLING FOR, AMONG OTHERS, LAW ENFORCEMENT. ALL CONTACTS SHOULD BE ROUTED THROUGH THAT MECHANISM. SCIENTISTS CONTACTED DIRECTLY SHOULD FORCE THE OUTSIDER TO USE THAT MECHANISM FOR THEIR OWN PROTECTION.” And when asked about how the FBI can improve their relationship with the scientific community, another respondent asserted, “CONVINCE US THAT THEY CARE ABOUT CIVIL LIBERTIES AND ACADEMIC FREEDOM; KNOW

#### SOMETHING ABOUT THE SCIENCE RELEVANT TO THEIR WORK.”

The next step in this ongoing partnership with the FBI is to develop a training video to help their agents interact more effectively with scientists during the course of an investigation or when they need technical expertise. The training video will begin with an introduction to the survey, why it was conducted, and what the primary findings of it were. There will be a section on the scientific community featuring interviews with scientists describing their views, concerns, or suspicions about working with LE agents. The goal is to have the range of opinions and content expressed in the open ended questions of the survey represented in the video by a series of short interviews. It is likely to contain points of view that some in law enforcement will find acerbic or misguided, nonetheless, it is essential to digest the full range of opinions with particular attention paid to those that might stand in the way of

counterintelligence data gathering, incident response, and prevention. It is critical to the effectiveness of the video that agents are exposed to, confronted with, and ultimately shocked by some of the extreme opinions that they could encounter. Only a small percentage of scientists have had past interaction with law enforcement agents, so interviewees will be speculating on what they expect the interaction would be like. To counter this, the video will also feature reflections from scientists who have personally or whose institutions have maintained good relationships with the FBI.

The second section of the video will focus on what LE agents can do to have productive interactions with scientists and alleviate the fears, concerns, or suspicions they might encounter. This will also consist of interviews with scientists describing the best ways for agents to initially approach or interact with them. Scientists who have had past interactions with agents will be asked to describe what approaches worked or did not work well to engage them. It is also possible that scientists whose work has required them to have an ongoing relationship with the FBI will be able to provide insight on how they have approached colleagues or new employees who were resistant to working with law enforcement.

The video will be designed to raise awareness of the varying views law enforcement personnel are likely to encounter when interacting with the scientific community and to provoke discussion on how they can best interact with scientists. Further, it may provide insight into best practices for coordinating contact between multiple agency units and individual academic institutions. This project provides an opportunity to reach out to the scientific community and publicly let them know that law enforcement agencies are interested in strengthening ties and understanding their points of view and provides the groundwork for forming new agency protocols on handling interactions with the scientific community.

# Securing Venezuela's Arsenals

By Matt Schroeder, Project Manager of the Arms Sales Monitoring Project

The discovery of Swedish AT-4 anti-tank rockets sold to Venezuela in a Colombian rebel arms cache raises serious questions about Venezuela's ability to safeguard its arsenal of modern weaponry, including dozens of advanced SA-24 shoulder-fired, surface-to-air missiles. Given the potential threat posed by these missiles and other weapons in Venezuela's rapidly growing arsenal, the international community should take immediate steps to identify and close the gaps in Venezuela's stockpile security and to ensure that the end-use monitoring conducted by states that export weapons to Venezuela is sufficiently robust.

According to Colombian authorities, Swedish anti-tank rocket launchers were found in October 2008 in an arms cache allegedly linked to the FARC.<sup>1</sup> On July 27th, Colombian Vice President Francisco Santos asserted that "[i]n several operations in which we have recovered weapons from the FARC, we have found powerful munitions and powerful equipment, including anti-tank weapons, from a European country that sold them to Venezuela and that turned up in the hands of the FARC."<sup>2</sup> Thomas Samuelsson of the Swedish firm Saab Bofors Dynamics confirmed that the AT-4 rockets were manufactured and sold to Venezuela by his firm.<sup>3</sup> The Venezuelan government responded harshly to Colombia's revelation, calling it "laughable" and recalling the Venezuelan ambassador to Colombia.<sup>4</sup>

This is not the first time that Colombian authorities have discovered Venezuelan weapons in rebel arms caches. In 2006, the Federation of American Scientists called attention to several reports of Venezuelan firearms acquired by the FARC, sometimes "...in lots of 50," according to a demobilized guerrilla interviewed by Jane's Information



Group.<sup>5</sup> In most of these cases, it is not clear what role, if any, that Venezuelan government officials played in the diversion. There is much speculation about the regime's support of the FARC and its role in arms trafficking to the embattled rebel group,<sup>6</sup> but verifying accusations of high-level complicity by the Venezuelan government based on information in the public domain is nearly impossible and, at one level, it doesn't matter. The Venezuelan government is responsible for safeguarding the military's arsenal and should be held accountable for any diverted weapons, regardless of the circumstances surrounding their diversion. The focus, therefore, should shift from the fruitless back-and-forth with Chavez over his regime's alleged support for the FARC to identifying the specific sources of diverted weapons, bolstering Venezuelan stockpile security, and calling on states that arm Venezuela to closely monitor their exported weapons.

The need for strong controls on Venezuela's arsenals has never been greater. In April, the world got its first, surprising glimpse of dozens of sophisticated SA-24 surface-to-air missiles imported by

Venezuela, presumably from Russia. The missiles – the acquisition of which was rumored but not confirmed – were caught on tape during a military parade. The SA-24 is an advanced, shoulder-fired, infra-red seeking missile with a range of 6000 meters.<sup>7</sup> Given recent events, the wisdom of selling dozens of sophisticated shoulder-fired missiles to Venezuela seems dubious. But Chavez is not about to give up the missiles, and Russia is not about to take them back. What to do?

The international community should start by demanding an immediate and thorough investigation into the diversion of Venezuelan weapons seized from Colombian rebels or other unauthorized end-users. This investigation should be led by an independent organization such as the Organization of American States, which conducted a similar investigation into the diversion of Nicaraguan assault rifles in 2001. As part of this investigation, the Venezuelan government should provide a detailed summary of the stockpile security measures currently applied to its small arms, light weapons, and ammunition. This summary should be at least as detailed

as the information provided by the United States in the U.S. Defense Department manual, "Physical Security of Sensitive Conventional Arms, Ammunition and Explosives,"<sup>8</sup> and should be made available to the Organization of American States, its members, and the governments of countries that sell weapons to Venezuela. If done correctly, the investigation will reveal any problems with Venezuela's stockpile security controls, and will provide a blueprint for any necessary changes to these controls.

Secondly, the states that export weapons to Venezuela should condition future weapon sales on a full and complete investigation into recent reports of arms trafficking and diversion, and the implementation of corrective actions aimed at preventing future incidents. Countries that have recently suspended weapon sales to Venezuela should make it clear that arms sales will not resume until shortcomings in stockpile security are fully addressed and Venezuelan weapons stop turning up in the caches of illegal armed groups.

Exporting states should also adopt rigorous end-use monitoring requirements for all small arms and light weapons exported to Venezuela. This monitoring should be applied retroactively to previously exported arms and should include on-site inspections of Venezuela's weapons depots by officials from the exporting state; rigorous transport, use, storage and retransfer requirements and restrictions; and routine post-shipment checks of exported weapons. Additional controls should be applied (if they aren't already in place) to the SA-24 shoulder-fired missiles, including mandatory on-site physical inventories by serial number of all missiles and launchers. The inventories should be conducted monthly by Venezuelan authorities and annually by officials from exporting states. The international community should monitor implementation of these measures by Venezuela and its arms suppliers, and should intervene if these governments fail to make adequate progress in a timely fashion.

Finally, the international community should embrace post-shipment end-use monitoring as a fundamental anti-trafficking strategy and should push for universal adoption of robust EUM by arms exporting states. Venezuela is but one of many sources of illicit arms, even in South America, and the global nature of arms trafficking means that unsecured arsenals anywhere are a potential target for international traffickers everywhere. While stemming the illicit arms trade requires action on many fronts, onsite physical inspections of exported weapons are particularly important as they have the potential to deter unauthorized retransfer and ensure that incidents of diversion and lapses in stockpile security will be detected by the exporting state. Few exporters actively and systematically track their weapons after they leave their shores, however, and fewer still regularly send officials to physically check on exported weapons. According to Sarah Parker of *Small Arms Survey*, "[i]n practice...it seems that few states other than the United States conduct significant physical and post-delivery checks."<sup>9</sup> This must change if arms exporters and their clients are ever to curb the illicit trade in small arms and light weapons.

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## Notes

- 1 Frank Bajak, "Rocket launchers sold to Venezuela went to FARC," *Associated Press*, 28 July 2009.
- 2 Arthur Brice, "Venezuela freezes relations with Colombia," *CNN*, 29 July 2009.

- 3 Chris Kraul, "Colombia-Venezuela relations erode further with rocket revelation," *Los Angeles Times*, 28 July 2009. During a telephone call on 30 July 2009, Swedish officials confirmed to the FAS that serial numbers on the seized missiles matched those sold to Venezuela.
- 4 Chavez claims that the AT-4s were stolen from a naval post in Cararabo in 1995. Others, including Anna Gilmour of Jane's Information Group, think that the launchers were acquired more recently. FARC leader Alfonso Cano claims that his group captured the launchers "a long time ago in a military battle on the border." See "FARC chief denies getting launchers from Venezuela," *Associated Press*, 13 August 2009; "Chavez halts imports of 10,000 Colombian cars," *Agence France Presse*, 6 August 2009; and Brice, "Venezuela freezes relations with Colombia."
- 5 Andy Webb-Vidal, "South American cocaine trafficking operations shift towards Venezuela," *Jane's Intelligence Review*, May 2006. See also Gonzalo Guillen, "Venezuelan ammunition reaching rebels," *Miami Herald*, 21 January 2008; David Gonzales, "Assembly to be Asked to Investigate Alleged Trafficking of Arms to Guerrillas," *El Nacional*, 28 March 2005 (English translation); "General Tapias on Weapons Seized from Illegal Armed Groups in Past Five Years," *El Pais*, 11 July 2000 (English translation); Andy Webb-Vidal, "Lords of War: Running the arms trafficking industry," *Jane's Intelligence Review*, May 2008; "Venezuelans admit charges of arm traffic in Colombia," *El Universal*, 9 June 2008; Kim Cragin and Bruce Hoffman, *Arms Trafficking and Colombia* (Santa Monica, CA: RAND, 2003); UN Office on Drugs and Crime, *Violence, Crime and Illegal Arms Trafficking in Colombia*, December 2006; Jose de Cordoba, "Colombia rebels wield power inside Venezuela," *Associated Press Financial Wire*, 25 November 2008; and Matthew Schroeder, *Small Arms, Terrorism and the OAS Firearms Convention*, FAS Occasional Paper No. 1, March 2004.
- 6 See Simon Romero, "Venezuela Still Aids Colombia Rebels, New Material Shows," *New York Times*, 3 August 2009. In September 2008, the US Treasury Department added two senior Venezuelan government officials and a former official to the Office of Foreign Asset Control's list of Specially Designated Nationals list. According to the Treasury Department, these officials "armed, abetted and funded the FARC..." See "Treasury Targets Venezuelan Government Officials Supporting the FARC," Press Release HP-1132, 12 September 2008. <http://www.treas.gov/press/releases/hp1132.htm>
- 7 James C. O'Halloran and Christopher F. Foss, *Jane's Land-based Air Defense 2008-2009* (Cambridge University Press, 2008).
- 8 DOD 5100.76-M
- 9 "Devils in Diversity: Export Controls for Military Small Arms," in *Small Arms Survey 2009: Shadows of War* (Cambridge University Press, 2009), p. 82.



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