Homeland Security Institute

Annual Report

pursuant to

Homeland Security Act of 2002

July 1, 2005
Homeland Security Institute
ANNUAL REPORT

Introduction

Established in April 2004, the Homeland Security Institute (HSI) is a federally funded research and development center (FFRDC) mandated by Section 312 of the Homeland Security Act of 2002, which created the Department of Homeland Security (DHS). HSI is managed and operated by Analytic Services Inc. under a contract awarded by DHS, following a full and open competition.

The Homeland Security Act requires HSI to transmit an annual report of its activities to the Secretary of Homeland Security and to the Congress. This 2005 Annual Report describes how HSI has developed and carried out the functions authorized by the Act during its first year of operation.

Consistent with the provisions of the Homeland Security Act, HSI’s fundamental role is to

- Provide an independent, scientific, and technical resource for the homeland security community.
- Analyze homeland security issues, trends, policies, and practices.
- Facilitate innovation and improvement of homeland security.

As the first FFRDC dedicated to the area of homeland security, HSI has a unique responsibility to provide high-quality analytical and technical support for all participants and stakeholders in homeland security: DHS, as well as other federal, state, and local government agencies, nonprofit and nongovernmental organizations, the private sector, and the general public.

HSI focuses on improving decision making by employing an integrated systems approach to evaluate homeland security at all stages of development and use, in order to provide practical solutions to critical problems. HSI also seeks to develop long-term, strategic perspectives on key homeland security issues. The Institute recognizes the challenge of balancing long-term objectives with meeting short-term needs.

The Under Secretary for Science and Technology acts for DHS as the primary HSI Sponsor and has appointed an HSI Executive Agent who reviews and approves the Institute’s DHS-sponsored research plan, provides for day-to-day oversight, and chairs the HSI Advisory Group. The HSI Advisory Group is composed of senior representatives from DHS components; it ensures that HSI’s research program addresses DHS senior management concerns and priorities.

In developing this integrated understanding of the security environment, HSI consults widely (as required by the Homeland Security Act) to incorporate the perspectives of the full range of
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public- and private-sector clients and stakeholders, and works to illuminate gaps and obstacles as well as opportunities and synergies. All this is aimed at providing decision makers with better knowledge of conditions and options, to help them realize better—more effective, efficient, and sustainable—solutions to complex homeland security problems.

Description of Activities

Section 312(c) of the Homeland Security Act of 2002 authorizes the Secretary to establish the duties of HSI and lists eight specific areas of research activity that the Secretary may require, among others he may determine (see the Appendix). The following section reviews examples of the activities HSI has carried out during the past year in these authorized areas.

1. System Studies

HSI has conducted studies involving system architecture, vulnerability, and risk, augmented by mathematical modeling and computer-simulation analysis to identify key interdependencies and relationships relevant to designing sustainable, practical, and cost-effective solutions that merge improved security with productivity. For example:

- The commercial ferry industry comprises over 200 operators and 700 vessels that are potential targets for terrorist attack. Decision makers need to understand the direct and indirect impacts of alternative risk management strategies at the port, regional, and national levels. To help meet this need, HSI developed a simple model of commercial ferry security protocols and used it to study the relationship among screening policy, technology, operations, cost, and impacts on ferry owners, operators, and users. The U.S. Coast Guard used the results to inform its decisions on screening policy.

- A fundamental challenge for DHS is to develop the ability to link proposed investments in homeland security with measurable benefits and capability improvements that can be evaluated in a risk-management framework. HSI teams, in concert with multiple DHS components and other federal agencies, worked throughout the year to develop a unified homeland-security taxonomy as a foundational element of such a framework. The Institute also began prototyping methods and tools that can be used in implementing a risk-based approach to plan and assess programs to meet critical needs in resource-constrained environments.

Other related HSI tasks include a comparative analysis of risk, vulnerability, and consequence assessment models, as well as commercial- and government-developed models to assess the technical benefits of triggered biological sensors in an urban environment.
2. Economic and Policy Studies

HSI is managing projects that assess the costs and benefits of alternative approaches to homeland security to provide comprehensive knowledge to assist decision makers:

- At a time of keen public concern about the costs and benefits of homeland security initiatives, understanding the economic impact of homeland security policies and programs is critical. Under a new HSI task, the Institute will be analyzing various types of risk-reduction measures, characterizing different economic analysis approaches, and applying them to case studies. The Institute will also explore ways in which these approaches are integrated in cost-benefit, cost-effectiveness, and tradeoff analysis.

- Rulemaking under the Maritime Transportation Security Act of 2002 must be supported by regulatory analysis of economic impacts. Increases in maritime security levels or port closures in response to a transportation security incident could cause serious economic disruptions. HSI is beginning a new task to help the Coast Guard estimate the potential economic impacts of such disruptions on one, multiple, or all U.S. ports.

3. Evaluation of Effectiveness

A number of HSI projects assess the effectiveness of homeland security operations to assist in continuous improvement:

- HSI is evaluating the initial operational capabilities of the National Science and Technology Threat Assessment Reachback support center.

- Our lessons-learned analysis of first responders covers federal, state, local, and public interests. This project also identifies dual economic and security-benefit trends.

- Another project provides operational evaluations by interviewing end users of deployed systems and then cataloguing their basic performance specifications and capabilities.

- HSI is assessing the effectiveness of the Arizona Border Control Initiative—a multiphase program.

4. Common Standards and Protocols

Key benefits for centralizing the homeland security mission through DHS are the predictability, stability, interoperability, economies of scale, and accountability that common standards and protocols can achieve for first responders and field operators:

- One task at HSI directly addresses the issue of standards. It provides research to the DHS Science and Technology (S&T) Directorate for developing and integrating standards. It also supports assessing and identifying first responder preparedness.

- A more focused task involves examining risk assessment standards—especially safety guidelines—of several federal agencies and private industries. The objective is to develop
and recommend standards, good practices, and guidelines for risk assessment tools to
DHS.

5. Establishing Test Beds for Evaluation of Technology

HSI is assisting the federal government in coordinating testing facilities to validate the
performance of relevant technologies and align technology with mission-critical requirements:

- A Federal Science and Technology Infrastructure Capabilities task will furnish DHS with
  an inventory of the capabilities of federal science and technology assets. These
capabilities include research and development capabilities and test beds that support
developmental and operational test and evaluation.

6. Design and Evaluation of Metrics

Several tasks develop or evaluate metrics to assess homeland security systems and operations:

- The strategic planning and investment-strategy tasks link individual programs to high-
  level outcome metrics that permit useful program assessment.

- The Arizona Border Initiative is developing performance metrics, as is the Urban Bio-
  Monitoring Architecture project.

7. Design and Support for Homeland Security Exercises and
   Simulations

HSI is pursuing effective exercises and simulations to train and integrate the homeland security
community for routine, high-impact, and low-probability events:

- Understanding an adversary’s motives, goals, strategy, and tactics is necessary to defend
  America against those who plot to attack the homeland and its people. Adopting the
  viewpoint of a potential enemy, members of red teams plan and practice attacks to test
the homeland’s defenses, led by blue teams. Designers of these exercises understand that,
in reality, enemies continually develop new strategies and tactics to overcome new
measures to strengthen defenses and reduce vulnerabilities. So an ongoing need for
innovative red team methods exists. To meet that need, HSI has identified innovative
methodologies for red teaming (used in the private and public sectors) and has provided
recommendations for advancing red team representation and for understanding
imaginative known and unknown adversaries.

- Another exercise-related task is the Chemical Countermeasures Tabletop Exercise. It
  analyzes the response of federal interagency laboratories to a chemical WMD attack. This
task permits an investigation of command and control relationships among the principal
federal agencies and the responding laboratories.
8. Strategic Technology Development

Strategically well-planned research and development offer the potential to accelerate the creation of technical innovations that are relevant and useful to improving homeland security:

- HSI surveyed the capabilities of selected Department of Energy facilities to support homeland security, with a focus toward technology development.

- This project resulted in two additional projects: one that will recommend a decision process and criteria for DHS S&T’s consideration in deciding which labs to focus resources on, and a project to independently identify the enduring capabilities required by DHS S&T to accomplish its missions.

Two additional active projects at HSI are designed to develop strategic technologies from the perspective of DHS:

- Private venture capital holds the potential to complement public investment to promote commercially viable, broadly adoptable homeland security innovations. HSI’s Venture Capital task has investigated methods for leveraging private venture investment to stimulate relevant innovations.

- The federal SAFETY Act program is based on legislation designed to reduce liability concerns of potential innovators of homeland-security technology. HSI will analyze organizational and procedural issues concerning the management of the SAFETY Act and develop appropriate recommendations.

9. Other Tasks

HSI has been authorized by DHS to conduct additional studies that build on the recommended activities of the Homeland Security Act of 2002:

- One of these tasks is the Reasons for Successful and Unsuccessful Terrorist Attacks. Understanding the factors that made attacks succeed or fail in the past can be a stepping stone to improve strategies for thwarting future attacks. HSI has created a database of terrorist attacks against the United States and U.S. interests since the mid-20th century. With over 2,500 entries, the project is now expanding its scope to include terrorist attacks against American subjects abroad. The chronology provides the basis for identifying certain patterns in the nature and frequency of attacks and types of groups involved.

- Another task furnishes DHS with reports on particular technologies, especially CBRNE-related weaponry and countermeasures, and builds a prototype information-retrieval system to aid in the assessment process.
Consultation on Institute Activities

The Homeland Security Act requires HSI to consult widely with representatives from private industry, universities, nonprofit institutions, government agencies, and other FFRDCs:

- HSI has organized and hosted two large two-day conferences in the Washington, DC, metropolitan area: the Wide-Area Bio-Restoration Conference in February 2005 and the Cargo Summit in December 2004. Numerous representatives from federal and state agencies, as well as universities, attended.

- A series of homeland security Task Development Workshops held at HSI during March and April 2005 included participants from across the federal government, as well as representatives of state and local governments and the private sector.

- HSI is working with the railroad industry to improve information sharing and collaboration and integration of business and governmental practices.

- HSI has established research partnerships with Auburn University, Georgetown University, George Washington University, Kansas State University, Purdue University, and the Stevens Institute of Technology. Consulting contracts have been signed with researchers from the University of Maryland and the University of Virginia.

- HSI has also consulted with such federal agencies as EPA and NASA. Private-sector consultants and manufacturers include Innovative Decisions, Inc.; Entropy International; Cycorp, Inc.; and Public Technology Inc.

Use of Centers

HSI has a contract with the Center for International Security Policy Research. It also is preparing to develop means to leverage the capabilities of the National Infrastructure Simulation and Analysis Center.

Relationship with DHS and Other Clients

HSI staff maintain a special relationship with DHS. DHS provides them with access to classified and sensitive data, facilities, plans, and related information to ensure that HSI has the best data available.

HSI can accept work from agencies other than DHS—other federal government entities, state and municipal governments, and not-for-profit organizations—if the work is consistent with the HSI core statement and authorized by DHS.
Historical Timeline


- November 2002: The President signs the Homeland Security Act of 2002; Section 312 establishes HSI as an FFRDC.

- December 2003: DHS initiates an open request-for-proposals competition for the HSI contract.

- April 2004: DHS awards the FFRDC contract to Analytic Services Inc.

- June 2004: HSI begins its first DHS project.
Appendix

Homeland Security Act of 2002

SEC. 312. HOMELAND SECURITY INSTITUTE.

(a) ESTABLISHMENT.—The Secretary shall establish a federally funded research and development center to be known as the “Homeland Security Institute” (in this section referred to as the “Institute”).

(b) ADMINISTRATION.—The Institute shall be administered as a separate entity by the Secretary.

(c) DUTIES.—The duties of the Institute shall be determined by the Secretary, and may include the following:

(1) Systems analysis, risk analysis, and simulation and modeling to determine the vulnerabilities of the Nation’s critical infrastructures and the effectiveness of the systems deployed to reduce those vulnerabilities.

(2) Economic and policy analysis to assess the distributed costs and benefits of alternative approaches to enhancing security.

(3) Evaluation of the effectiveness of measures deployed to enhance the security of institutions, facilities, and infrastructure that may be terrorist targets.

(4) Identification of instances when common standards and protocols could improve the interoperability and effective utilization of tools developed for field operators and first responders.

(5) Assistance for Federal agencies and departments in establishing test beds to evaluate the effectiveness of technologies under development and to assess the appropriateness of such technologies for deployment.

(6) Design of metrics and use of those metrics to evaluate the effectiveness of homeland security programs throughout the Federal Government, including all national laboratories.

(7) Design of and support for the conduct of homeland security-related exercises and simulations.

(8) Creation of strategic technology development plans to reduce vulnerabilities in the Nation’s critical infrastructure and key resources.

(d) CONSULTATION ON INSTITUTE ACTIVITIES.—In carrying out the duties described in subsection (c), the Institute shall consult widely with representatives from private industry, institutions of higher education, nonprofit institutions, other Government agencies, and federally funded research and development centers.

(e) USE OF CENTERS.—The Institute shall utilize the capabilities of the National Infrastructure Simulation and Analysis Center.

(f) ANNUAL REPORTS.—The Institute shall transmit to the Secretary and Congress an annual report on the activities of the Institute under this section.

(g) TERMINATION.—The Homeland Security Institute shall terminate 3 years after the effective date of this Act.*

*Extended to 5 years by later legislation.