

# F.A.S. PUBLIC INTEREST REPORT

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## HENRY KELLY APPOINTED FAS PRESIDENT

Henry Kelly, currently Assistant Director for Technology in the White House's Office of Science and Technology, will take office as the President of the Federation of American Scientists and the FAS Fund by June 1, replacing Jeremy J. Stone, who completes, this Spring, 30 years of service as FAS's Chief Executive Officer.

Dr. Kelly, 54, was trained as a physicist at Harvard University. He has had broad work experience, including positions at the Arms Control and Disarmament Agency (three years), the Solar Energy Research Institute (two years), the Department of Energy (two years) and the Office of Technology Assessment (eleven years) before his seven-year stint in the White House. In his current position, he has played a central role in the development and implementation of science and technology projects throughout the federal government. This has included negotiating and implementing major administration research partnerships targeting technologies aimed at breakthroughs in the environmental performance of automobiles (PNGV), housing (PATH), and the production of fuels and feedstocks from renewable biological sources.

He convened the President's Information Tech-

nology Advisory Committee and helped translate their advice into a large expansion and refocusing of federal information technology research. And he was instrumental

in creating major federal programs in learning technology for children and adults, including an executive order accelerating use of instructional technology for training federal civilian and military employees. He worked to support the Comprehensive Test Ban in the Arms Control and Disarmament Agency and the White House and a range of nuclear disarmament issues at ACDA.

Officials at the FAS search committee reported warm endorsement of Kelly for the position. Jeremy Stone, who has known Kelly for many years, said he was "perfect for the position, an energetic, well-trained scientist and activist, with uniquely broad and relevant Washington experience, and a kind and like-

able person who would get on well with staff, officials, members and funders." Kelly, he reported, had "impressed the FAS staff with his sincere interest in their projects and his desire to move FAS forward" and had cautiously, and skillfully, called upon relevant foundation staffers to confirm their readiness in their continuation to fund FAS under the new leadership.



*Dr. Henry Kelly  
Newly-appointed President of the  
Federation of American Scientists*

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Stone himself, now working primarily as the President of Catalytic Diplomacy, has been to Asia four times since November. He reports he has "never been more successful in my work." His peace and security activities are currently emphasizing China-Taiwan, Iran and Russia.

Chairman of the Federation of American Scientists Fund, Frank von Hippel, has known Kelly since 1974. Kelly, then on the staff of the Congressional Office of Technology Assessment, organized OTA's Peer Review of the claim put forward by then-Secretary of Defense James Schlesinger that a Soviet attack on U. S. nuclear missiles and bombers was "thinkable" because it would kill only 15,000 to 25,000 people. Following the OTA Peer Review, the Department of Defense revised its fatality estimate to up to 20 million. Von Hippel "looks forward to having Kelly devoting some of his enormous talents once again to raising the level of the nuclear weapons policy debate."

Asked about his decision to accept the position, Kelly said: "I'm honored and excited by the opportunity to serve as President of the Federation of American Scientists. FAS has a heroic 50 year record of bringing reliable information, clear thinking, and practical agendas for action to public policy debates. The solid foundation established by Jeremy Stone and a superb FAS staff makes me confident that we can continue this mission. I want to build on FAS' solid work in space and arms control and establish programs in a few new areas. One that is of great interest to me personally is using emerging information technologies to make instruction on any subject accessible and affordable to every person on the globe. Since the FAS was founded the dangers of misused technology have become more subtle while the opportunities have become more spectacular. The need for the organization has never been greater."

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Current war and peace issues range from nuclear war to ethnic conflict and from nuclear disarmament to arms sales; sustainable development issues include disease surveillance, climate modification, poverty, food security and environment. FAS also works on human rights of scientists and on reductions in secrecy.

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## SPINNING OUT OF CONTROL: THE IMPACT OF GLOBALIZATION ON THE CONVENTIONAL ARMS TRADE

*By Tamar Gabelnick*

While the nuclear arms control community is decrying the possible disintegration of several arms control treaties, conventional arms control proponents are still trying to create an effective non-proliferation regime. The limited political consensus for arms sales restrictions that existed during the Cold War has evaporated, leaving no widely accepted norm of restraint in its place. Instead, global market forces are driving the arms trade, with governments' political and security interests often taking second place to the economic interests of the arms industry.

The phenomenon of globalization has reached the arms industry, and as the U.S. and its allies help build weapons production capabilities in more and more states, they are losing their ability to control the arms trade. Limits on military technology transfer are in order. In addition, the trend toward transnational weapons development and production will require states to make more joint decisions on exports of these co-developed arms. In order to avoid the temptation to adopt the lowest common export criteria, the international community urgently needs to adopt strict common standards for arms transfers.

### **The New Economics of the Arms Trade**

From 1988 to 1996, the global volume of arms sales was cut in half, leaving weapons makers frantic to find new markets and outbid competitors. Few arms producers have converted to civilian goods, and the frenzy of mergers and acquisitions – first in the U.S. and now in western Europe – has done little to reduce the problem of overcapacity. Instead, the large and powerful arms industry is successfully lobbying for relaxed arms export policies and increased subsidies to support their overseas sales.

Governments have by and large accepted the arms industry's view, letting economic considerations hold sway in most arms export decisions. The rationale used to justify many exports is that overseas arms sales keep open lines of production in between domestic orders, maintaining critical skills and infrastructure. In addition, arms export proponents argue that having external buyers spreads out the fixed costs of research, development, and production, keeping down per unit costs for the host government. European states, with limited domestic markets, have long felt pressure to export to keep down costs. Russia, back

in the weapons market after a long decline in sales, cares almost exclusively about earning foreign currency.

The U.S. government has also adopted the economic argument for arms exports. The Clinton administration was the first to explicitly identify economic factors as central elements of its conventional arms transfer policy. Presidential Decision Directive 34, signed in 1995, states that one of the goals of U.S. arms exports is "to enhance the ability of the U.S. defense industrial base to meet U.S. defense requirements and maintain long-term military technological superiority at lower costs," and that the export decision should be based in part on "the impact on U.S. industry and the defense industrial base."

Yet the economic benefits of arms sales are largely overstated. A 1999 GAO report challenged the notion that arms exports significantly lower U.S. procurement costs. Moreover, the U.S. spends roughly \$8 billion a year in support of arms exports (about half the value of annual U.S. arms shipments). This sum includes grants and loans to foreign governments to buy U.S. arms, the salaries of U.S. staff who promote and process arms sales, and forfeited research and development "recoupment fees" from foreign buyers. In addition, the common practice of giving the purchasing country up to 100% of the purchase value in co-production, investment, or marketing assistance further reduces economic gains from arms exports.

### **No Holds Barred**

The incorporation of arms industry profits and defense procurement savings into the arms export decision-making process has helped break down barriers to arms exports. In an alarming display of short-sightedness, the Clinton administration permits arms sales to all but a short list of "rogue" states. The U.S. weapons industry delivered arms to, signed new contracts with, or received export licenses for 155 out of 190 independent countries in fiscal year 1998. Over \$18 billion of arms were shipped from the U.S. that year. Among the large number of arms importers are states that are involved or recently coming out of conflict, engaged in arms races with hostile neighbors, abusive of the rights of their own citizens, or forced to divert scarce resources to buy arms.

Profit motives often lead to arms export decisions

that work against stated U.S. foreign policy goals, such as preserving stability in the Middle East and the Aegean or promoting democracy in Latin America. In the "profit-over-pragmatism" logic, Israel may receive up to \$17 billion worth of weapons from the U.S. to seal a peace accord with Syria; Colombia is about to receive almost \$1 billion worth of arms to fight leftist insurgents in the name of reducing drug consumption in the U.S.; and Turkey's failure to reduce human rights abuses or to negotiate an end to its 15-year-old conflict with Kurdish rebels may soon be rewarded with a \$4 billion attack helicopter sale.

In addition to massive quantities of arms exports, the U.S. is selling increasingly sophisticated weaponry to a wider group of countries, introducing new technology

### U.S. Manufacturing & Technical Assistance Agreements: Fiscal Years 1996-98

*Top Ten Recipients, Licenses Authorized*

1. United Kingdom	\$6,789,627,372
2. Japan	6,459,496,574
3. Saudi Arabia	1,590,192,092
4. South Korea	1,494,142,769
5. Canada	1,485,302,485
6. Italy	1,164,615,517
7. Israel	1,080,372,415
8. Germany	866,309,451
9. Singapore	857,577,181
10. Australia	822,885,645
<b>World Total</b>	<b>\$35,683,853,710</b>

*Source: "665" Reports, State Dept. FY '96-98*

into highly charged regions like the Middle East and the Aegean. For example, the United Arab Emirates just finalized a deal to buy 80 F-16s that will have better range, radar, and targeting accuracy than those used by the U.S. Air Force. Vice President Gore announced this controversial concession, a decision surely facilitated by the \$6 billion-plus price tag and the fact that the jets will be built in electorate-rich Texas.

### The Proliferation of Producers

The high-pitched race to export means that not just arms, but also the technology needed to produce arms

are being sent to nations worldwide with scant reflection on the long-term consequences. In order to seal deals in this buyers' market, exporters must often provide importing states with a share in the production of the equipment. These "offset" arrangements can include local assembly work, sub-contracting agreements, joint weapons development, and technology transfers. Many importing states openly declare their intention to use the foreign technology and expertise to become independent producers and exporters of weapons systems. For instance, Turkey and South Korea now have F-16 plants that produce the jets for their own use, and Turkey also produced 46 jets for Egypt. Turkey is also demanding enough technology transfer for a pending attack helicopter deal to become an independent helicopter maker.

The U.S. government originally encouraged the export of arms production and associated technology to key allies to strengthen their defense industry and to encourage "interoperability" with U.S. systems. But with the arms industry leading the way, the U.S. and other exporting states are now engaged in some form of co-production or joint development with countries worldwide, including many newly industrialized and developing states. These governments have become complicit partners in the proliferation of weapons manufacturing capability, a strategy which disregards the potential long-term threat to international peace and security, let alone the competition from new producers.

Because even close U.S. allies have arms export standards that may be at odds with U.S. interests, Washington requires its permission for third party transfers of U.S.-origin arms and military technology. Yet the U.S. cannot easily prevent states from using American technology in locally developed systems exported to third parties. For example, Israel is negotiating a sale of an airborne early-warning radar system to China, which the U.S. fears will increase China's military advantage over Taiwan. The government of Israel claims that the U.S. cannot block the sale, however, because no U.S. technology is directly involved. But since the U.S. played a fundamental role in creating the Israeli military industry, this statement cannot be wholly accurate.

So far, the U.S. has protected its most sensitive technology with so-called "black boxes," physical or electronic barriers to reverse engineering. But U.S. allies are now demanding that this practice be stopped. For example, Israel and Turkey want U.S. companies to transfer software the fire-control radar source codes in

order to win major attack helicopter contracts. Germany has also threatened to pull out of joint development of the Medium Extended Air Defense System (MEADS) because of the black boxes around U.S. technology.

So far, the Pentagon has resisted succumbing to this blackmail, but signs point to a reversal in policy. Recent reports state that Germany will gain access to the MEADS "black box" technology, and Israel is confident that it will be granted the source codes it requested. Once the precedent is set, it will be difficult to resist demands from other allies. Technology transfer at this level will not only enable states to incorporate U.S. technology into their exported arms, but also to adapt their own equipment in a way which may threaten U.S. interests. For example, source codes for fighter aircraft radars allow the user to change the pre-set friend or foe designator.

Licensed production of less sophisticated equipment, such as small arms and ammunition, also poses serious proliferation problems. Not only is it harder to prevent unauthorized retransfers of these easily concealed weapons, but licensed producers often get around U.S. law altogether by making small modifications to the design and selling them as domestic models. Moreover, although the United Nations has identified ammunition control as a potential chokepoint in the overly abundant small arms supply, United States sold \$105 million worth of ammunition raw materials and manufacturing equipment to 66 countries in FY 98. Enlarging the body of states actively involved in producing this most basic tool of violence undercuts the U.S. government's work on limiting the deadly impact of small arms in conflicts worldwide.

### **A Race to the Bottom on Export Standards**

Under a law passed in November 1999, the U.S. administration is required to work toward a multilateral "Code of Conduct" on arms transfers, which would establish common arms export standards based on the recipient state's respect for human rights and international law. Yet much of the administration's energy is currently devoted to *reducing* existing U.S. restrictions on arms exports and technology transfers, again for largely economic reasons.

The Pentagon is aggressively promoting the notion that the U.S. can greatly benefit from the process of "defense globalization," or increased transnational cooperative defense projects. But first, according to DoD, the U.S. must "modernize," or liberalize, U.S. arms export



*Secretary of Defense William S. Cohen (left) and UK Sec. of State for Defence Geoffrey Hoon sign a Declaration of Principles for Defense Equipment and Industrial Cooperation on Feb. 5, 2000 without State Department or congressional endorsement.*

regulations. Strict rules on everything from technology transfers to third party exports are allegedly inhibiting closer defense links with foreign corporations.

The Pentagon's goal is to encourage European partnership with U.S. firms by eliminating arms export license requirements for favored allied partners, issuing program licenses for entire weapons systems (including spare parts and associated technology), and reducing restrictions on third-party transfers of jointly developed systems. While the State Department was initially reluctant to accept these proposals, it is being strong-armed into accepting almost all of them. The administration is now moving quickly toward agreement on the reforms in order to announce them at the May 2000 NATO ministerial.

In the meantime, the Pentagon has already begun to take steps to hasten its export approval process, placing time limits on license decisions in a move which favors quantity over quality. It also independently negotiated and agreed to a cooperative agreement on defense trade with the United Kingdom, without the approval of the State Department or Congress. The agreement, signed in February 2000, commits the parties to work toward reducing all barriers to free arms trade and technology transfer between them and to reducing impediments to third party transfers of jointly produced weapons. The agreement also calls on the parties to achieve greater "efficiency" in arms export decisions, and to "diminish legislative and regulatory impediments to optimizing market competition." In other words, the paper commits the U.S. to bring down its standards to the level of its trading partners rather than encouraging both parties to adopt the highest possible common standard.

### A Better Model

In order to reverse the disturbing movement toward free trade in conventional arms, a fundamental shift must take place in the way such sales are viewed. Many governments aggressively promote weapons sales in the global market just as they do for other key industries. Yet like nuclear materials, narcotics, or other potentially destructive products, conventional arms should *not* be treated like any other commercial good. One need look no further than central Africa, South Asia, and the Middle East to witness the level of destruction and suffering that conventional arms can inflict. Economic profit must therefore be removed from governments' decisions about arms exports. Instead, the global norm governing arms sales should be the impact on international stability, regional security, and the protection of human rights.

Unfortunately, there are currently no international regimes which establish common norms on arms transfers nor bind states in any way to limit arms exports. The successor to the Coordinating Committee for Multilateral Export Controls (COCOM) — the western states' Cold War agreement to prevent arms and dual-use technology from going to communist states — is a weak body called the "Wassenaar Arrangement." This group, which includes Russia and other Eastern European exporters, is primarily a post-facto mechanism for sharing information on arms and dual-use technology transfers. A more proactive role for the group is hampered by a consensus decision-making process and the strenuous opposition of states like Russia and France to go beyond a passive mandate.

The international community sorely needs more effective instruments to regulate the arms trade. With a congressional mandate to establish a multilateral Code of Conduct, the U.S. government must now take the lead on such an agreement. The Code of Conduct would commit major exporting states to preventing arms sales to countries involved in regional arms races, a history of aggression against other states, or with poor human rights records. In May 1998, the European Union agreed to use a similar set of principles when assessing arms transfers, to inform each other of sales denials based on these criteria, and to consult each other if planning to undercut such denials. Expanding this type of regime to as many major arms exporters as possible would reverse the current race to the bottom in arms export standards.

In addition, arms exporting states should take steps to reverse the diffusion of technology that allows increasing numbers of states to produce advanced weaponry. Increasing numbers of independent actors will make an international normative agreement on arms transfers even harder to enforce. A new conventional non-proliferation regime should be developed to prevent the transfer of military production technology to states which do not already have an autonomous capacity to manufacture such equipment.

In other areas of trade, these restrictions would be decried as an unfair system of protectionism. But just as the World Trade Organization exempts military equipment from free trade rules on security grounds, arms importing states need to accept that it is more important to promote international peace and security by reigning in the arms trade than to "share the wealth" in this deadly market.

## TECHNOLOGY TRANSFER: UBIQUITOUS STUMBLING BLOCK, UNIQUE OPPORTUNITY

*By Dorothy Preslar*

The questions of how, when, where and what technologies will be shared on an equal footing among nations are becoming an increasingly troublesome problem for arms control. For example, completing a protocol for the Biological and Toxin Weapons Convention (BTWC) hinges on the resolution of two outstanding issues — both related to technology transfer, though in unrelated ways.

The first is the need to protect proprietary bio-

technology in the declarations-confirmation visit mechanism proposed for implementing the treaty — that is, a fear that treaty office inspectors will detect innovations in research and production methodology and clandestinely pass along their observations and information to others.

The second is the need of many countries now thrust into the global marketplace to acquire cutting-edge technologies they have as yet not developed (and indeed, have no time to play catch up on all fronts) — that is, a

fear that the final protocol will not deliver on the treaty's "promise" that technology sought for peaceful purposes will be available.

Protocol negotiations, or rather the impasse, on these issues have become so sensitive that the usual suspects are not even talking to the media. Exactly what specific technology is sought but not available from *any* source is not clear. What is becoming obvious is that countries want to acquire technology in an international atmosphere of permission and confirmation of equal status.

FAS and the Stockholm International Peace Research Institute (SIPRI) are jointly exploring these issues in research on "Managing Technology Transfers in a Security Environment." This work, funded by a grant from the United States Institute of Peace is intended to help sort out the questions of what, how, when and where, and to strike a balance between military security interests and global needs.

### Sensible Approach Under Development

A recent development regarding U.S. computers indicates that managing technology transfers on the basis of common sense and close monitoring of the advance of technology is possible. This time last year, the restrictions on computer sales were highly restrictive and based on out-of-date criteria that put even laptops into the dual-use category.

In June 1999 representatives of the U.S. computer industry visited Congress to argue for new definitions of what constitutes a high performance computer under the export control regime that has focused on potential use in military programs in certain countries. They demonstrated that the pace of refinements and developments in the industry made the definition — 2000 million theoretical operations per second (MTOPS) — obsolete. The industry's other concern was the narrow market defined for high performance computers — at that point, the countries of Western Europe, Canada, Japan, Mexico, Australia and New Zealand.

In early July, President Clinton relaxed the export limitations, adding Brazil, Poland, Hungary and the Czech Republic to the list of countries to which U.S. computers of any size and performance can be shipped without a



***Pentium III notebook:  
Super computer?***  
*US still says "yes" for sales to  
Cuba, Iraq, and Libya.*

permit, while increasing the MTOPS limit on computers sold to China. On February 2 of this year, Clinton further relaxed the export limits, even to the so-called Third Tier nations (Russia, India, China, Pakistan, Vietnam, Israel, etc.). Now, only Tier 4 countries (Libya, Cuba, Iraq) are limited to 2000 MTOPS.

This type of approach incorporates both common sense and marketplace actuality in designating technological thresholds. It also may pave the way for linking U.S. export controls in other advancing industries to timely factual situations, rather than to situations that existed last year, or the year before that.

### Evolving Acquisition Strategies

Meanwhile, countries seeking cutting-edge technology are finding ways to get what they need in ways other than by direct purchase. The most productive avenues appear to be country-to-country cooperative programs, multi-national corporation investment, international industrial consortiums, and certain international agencies.

Examples of these strategies in the past four months include:

1. Action in Nov. 1999 by the Indian Federal Commerce and Industry Ministry to pursue multi-national company investment in India that includes transfer of "cutting edge" technologies, possibly leading to the Feb. 9 announcement that Citcom of the U.S. will transfer information technology in a joint venture with BHARI
2. Five-year plan announced in Dec. 1999 by Japan and China to promote transfer of Japanese coal mining technology to China and to provide training to Chinese entrepreneurs
3. Multimillion dollar project between Vietnam and Netherlands announced in Dec. 1999 to transfer pig and poultry-raising technology to the Asian country
4. Agreement in Jan. 2000 between China and Australia to jointly research and develop livestock embryo transfer techniques and technology aimed at raising superior livestock for sale in China

### Responsible Transfer Program

With respect to international agencies involved in technology transfer, a collaboration between two U.N.

agencies, the Food and Agriculture Organization and the International Atomic Energy Agency (FAO/IAEA), has managed to come up with a responsible program of coordinated research projects (CRPs). For about a decade, this joint UN initiative has been transferring technologies to developing nations to improve crop and food animal production, and to enhance these countries' ability to export agricultural products and to preserve native species by innovative disease diagnostic, prevention and control projects.

As examples, the CRPs have resulted in tsetse fly eradication on the island of Zanzibar through sterile insect technology, and more effective surveillance of rinderpest, Peste des Petitis Ruminants and Contagious Bovine Pleuropneumonia – the first two of which affect both wild and farmed animals – through ELISA and PCR radioisotope technology. This technology is *per se* dual use, as is practically all microbiological innovations of the past quarter century.

The FAO/IAEA's newest CRP is to develop and standardize assays for Foot and Mouth Disease (FMD) antibodies in livestock. These tests will distinguish between antibodies generated by vaccination against the disease (or remain in the animal after it has recovered from the disease) and those that indicate active infection. Under international sanitary regulations, detection of the antibody in even one animal out of an entire herd means that no other animal in that herd can be transported or sold. Successful testing and deployment of the test is of vital importance in South America, Africa and Asia and

will hopefully end the discriminatory situation.

Sensitivity testing of three different diagnostic kits, all of which utilize ELISA-based techniques, is now underway at 15 laboratories whose diagnostic work reflects strains of the disease found in China, Laos, Myanmar, Thailand, Hong Kong, Philippines, Malaysia, Peru, Uruguay, Argentina, Paraguay and South Africa. In Taiwan, the strains include both pig and cattle forms of the disease.

The relevance of FAO/IAEA CRPs to technology transfers in an environment of potential weapons proliferation is that the basic technology (science, equipment, application, training) is actually transferred (although not proprietary products) into the countries that need it and will continue to benefit from it.

### Biological Weapons Concerns?

Could radioisotope biotechnology be useful in a covert biological weapons program? Yes, but its utility is marginal, given what is really involved in developing and producing an effective weapon in quantities sufficient to induce mass casualties and the means to deliver it.

The threat posed by a developing world unable to feed and care for its peoples far outweighs the threat potential in the transfer of such technologies – and others more basic (viral and biological material itself) and even more advanced (genomic data bases and techniques) – when transferred by a mechanism open to public scrutiny and when subjected to a non-invasive monitoring system that could be a function of a BTWC protocol directorate.

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