

ISSUES AND EVENTS

Science and Technology Are a Focus of Debate on New Homeland Security Department

Just before President Bush delivered his bill to Congress on 18 June to establish the \$37.5 billion Department of Homeland Security (DHS), the White House released analytical documents indicating what role science and technology would play in the department's war against terrorism. "America's vast science and technology base provides us with a key advantage," one administration document said. "The department would press this advantage with a national research and development enterprise for homeland security comparable in emphasis and scope to that which has supported the national security community for more than fifty years."

The administration's DHS would involve not just billions of dollars but about 170 000 federal employees and the restructuring and merging of programs in more than two dozen federal government units. According to a recent analysis by the American Association for the Advancement of Science (AAAS), "creating the DHS will require the most extensive reorganization of the executive branch since World War II. . . ." As part of that reorganization, R&D programs from five existing departments—Health and Human Services (HHS), Energy, Commerce, Agriculture, and Transportation—would "fold in" to the new DHS.

The Bush proposal is a reversal for an administration that spent months resisting calls from Congress and others to create a cabinet-level homeland security department. A high-level department with its own significant budget would be much better defined and able to get things done than the administration's current Office of Homeland Security, which has no real base of power. Although Bush continued to oppose creating a cabinet-level department, legislation sponsored by Senator Joseph Lieberman (D-Conn.) that would do just that was passed by the Senate. With mounting public pressure to elevate homeland security, the administration on 6 June announced the creation of the DHS—a bigger and, Republicans argued, better version of the antiterrorism agency than Lieberman envisioned. The administration's DHS bill quickly

► Congress, the administration, and a National Research Council committee have come up with myriad ideas for creating a department of homeland security, but just what role science and technology will play is unclear.

received bipartisan support in general terms and it is clear that there will be a new department, probably by the end of the year.

Concern in Congress

But there is concern in Congress and elsewhere about the proposed structure of the new department, especially in regard to the role of science and technology. At a recent hearing of the House Science Committee, Chairman Sherwood Boehlert (R-N.Y.) told John Marburger, director of the Office of Science and Technology Policy, and other administration officials that the Bush proposal "simply does not give R&D a high enough profile to enable DHS to accomplish its goals. The bill does not even explicitly mention critical areas, such as cybersecurity and transportation security. It creates no slot for an official whose concern would be R&D."

Another Republican, Representative Connie Morella (R-Md.), said that "research and development strategy should not be handled piecemeal by the various division heads. There must be a high-level, dedicated office charged with overseeing and guiding the science portfolio at DHS." The administration's bill creates a position for undersecretary for chemical, biological, radiological, and nuclear countermeasures, who would be responsible for R&D programs, but critics worry no one person in the new department would have the job of overseeing and coordinating all levels of science and technology R&D. Marburger responded that Bush's bill does pay significant attention to science, but Boehlert's committee added to the House version of the bill language creating an undersecretary for science and technology.

Marburger later said he "wasn't surprised" by the House Science Com-

mittee's push for a science undersecretary. "Things like titles and details of structure can be worked out," he said. "We think there is enough flexibility built into the [administration's] legislation to make changes that are consistent with what Congress wants. I am reluctant to build too much into the legislation in order to avoid restricting management's ability to structure this department in the best way."

Although the administration's bill remains vague on many details, the AAAS analysis concluded that about \$2.3 billion of the department's \$37.5 billion fiscal year 2003 budget would go for R&D. Nearly all of that money would come from current National Institutes of Health (NIH) programs. R&D breaks down as follows in the four divisions proposed for DHS.

Information Analysis and Infrastructure Protection. This division's main task is to analyze intelligence. DOE's National Infrastructure Simulation and Analysis Center (NISAC), a \$23 million partnership between Los Alamos and Sandia National Laboratories, would be transferred to DHS. NIST's computer security division in Gaithersburg, Maryland, would also be transferred to DHS under the proposal, but several members of the House Science Committee, including Rep. Vern Ehlers (R-Mich.), a physicist, said they will not allow that to happen. The proposed move of NIST's computer security program highlights the broader problem of trying to move organizations that have more than one purpose into DHS.

The NIST division is important to DHS, but it also is a highly successful program that works closely with private industry on issues unrelated to homeland security. "There is a need to have core capabilities within DHS and there is a need to have functions that have most of their thrust outside homeland security to stay with their parent department," Marburger said. "Where you draw the line is, to some extent, a judgment call."

Chemical, Biological, Radiological, and Nuclear Countermeasures. This division is intended to handle most R&D in the Bush proposal. In its original 6 June announcement, the

White House proposed moving almost all of Lawrence Livermore National Laboratory from DOE to DHS, along with the lab's proposed FY 2003 budget of \$1.2 billion. In the legislation that went to Congress, only LLNL's advanced scientific computing research program and a limited number of other programs would move to DHS control. A separate DHS facility might be built at the lab, Marburger said, and the DHS work at the lab would become "a center of excellence" that, he added, would "reach out and fund and coordinate research at the other national labs, universities, and other research organizations. The entire R&D program for homeland security would be linked to that site at Lawrence Livermore." The University of California runs the lab for DOE and would also run the DHS facility at the lab, he said.

DOE would also lose pieces of programs that deal with such things as microbial pathogens and nuclear security. The AAAS estimates about \$100 million worth of DOE programs would move to DHS.

The largest R&D transfer would be about \$2 billion in funding that currently goes through HHS to fund bioterrorism-related R&D at NIH and the Centers for Disease Control and Prevention. NIH and CDC employees doing such research would stay where they are, but control of their funding would go to DHS, which would have the authority, in collaboration with HHS, to set the research agenda for antiterrorism work. It is unclear whether Congress will support giving control of NIH and CDC funding to DHS.

Border and Transportation Security. This division is the largest in terms of budget and personnel, but small in R&D spending. It would take over the Transportation Security Administration's aviation security R&D budget of about \$95 million, and another \$35 million in US Coast Guard and Department of Agriculture research money.

Emergency Preparedness and Response. This division, which coordinates federal assistance in response to disasters and domestic attacks, has no R&D programs.

The congressional arguments for centralizing and strengthening science and technology in the new department were bolstered in late June when the National Research Council (NRC) released the lengthy study *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*. The report makes nearly 150 specific recommendations about how the federal govern-

Components of 'Little Boy' Sold at Auction

The original red arming plug and green safety plug that were built for Little Boy, the first of only two atomic bombs ever used in combat, have been sold at auction for \$167 000. The purchaser was Clay Perkins, a retired physicist in Rancho Santa Fe, California. The sale went ahead despite a last-minute attempt by the US Air Force to block it for national security reasons.

The US B-29 bomber *Enola Gay* dropped Little Boy on Hiroshima, Japan, on 6 August 1945. The 9000-pound bomb had an explosive yield equal to 20 000 tons of TNT, and is believed to have killed more than 140 000 people. Morris Jeppson, the aircraft's weapons test officer, removed the plugs moments before the bomb was released. The green safety plug was used to test the device on the aircraft, and the red arming plug was a spare identical to those used to help trigger the bomb's detonation. They are the only parts of the original bomb that survived. Jeppson kept them as mementos but finally decided to sell them because he wanted to leave some inheritance to his family. "There were four serious bidders for the parts," says Levi Morgan, a director of Butterfields Auctioneers in San Francisco, "but only two went above \$100 000."

The air force argued in federal court that the sale should be stopped for two reasons: It would violate national security, and the plugs were US government property. On 14 June, the air force lost on both counts. "Veterans of every war took home government property," Morgan says, "so it's a bit awkward to try and use this defense now."

Perkins says he wanted the plugs for both historical and personal reasons. "These items are the most significant physical artifacts of the beginning of the atomic age," he points out. "And the dropping of the bomb also sparked my interest in physics." He says he'd be willing to loan the bomb plugs to a museum at a later date but, for now, "they are very safely locked up."

PAUL GUINNESSY



THE CONTROVERSIAL PLUGS from the Little Boy atomic bomb still carry labels, dated 7 August 1945, written by Morris Jeppson, the *Enola Gay* weapons test officer.

ment should use science and technology to fight terrorism. The day the report was released, Boehlert had its two coauthors testifying before his committee. Lewis Branscomb, a director in the Center for Science and International Affairs at Harvard University's Kennedy School of Government, and Richard Klausner, executive director of global health programs at the Bill & Melinda Gates Foundation, both emphasized that, in the words of the report, "science and technology could be harnessed to prevent or contain terrorist attacks."

An idea book

Marburger later characterized the report as "an idea book, a source book, but not a blueprint." In an interview, Branscomb said, "The point of the report is to persuade [the administration and Congress] that they are going

to have to make some choices and organize to get the R&D done."

Branscomb was critical of the DHS proposal, saying the administration is "creating a \$40 billion department without knowing what it is going to do. I think there is a huge amount at stake because neither the president's bill nor Lieberman's bill is thoroughly satisfactory with respect to the science and technology side of things."

Among the recommendations in the report, Branscomb said two were critical. "If there is a department, it must have a senior technical officer. No corporation would even think about doing this without a senior technical officer," he said. The House Science Committee's creation of a DHS undersecretary for science is an attempt to deal with Branscomb's concern. "Second," he added, "is the creation of a homeland

security institute, without which I don't see how they are going to make choices, build programs, and test whether they are any good or not."

The quasi-governmental institute would use independent contractors to provide technical expertise and analysis for DHS much in the same way the MITRE Corp and the Insti-

tute for Defense Analyses provide support for the Department of Defense. Such companies work without the constraints of government procurement regulations and, because of that, Branscomb said, they can attract the expensive, specialized talent that a government agency typically could not.

Some members of Congress have pushed to create the DHS by 11 September for obvious symbolic reasons, but given the vastness of the reorganization involved, many Capitol Hill observers believe Congress will be forced into session after the November elections to work out the final details.

JIM DAWSON

European Space Science Stretches Lean Budget

When David Southwood, the European Space Agency's director of science, emerged in May from several months of feverish strategizing, he delivered some surprisingly good news: ESA will fly all of its planned space exploration missions despite the recent blow to its science budget.

ESA's crisis began last November, after ministers representing the agency's 15 member states put the screws to the science budget. For the years 2002–06, science exploration was allotted €1869 million (euros and US dollars are roughly equal in value). "I got even less than our most pessimistic assumption," says Southwood. "If I integrate over 10 years—the time scale for space mission planning—it's about a €500 million reduction."

The tightened budget cast a pall over ESA's space science program. It was widely expected that the galaxy mapper GAIA would be axed. Instead, Southwood and ESA science policy advisers shook up the mission plan, ultimately saving GAIA and even adding Eddington, which will observe variations in light intensity to seismically probe the internal structure of more than 100 000 stars and hunt for planets. Other, smaller missions were also added, such as SMART 2 (Small Missions for Advanced Research in Technology), which will test, among other things, new sensors for precision positioning of spacecraft.

"The ESA executive and scientific working groups have done a tremendous job," says Bo Andersen of the Norwegian Space Centre in Oslo, who chairs ESA's scientific program committee (SPC). "We have managed to have no significant loss in science." Indeed, where the earlier plan included 12 missions in 11 years, the new one, dubbed Cosmic Vision, packs 16 missions into 10 years.

Rabbits and risks

How can more science be squeezed out of less money? ESA's new plan lumps missions together to exploit technical and scientific similarities. Eddington,

 To save its science missions, ESA will follow a more rigid schedule and forge closer cooperation with national space agencies.

for example, is grouped with Herschel and Planck, missions that will explore the infrared and microwave universe and the cosmic microwave background, respectively. The idea is to reduce costs by building the spacecraft and launchers for different missions in parallel. Work and launch schedules within groups are flexible: If, say, Planck faces delays, industry can turn its attention to a partner mission, rather than be paid to wait. Overall, however, ESA's new plan is less forgiving of delays than before. "I'll have to make sure that people don't cut corners just to meet deadlines," says Southwood.

Industry also came up with a trick to shrink GAIA's detectors, which will allow the craft to be sent into space with a smaller launcher. "This saves well over €100 million," says Southwood. "It's the biggest savings from a straight technical leap." The reason GAIA was first in line for the guillotine is because it is a purely European mission, he adds. "If I cancel NGST [Next Generation Space Telescope], I'm betraying America. If I cancel [the Mercury mission] BepiColombo, I'm betraying Japan. GAIA is a European flagship, and I had to think of stopping something big."

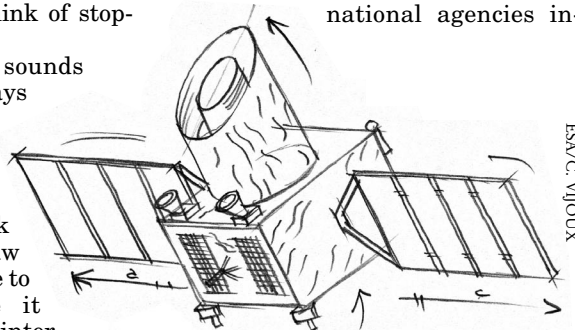
"The new program sounds easy, but it's tough," says Southwood. "I am taking a big risk. If you pull rabbits out of hats, people may want you to do it again. I can do this trick only once." It's like a jigsaw puzzle, he adds. "You have to put each piece where it matches, so it's firmly interwoven. We won't be able to choose individual missions anymore—we'll have to choose groups that can be done synergistically. This is the opposite of the US approach, but

obviously we have the same aims."

Doubts about on-time instrument delivery nearly caused Venus Express to be withdrawn from ESA's slate of missions. It would have to fly in 2005, says Southwood, "and I need absolute commitment that I'll get my payload"—the scientific instruments—"from scientific institutions in the member states. I integrated my doubts, and I felt the risk was too high." He adds that flying Venus Express later than 2005 would double its cost, "by losing commonality" with Mars Express and Rosetta, a cometary mission.

Planetary scientists argued that ESA's program would be weak without Venus Express. In mid-June, when it looked certain that the mission would be scrapped, Venus Express coordinator Dmitri Titov, of the Max Planck Institute for Aeronomy in Katlenburg-Lindau, Germany, said, "between Mars Express in 2003 and BepiColombo in 2011 or 2012, there is a big gap in planetary missions. This means not only a lack of data and a lack of new discoveries, it means that the planetary community in Europe will leave their labs. So I think it's very worrying."

Venus Express got a reprieve at the 11th hour: On 11 July, barely leaving time to meet the 2005 launch date, ESA decided to start work on Venus Express, and it gave the national agencies in-



Eddington EDDINGTON, a mission to study stars, was added to the European Space Agency's revised science plan.