Prometheus, Vol. 21, No. 3, September 2003

R&D in the United States Department of Homeland Security[1]

KEI KOIZUMI, JOANNE CARNEY, DAVID COOPER & AL TEICH

ABSTRACT

- The Department of Homeland Security (DHS) began full operations in March *by consolidating nearly 180,000 federal employees from nearly two-dozen agencies into a single cabinet-level department.*
- *The DHS would become one of the major funding sources of R&D.* The DHS R&D portfolio would total $1.0 billion in FY 2004, a 50% jump *from the $669 million for comparable programs in FY 2003 and nearly quadruple the FY 2002 funding level.*[2]
- *In FY 2003, DHS R&D would be mostly transfers of existing programs from the Departments of Agriculture (USDA), Defense (DOD), Energy (DOE), and Transportation (DOT), but* in FY 2004 a new Homeland Security Advanced Research Projects Agency (HSARPA) would fund extramural R&D.
- Bioterrorism R&D would stay in the National Institutes of Health (NIH), *but DHS will have a priority-setting role.*

Introduction

Each year since 1976, the American Association for the Advancement of Science, in collaboration with a group of US science, engineering, and higher engineering societies, has published a report analyzing R&D in the proposed federal budget. The report is issued in the spring, soon after the President submits his budget to Congress. Its function is to make available to the scientific and engineering communities as well as policymakers timely, objective information about the Administration's R&D plans for the coming fiscal year.

The report includes an overview of the budget and overall fiscal setting; discussions of the place of R&D in the budget, the political context of the R&D proposals, and major trends in R&D funding; as well as analyses of funding patterns. It includes chapters that examine the proposed R&D budgets of major federal agencies and departments (e.g. the National Science Foundation, the National Institutes of Health, the Department of Defense, and NASA) as well as cross-cutting analyses that look at the budget in terms of scientific and engineering disciplines and fields of research.

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2003 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/0810902032000113488

When the Department of Homeland Security, created in the wake of 'September 11', formally came into existence in March 2003, it immediately became one of the major R&D funding agencies in the US government and a focus of intense interest among members of the US science and engineering communities as well as those in other countries. The following article is adapted from the chapter on R&D in the Department of Homeland Security in the most recent AAAS report, *AAAS Report XXVIII: Research & Development FY 2004* (AAAS, Washington, DC, April 2003). It describes the organization of the new department for science and technology, its programs and the proposed budgets for those programs. More information about the R&D Budget and Policy Program, including the full text of this and previous reports, may be found at http://www.aaas.org/spp/rd.

On 1 March, the new Department of Homeland Security (DHS) took shape with the transfer of approximately 180,000 federal employees in nearly two dozen federal agencies to the new department. While DHS officially came into existence on 24 January with a skeleton staff, March 2003 marked the formal reorganization of existing government programs into a new cabinet-level department devoted to protecting the US homeland against terrorist attacks. Included under the new DHS umbrella are agencies such as the Coast Guard, the Customs Service, the Federal Emergency Management Agency, and the Immigration and Naturalization Service; all told, the DHS brings together $36 billion worth of programs (FY 2004 request) in the largest reorganization of the federal government since the 1940s.

The department was created by the Homeland Security Act of 2002 (Public Law 107–296), which was enacted on 25 November after much partisan wrangling. Drawing on several bills introduced in Congress, President Bush proposed legislation creating the department in June, citing the need for coordination among the many government agencies with responsibilities for protecting the nation. The legislation was slowed down by several controversies, including a dispute over personnel rules that delayed passage until after November's midterm elections.

A last-minute controversy that threatened to delay the legislation even further was caused in part by a provision that directed DHS to establish a university-based R&D center and set 15 detailed criteria to determine where to locate it. It was widely reported that the requirements were crafted by Rep. Tom Delay (R-TX), then the majority whip, in order to favor Texas A&M University. These criteria were revised in the FY 2003 omnibus appropriations bill to broaden eligibility.

The final legislation differed substantially from the Bush Administration's original proposal in two respects related to R&D. Congress established an Under Secretary for Science and Technology reporting directly to the Secretary of Homeland Security (Tom Ridge), who will serve as the apex of a new S&T infrastructure. The Under Secretary will head the Directorate for Science and Technology and serve as scientific and technical advisor to the Secretary. President Bush nominated Dr Charles E. McQueary, a mechanical engineer and retired president of General Dynamics, to this post. The Senate confirmed his nomination on 19 March.[3]

In addition, the President's original language would have transferred $1.5 billion in bioterrorism R&D programs to DHS from the Department of Health and Human Services (HHS). The final bill keeps these programs at HHS, while giving the DHS secretary authority to set priorities for them.

Also in the Homeland Security Act is a directive requiring the President to create procedures safeguarding 'homeland security information that is sensitive but unclassified'. Although the term has often been used informally, this marks the first formal demarcation of a category of information considered 'sensitive but unclassified'. The provision has created some concern in the research community that the new category could create confusion over the status of information or could be misused to restrict the flow of information that does not present a true threat to national security.

The DHS R&D Portfolio

The President's FY 2004 budget request, released on 3 February just days after the formal creation of DHS, proposes a budget of $36.2 billion for the new department in FY 2004. *Included in this total is an R&D portfolio of $1.0 billion, up from $669 million in FY 2003 for the various existing agency R&D programs that transferred to the new department on 1 March.*[4] Not only would DHS quickly become one of the major R&D funding agencies, but it would enjoy by far the largest percentage increase in R&D. The DHS will have its own S&T policy infrastructure as well as a significant R&D portfolio of its own, drawing on transfers of programs from other agencies as well as newly created R&D programs and performing organizations.

R&D in the Directorate of Science and Technology

Nearly all of the DHS R&D programs will find their home in the Directorate of Science and Technology, one of four broad directorates in the new department. This Directorate will have responsibility for setting homeland security R&D goals and priorities, coordinating homeland security R&D throughout the federal government, funding its own homeland security R&D, facilitating the transfer and deployment of technologies for homeland security, and advising the DHS Secretary on all scientific and technical matters.

The S&T Directorate will take in 80% of the R&D in DHS ($801 million out of $1.0 billion).[5] Except for a small amount for overhead costs ($2 million), all of the $803 million in funding in this directorate will be R&D, with the majority of funds for development and only about 10% each for basic research and applied research.

The FY 2004 DHS budget breaks down the directorate's R&D portfolio as follows: $137 million for the development of radiological/nuclear countermeasures including detection systems and crisis-response technologies; $365 million for the development of biological countermeasures to reduce the probability and impacts of an attack; $65 million for chemical or explosives countermeasures (including aircraft explosives); $90 million for threat and vulnerability assessments to develop technologies for analyzing threats, especially in information technologies; $25 million for a standards program to develop, test and evaluate criteria for homeland defense technologies; $55 million for conventional missions R&D to develop technologies that could assist DHS units in better performing their existing, non-homeland security missions; and finally $62 million for University Programs and the Emerging Threats and Rapid Prototyping Program, which will fund university research and basic research.

The Directorate of S&T will rely on several existing agency programs to carry out this work. The Directorate is the new home of existing Department of Defense

(DOD), Department of Energy (DOE), and Department of Agriculture (USDA) programs with an estimated budget of $521 million in FY 2003. Nearly all of this funding comes from DOD's newly created National Bioweapons Defense Analysis Center, which will be responsible for nearly the entire $365 million FY 2004 biological countermeasures portfolio. Although officially an existing program, it was created just in the FY 2003 budget and will actually take shape this year under the auspices of DHS. From DOE, DHS takes in parts of the Lawrence Livermore National Laboratory (LLNL) such as its Advanced Scientific Computing Research program and some smaller programs. Among other DOE programs, the Biological and Environmental Research program's microbial pathogens activities, and the national security and nuclear smuggling and other programs within Nonproliferation & Verification R&D move to DHS. DHS also takes in the Plum Island Animal Disease Center off Long Island, New York, formerly funded through USDA's Agricultural Research Service (ARS).

DHS will also create a new R&D unit in the S&T directorate called the *Homeland Security Advanced Research Projects Agency* (HSARPA), modeled on the existing Defense Advanced Research Projects Agency (DARPA) in DOD. HSARPA will award extramural grants for basic and applied research to promote revolutionary changes in homeland security technologies; will develop and test potential technologies; and will accelerate or prototype the development of technologies for deployment. HSARPA will therefore have responsibility for the entire spectrum of R&D, though initial indications are that the majority of activities will be in development and advanced prototyping to shift new technologies from the laboratory to deployment of actual products. As an example, the DHS FY 2004 budget suggests that HSARPA funding will 'address immediate gaps in high-priority operational areas like protecting critical infrastructure and securing our nation's borders'. HSARPA will begin life with a request for roughly $350 million in FY 2004.

In order to carry out its S&T tasks, the Directorate will create a new S&T infrastructure over the next few months to a year. The Under Secretary for S&T will be assisted by staff and will also have the ability to rely on numerous new institutions to be created in the coming months. There will be a Homeland Security Advisory Committee consisting of 20 members appointed by the Under Secretary representing first responders, citizen groups, researchers, engineers, and businesses to provide science and technology advice to the Under Secretary. The DHS could also create a new federally funded research and development center (FFRDC), the Homeland Security Institute, to act as a think tank for risk analyses, simulations of threat scenarios, analyses of possible countermeasures, and strategic plans for counterterrorism technology development.

There will also be an Office for National Laboratories that will coordinate DHS interactions with DOE national laboratories with expertise in homeland security; the Office can help DHS jointly sponsor R&D at the labs or can contract directly with the labs for R&D. The Office also has the authority to establish a semi-independent DHS headquarters laboratory within an existing federal laboratory, national lab, or FFRDC to supply scientific and technical knowledge to the DHS; the most recent indications are that DHS plans to do so with at least five national labs. In addition to Livermore, DHS has initial plans to establish four other labs-within-labs at Los Alamos, Sandia, Pacific Northwest, and Oak Ridge National Laboratories. DHS will also establish one or more university-based centers for homeland security.

R&D in Other DHS Directorates and Programs

$200 million, or a fifth, of the FY 2004 DHS R&D portfolio would remain outside the S&T Directorate.[6]

Directorate of Border and Transportation Security

This division is by far the largest of the four in terms of budget and personnel with a budget of $18 billion in FY 2004, and will integrate federal government operations aimed at securing US borders and transportation systems. It folds in the Immigration and Naturalization Service, the Customs Service, and the recently created Transportation Security Administration (TSA) from the Department of Transportation. This directorate inherits TSA's R&D programs on aviation security, with an appropriation of $110 million in FY 2003 rising to $172 million in FY 2004. Current plans call for the S&T Directorate to gradually assume responsibility for these R&D activities over the next few years.

Directorate for Information Analysis and Infrastructure Protection

R&D is not a large part of this directorate, totaling just $5 million in FY 2004 out of a total budget of $829 million. DOE's National Infrastructure Simulation and Analysis Center (NISAC) moves to DHS. NISAC is a partnership between Los Alamos and Sandia laboratories, both in New Mexico, and performs R&D to analyze critical infrastructures and their vulnerabilities, and simulate infrastructure or biological attack scenarios.

Directorate of Emergency Preparedness and Response

This directorate will coordinate all federal assistance in response to disasters (including natural disasters) and domestic attacks, and folds in the Federal Emergency Management Agency (FEMA). There are no R&D programs within its $6 billion budget in FY 2004, though the S&T Directorate could fund R&D to improve this directorate's ability to respond to disasters.

Coast Guard

The Coast Guard's $23 million R&D portfolio becomes part of DHS. DHS takes over responsibility of the Coast Guard from DOT, but the Coast Guard will remain an independent entity.

Other Homeland Security R&D Programs

Although DHS will be the focal point for homeland security-related R&D in the federal government, the majority of federal homeland security-related R&D will remain outside the department. *Bioterrorism R&D programs currently within the National Institutes of Health (NIH) will stay there instead of transferring to DHS.* The NIH bioterrorism R&D portfolio for FY 2004 would be $1.6 billion, mostly in the National Institute of Allergy and Infectious Diseases (NIAID), dwarfing the DHS R&D portfolio. The DHS legislation signed into law last November gives the DHS Secretary authority with the HHS Secretary to set priorities and strategy for human

health-related research on terrorist threats, but no funding authority; research grants will continue to flow from NIH out of the NIH budget and be administered by NIH personnel using existing funding mechanisms, but research priorities will come from DHS. Other counterterrorism R&D programs in other agencies, notably the Environmental Protection Agency (EPA), DOD, and DOE, will continue to remain outside DHS.[7]

Next Steps and Possible Impacts

Although the DHS officially has assumed responsibility for its wide-ranging portfolio, it will take years before the DHS reorganization is complete. In particular, it will take months before the new department has the leadership and capabilities to flesh out its S&T infrastructure.

In the meantime, Congress has struggled to reorganize its committee structure to handle the new department. The prospect of changing the composition of appropriation and authorization committees, and forcing some Members to relinquish political clout over the components of the department, initially left many political wonks skeptical that Congress would rise to the occasion. But the House moved fairly rapidly, perhaps a bit too quickly for the Senate.

The House Select Committee on Homeland Security, led by Rep. Christopher Cox (R-CA) and Rep. James Turner (D-TX) formally organized in February 2003. The committee has the authority to coordinate all House oversight of DHS and may also exercise exclusive legislative jurisdiction over the Homeland Security Act that established the department. The 50-member Select Committee is comprised of the chairs of relevant oversight committees, as well as a broad spectrum of Democratic members with a range of interests (e.g. workers rights). The Senate, meanwhile, has not addressed the issue of whether or how to knit together the authorizing committees into a similar counterpart, and has left most oversight functions with the Government Affairs Committee that crafted the legislation.

The House also took the first step on the appropriations front with House Appropriations Chairman C. W. (Bill) Young (R-FL) stating his intention to create a Homeland Security subcommittee that will consolidate authority over DHS, which is still currently spread over nine subcommittees. In order to keep the total number of appropriations subcommittees at 13, Young proposed to combine the Transportation and Treasury/Postal subcommittees. Sen. Ted Stevens (R-AK), Chairman of the Senate Appropriations Committee, expressed displeasure that the House had made such a move without consulting their chamber. In the end, the Senate relented and agreed to create a new appropriations subcommittee structure mirroring the House version. Shifting the appropriations debate to a single subcommittee will significantly smooth the way for the FY 2004 budget deliberations.[8]

With congressional oversight more or less in place, the difficult task of using that oversight to assist the department to flesh out its structure now comes into play. With a looming war, the S&T components will likely take second stage to more pressing issues such as border and transportation security and immigration. Two exceptions, however, are in the area of bioterrorism R&D (as noted above) and applied research and development into technologies that can be utilized to enhance border and transportation security.

While the research community lies in wait for funding opportunities in the R&D components of the new department, of heightened concern will be the role that

DHS plays in balancing national security interests with academic freedom pursuits. Scientific research, especially in biotechnology fields, can be a double-edged sword and the knowledge gained can be used not only to create therapies but also to create weapons by those with intent to do harm.

Compounding this is the reality that science is a global enterprise that relies on the education of its workforce and the conduct of research in an open and internationally collaborative setting. How DHS plans to handle foreign students and visitors, sensitive but unclassified information, and the sharing of research results supported through its federal grants and contracts will be carefully scrutinized by the scientific community.

Notes and References

1. Reprinted with permission from American Association for the Advancement of Science, *AAAS Report XXVIII: Research & Development FY 2004*, Washington, DC, April 2003, Chapter 12.
2. *Ibid*, Table II–20.
3. Dr Charles McQueary was sworn in as the Department's first Under Secretary for Science and Technology on 9 April 2003.
4. See American Association for the Advancement of Science, *op. cit.*, Table II–20.
5. *Ibid*, Table II–20.
6. *Ibid*, Table II–20.
7. For more on the NIH R&D portfolio, see *Ibid*, Chapter 8.
8. See *Ibid*, Table I–9 for R&D by appropriations subcommittee.