

Obama announces reforms to simplify and reduce export controls

Universities welcome efforts to scale back federal controls over campus research by foreign nationals.

Last year J. Reece Roth, an emeritus professor of physics at the University of Tennessee, was sentenced to four years in prison for, among other violations of US export laws, disseminating US Air Force-funded plasma technology for the wing surfaces of unmanned aerial vehicles to two graduate students, one Iranian and one Chinese, in his laboratory. Roth is appealing the verdict, but his experience illustrates the consequences academic researchers and their institutions can face by ignoring or being unaware of the byzantine system of restrictions and prohibitions that govern US exports of technology. At his trial Roth argued unsuccessfully that he did not think his basic research work, though funded by the military, was subject to export controls.

In August President Obama announced that the nation's cold war-era export control system will receive sweeping changes that the administration says will clarify and streamline export licensing requirements and substantially reduce the number of technologies that require export li-

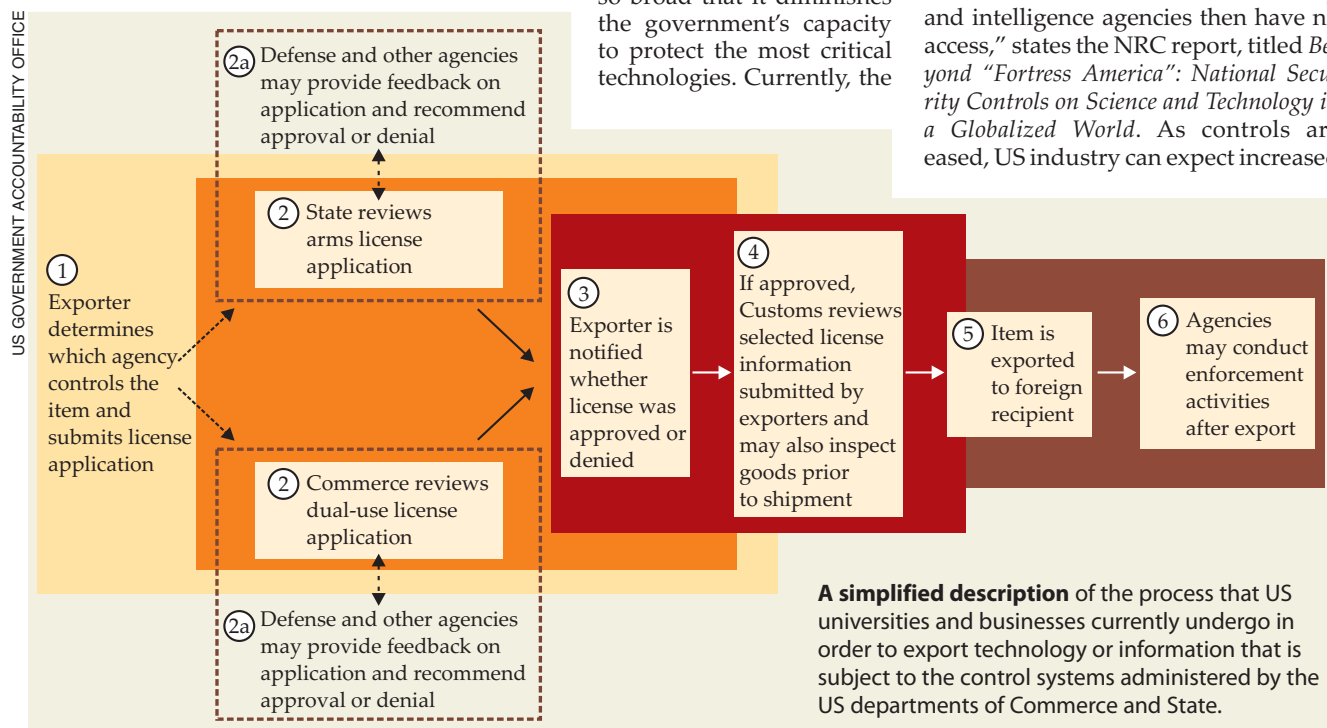
censes. When fully implemented, the reforms would lower what US manufacturers consider to be a major barrier to US competition in the worldwide technology market: Export items barred or restricted by US controls are often available from suppliers in other nations. The overhaul, Obama said in videotaped remarks to a Washington conference on export controls on 31 August, will change "what we control, how we control it, how we enforce those controls, and how we manage our controls." The new system will feature what other administration officials call the four singularities: one agency providing oversight, one list of controlled items, one agency enforcing controls, and a single licensing process.

Conflicting, confusing controls

The new policy is the result of an inter-agency review Obama ordered in August 2009 and takes into account recommendations of a National Research Council (NRC) committee last year. The administration's review concluded that the existing, bifurcated controls regime is overly complicated, redundant, and so broad that it diminishes the government's capacity to protect the most critical technologies. Currently, the

departments of State and Commerce frequently quarrel over administration and enforcement of two incompatible lists of controlled items, and they have no common database. As a result, a White House fact sheet says, the government doesn't know what it has approved for export and, "more significantly, what it has denied." As Secretary of Defense Robert Gates acknowledged at an industry association conference in April, in a few cases the same article from a US exporter received an export license from one agency and was denied it by the other.

The complexity of the US control system has led foreign manufacturers to shun US suppliers for fear that the finished products will be subject to US licensing or be prohibited from re-export to third nations. Controls can even backfire, harming the national security they ostensibly protect. "As foreign companies and governments fill the competitive gaps left by U.S.-based companies that are not permitted—or choose not—to export, valuable technical developments occur outside the United States to which the U.S. military and intelligence agencies then have no access," states the NRC report, titled *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*. As controls are eased, US industry can expect increased



sales of technology products abroad. Those sales will provide “greater opportunities and incentives for our companies to constantly innovate and refine the technologies that ultimately enhance and benefit US national security,” Secretary of Commerce Gary Locke told the August export-control conference.

Locke acknowledged that it will take time and legislation to achieve a single list with three tiers of constraints that reserve the most restrictive controls for a relatively small group of “our most sensitive items . . . which have high-value military or intelligence capabilities.” But some steps can be accomplished under the existing bureaucracy; Obama promised to establish one central agency to coordinate export enforcement and thus close the gaps and end the duplication that plagues the current system. The new authority is expected to be housed at the Immigration and Customs Enforcement unit in the Department of Homeland Security.

In advance of Obama’s announcement, government experts reviewed export-controlled items relating to tanks and military vehicles, just one of 20 categories on the munitions list. They determined that of the 12 000 items licensed in that category last year, 32% should be decontrolled and another 42% should be moved to the less stringent Commerce-administered control regime.

Exporting knowledge

US manufacturers and research universities applauded the administration’s plan. National Association of Manufacturers president John Engler said the reforms “will enhance the system dramatically and give focus to the most important products” and will increase association members’ competitiveness. Association of American Universities president Robert Berdahl called the proposal “an important first step towards achieving meaningful and sensible export control reform.” Berdahl said his organization is particularly pleased that the changes “look to protect national security without disrupting university research” and “are intended to ensure that the world’s best talent can participate openly in that research.”

Universities do not as a rule export physical products, but they routinely transfer knowledge to foreign nationals. If the transfer involves a controlled technology, universities often must obtain a license to allow a foreigner to participate—even if that individual is living in the US and the research takes place entirely on campus. In some cases, a foreign national’s use of an

instrument in a university laboratory could require an export license. It was the transfer of knowledge, or “deemed exports,” rather than a product that ensnared Roth, the University of Tennessee physics professor convicted of violating export laws. His Iranian and Chinese graduate students on that project almost certainly would have been denied licenses in any case.

The deemed exports concept is unique to the US, notes David Brady, director of Virginia Tech’s office of export and secure research compliance, and it causes considerable angst in the academic world, where the open exchange of information regardless of country of origin is a cardinal tenet. Some institutions will refuse to accept restrictions on access by foreign students and will instead turn down some research. Stanford University was forced to scale back one project it had under a subcontract to the Defense Advanced Research Projects Agency when it learned that an export-controlled technology would be central to the research, Stanford president John Hennessy told a House committee early this year. He said the university could not exclude several foreign graduate students, including two from China, who were part of the attempt to develop a microchip simulating the human brain.

Restrictions on research tools

Other research universities, including Virginia Tech, do accept restrictions in order to conduct research using a controlled technology. “We will comply and we will obtain licenses or restrict access on a case-by-case basis,” says Brady. Most problematic for academia are items on the munitions list, a compendium the White House describes as “broad, open-ended, subjective, and catch-all.” The rockets category, for example, includes sounding rockets, which are commonly used for all sorts of atmospheric research. “Technically speaking,” Brady says, “giving access to or teaching a foreign national how to use that sounding rocket could be considered a defense service by the State Department,” which administers the munitions list.

Devices known as inertial measurement units, widely used in transportation research, are another item on the munitions list. Although they are commercially available, an export license is required for foreign nationals to use the instruments, Brady says, even if the research clearly has no military application. And with rare exceptions, the government will deny licenses to citizens of more than two dozen nations, including

China, Iran, and several Arab states. Nationals from countries that are comprehensively embargoed by the US, such as North Korea and Cuba, are denied as well.

Some munitions-list controls are just silly. At the August conference, Locke displayed two virtually identical parts used to connect axles to the frames of heavy vehicles. They differed only in one being made of steel and the other of aluminum and one having a slightly larger hole. One is used on civilian fire trucks and can be exported freely; the other is a part for a military vehicle and “can get you 20 years in prison if you sell it abroad without a license,” Locke said.

The second set of restrictions on exports, the commerce control list (CCL), is a far more explicit compilation of dual-use technologies, having both commercial and military applications. Universities are less likely to run afoul of the CCL than of the munitions list because the Commerce system provides broader latitude for items used in fundamental research. A foreign national can operate a CCL-listed research instrument such as a mass spectrometer without a license, but that same person would probably need a license to also maintain, repair, and overhaul it, Brady explains. Universities that perform proprietary, industry-funded research have to be more cognizant of the CCL, he warns, because they will be treated under the more stringent provisions that apply to commercial technology exports.

A special case for satellites

Outraged by revelations that US satellite companies had transferred missile-guidance control technology to China, Congress in 1999 summarily moved export controls on civilian satellite technologies from the CCL to the munitions list. As a result, universities suddenly found that virtually all their space-related research required export licenses. Early this year Hennessy told lawmakers that scientists at Stanford who had designed and fabricated an instrument for NASA’s *Gravity B Probe* spacecraft were prohibited from discussing with colleagues outside the US the performance characteristics of the materials and the hardware used, despite the information’s publication in the open literature.

In another episode, described by a lobbyist who asked not to be named, a US university was forced to obtain an export license in order to return for repair an Italian-made component for a civilian satellite that had been damaged in tran-

sit. Because Congress mandated the stiffer controls on space items, lawmakers would have to act to change them.

Exports also must comply with US trade sanctions against rogue nations and regimes, terrorist organizations, drug traffickers, and entities involved in the proliferation of weapons of mass destruction. The Department of the Treasury's list of "specially designated nationals and blocked persons" currently runs to 741 pages. To top it off, a prospective US exporter of controlled items must ensure that the buyer isn't on a separate, periodically updated roster of nearly 200 individuals or organi-

zations to which US companies are prohibited from exporting some, if not all, controlled items. The list includes more than a dozen Chinese research institutes, such as the Beihang University of Aeronautics and Astronautics; a smaller number of Russian research institutes; and Israel's Ben Gurion University and the Negev Nuclear Research Center in Dimona.

"We scrutinize all of our Defense Department-funded research to ensure that what we are doing isn't involving defense articles or defense services. And if it is, we take the appropriate precautions for foreign national in-

volvement," says Brady. He estimates that at Virginia Tech, 100 or more research projects are reviewed annually for compliance with export controls. At least 100 US universities have officials whose role, like his, is to guide research faculty through the thicket of export regulations that come with their research grants. Apart from the administrative burden export controls impose on universities, Brady says, "research inefficiencies" are created when a program must be segregated to prevent a foreign national from working with controlled items.

David Kramer

US astronomy community sets plan to fit tight times

Balance, flexibility, and broad science mark the latest decadal survey. And, nitpicking aside, the survey is finding wide endorsement among astronomers and astrophysicists.

The flagship projects in astronomy and astrophysics for the coming decade will likely be the *Wide-Field Infrared Survey Telescope (WFIRST)* and the Large Synoptic Survey Telescope (LSST). They ranked first in the big-ticket space-based and ground-based categories, respectively, in *New Worlds, New Horizons in Astronomy and Astrophysics* (known as *Astro2010*), the decadal survey released by the National Research Council in August. The survey sets pri-

orities for the field for fiscal years 2012 through 2021 and will serve as a handbook for funding agencies.

"The survey puts science first. We were emphatic about that," says *Astro2010* committee chair Roger Blandford of Stanford University. The committee narrowed its focus to three broad science objectives: searching for the first stars, galaxies, and black holes; seeking nearby, habitable planets; and understanding the fundamental

physics of the universe. Those goals—plus fitting into a tight budget—inform the mix of space- and ground-based facilities and related activities the committee recommended.

Big surveys and midsize missions

The top space priority in the \$1 billion and up category is *WFIRST*, a survey "designed to settle essential questions in both exoplanet and dark energy research," according to *Astro2010*. In an

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