The Homeland Security Act of 2002 authorizes the Secretary of the Department of Homeland Security, acting through the Under Secretary for Science and Technology, to establish one or more federally funded research and development centers (FFRDCs) to provide independent analysis of homeland security issues. The RAND Corporation operates the Homeland Security Operational Analysis Center (HSOAC) as an FFRDC for DHS under contract HSHQDC-16-D-00007.

The HSOAC FFRDC provides the government with independent and objective analyses and advice in core areas important to the Department in support of policy development, decisionmaking, alternative approaches, and new ideas on issues of significance. The HSOAC FFRDC also works with and supports other federal, state, local, tribal, and public- and private-sector organizations that make up the homeland security enterprise. The HSOAC FFRDC’s research is undertaken by mutual consent with DHS and is organized as a set of discrete tasks.

The information presented in this annual report does not necessarily reflect official DHS opinion or policy.

For more information on this publication, visit www.rand.org/t/CP888

Published in 2018
Letter from the Director

As we close out the first fiscal year operating the Department of Homeland Security’s studies and analysis FFRDC, I’d like to use this annual report to provide DHS with an update on what we have done and a vision for the way forward. Our goal this year has been to stand up an FFRDC with the skills, experience, and resources DHS needs to meet the country’s most pressing homeland security challenges. We’ve made good progress in doing so and continue to work to improve.

Perhaps our largest accomplishments to date are the strong relationships we are building with DHS leaders, component-level staff and research sponsors, and our Program Management Office in the Science and Technology Directorate. These relationships have led to steady growth in the number of HSOAC projects, which are already helping improve DHS’s operational effectiveness.

Another accomplishment is in developing the capabilities DHS needs to address its research and analysis requirements. In addition to the strong bench of experts we had at our launch, we’ve grown our research staff through targeted recruitment and hiring. These efforts deepened our staff’s knowledge and experience of the organizations across DHS and their missions. Many of those on our team hold security clearances, enabling us to respond quickly to classified task requests. And we continue to work closely with our DHS counterparts to ensure that relevant staff have fitness. We have also set up secure IT systems and procedures to ensure that all material is handled with the appropriate level of sensitivity.

In this first annual report, we offer an overview of HSOAC capabilities and highlight how we are supporting the DHS mission and keeping the United States safe, secure, and resilient. I can confidently report that we are fully operational and prepared to meet the Department’s research and analysis needs.

With best regards,

Terrence Kelly
HSOAC Director
What Is an FFRDC? What Is HSOAC?

What Is an FFRDC?

Federally funded research and development centers (FFRDCs) are independent entities that help the U.S. government meet specialized research needs.

FFRDCs act as strategic partners to their sponsors by offering many services, such as
- conducting independent, objective analysis
- addressing important and complex long-term problems, facilitated by the FFRDC’s long-term, close relationship with its sponsoring department
- providing immediate assistance on urgent issues
- developing creative, cost-effective solutions.

All activities of FFRDCs are guided by Federal Acquisition Regulation 35.017.

HSOAC: Our Mission

The Department of Homeland Security (DHS) must address complex challenges in preventing terrorism, managing U.S. borders, enforcing and administering immigration laws, safeguarding cyberspace, and strengthening national preparedness and resilience. To support the Department in these missions, RAND operates the Homeland Security Operational Analysis Center (HSOAC) FFRDC for DHS. HSOAC provides the government with independent and objective analysis and advice in core areas important to DHS in support of policy development, decisionmaking, alternative approaches, and new ideas on issues of significance. HSOAC also works with and supports other federal, state, local, tribal, and public- and private-sector organizations that make up the homeland security enterprise.

Our mission is helping the Department of Homeland Security be more effective in making the nation safe, secure, and resilient.
Providing Critical Expertise

HSOAC provides deep expertise and experience on the following seven research focus areas that cut across DHS mission categories.

**Acquisition studies.** DHS has asked HSOAC to assist with its significant acquisition needs, ranging from major platforms (such as Coast Guard cutters) to highly specialized capabilities (such as protective systems for the U.S. Secret Service). HSOAC provides analytic capacity for
- acquisition planning
- program management
- system tests and evaluations
- analyses of lessons from completed or terminated acquisition programs.

**R&D studies.** To meet its research and development (R&D) needs, DHS has asked HSOAC to be prepared to provide forward-looking analysis to inform the mix of projects needed to prepare for an uncertain future, the capability to develop performance measures relevant to R&D tasks, and expertise to inform the transition of results into technology and practice. HSOAC offers
- analysis of early-stage R&D activities and their promise for solving critical challenges
- portfolio planning and analysis
- operational analysis supporting testing and evaluation
- support for the transition of products into government operations or licensing for use by others.

**Innovation and technology acceleration.** Accelerating organizational innovation and technology adoption has some overlap with R&D planning; however, HSOAC stands prepared to help DHS with the capacity and capabilities to undertake detailed technical analyses—for example, examining current technologies and standards to identify whether there are barriers that would prevent integration of a new system or tool. HSOAC furnishes the ability to
- develop and track key metrics of technical progress for technologies being developed within the government
- identify roadblocks to successful deployment (e.g., public concerns about privacy or safety related to a new system), in cases where performance is sufficient.

**Organizational studies.** Supporting DHS to increase operational effectiveness across its organizational components requires expertise and experience working across diverse organizational types, as well as the ability to address organizational study requirements in the complex, ever-changing, and high-consequence environment in which DHS operates. HSOAC researchers have expertise in the complexities of meshing law enforcement, military, and civilian organizational structures and cultures and have experience assessing workforce and performance management efforts for several DHS components and other large federal agencies, including the Department of Defense (DoD). HSOAC capabilities include
- aligning organizational structure to mission requirements
- developing strategies that help organizations meet the requirements set out in law and policy
• examining manpower and human capital challenges
• developing program and budget solutions that align organizational efforts to strategies and plans
• examining training needs for specific challenges
• examining the full logistical challenges (e.g., facilities, storage, transportation) of complex operations.

**Operational analysis.** DHS’s complex and multifaceted operational environment requires a full range of operational analysis. HSOAC has expertise in
• assessing mission requirements
• designing evaluations
• developing sophisticated performance metrics that capture security outcomes and effects on a broad range of outcomes, including such intangible factors as privacy and civil liberties.

**Regulatory, doctrine, and policy studies.** DHS, like other federal agencies, needs a clear understanding of the likely impacts of changes in external regulations, doctrine, and policy that affect its missions and activities, as well as insight into these changes’ effects on the broader homeland security environment. As a result, analytical support must be prepared to help both the Department’s response to external regulatory, doctrine, and policy changes and its employment of these in pursuit of its safety, security, and risk management responsibilities. HSOAC offers expertise in a wide range of established approaches relevant to this area, including
• regulatory impact analysis
• strategies-to-tasks mapping methods for examining organizational doctrine issues
• customized methodologies, as required, to address regulatory, doctrine, and policy issues of concern.

**Homeland security threat and opportunity studies.** Homeland security threats, risks, and opportunities are not static. Effective homeland security policy requires tracking them over time and forecasting them into the future. The stakes are also high: Successfully forecasting change before the fact can make the difference between being able to respond effectively to a threat or opportunity and not responding at all. HSOAC possesses expert understanding of terrorist and natural threats, as well as forecasting capability and the ability to improve the accuracy and effectiveness of forecasts over time. Additionally, understanding how threats and opportunities affect risk is a critical aspect of HSOAC capabilities in this area.
HSOAC draws on the RAND-wide research population to address DHS’s challenges. The pie charts below depict the characteristics of RAND’s research staff, but HSOAC can also draw on a large, diverse set of part-time professionals. HSOAC’s research staff offers a sophisticated mix of deep technical expertise, as well as analysts who have substantial experience in government, the military, and law enforcement. This combination facilitates technically sophisticated solutions that address a sponsor’s needs. Currently close to 300 researchers hold DHS Fitness, and we are constantly reviewing DHS needs and adding to this staff to meet them.

In addition to our extensive research expertise, HSOAC utilizes a range of tools and methods to share critical study results with appropriate audiences across the homeland security enterprise. This helps to ensure that the work of HSOAC has broad and sustained impact in supporting DHS and its missions.
HSOAC Staff: Bringing Together Rigorous Research and Practical Know-How

HSOAC staff include RAND personnel who have years of experience supporting projects for the homeland security enterprise on such topics as counterterrorism, border security and domain awareness, critical infrastructure protection, cybersecurity, and state and local disaster management.

In addition, the roster includes former senior government officials who provide a critical practitioner’s perspective, such as the

- former Senior Adviser to the Commissioner of Customs and Border Protection
- former Homeland Security Director for the Senate Committee on Homeland Security and Governmental Affairs
- former U.S. Coast Guard Deputy Chief, Office of Counter-Terrorism and Special Missions
- former Deputy Under Secretary in the DHS Science and Technology Directorate
- former Deputy Chief Counsel for the Northeast Law Division of U.S. Citizenship and Immigration Services
- former Director of Homeland Security and Homeland Security Adviser for the State of Maryland
- former Principal Deputy Assistant Secretary of Defense for Homeland Defense and Global Security
- former U.S. Coast Guard Vice Admiral, Atlantic Area Commander
- former DoD Principal Deputy Under Secretary for Policy
- former DoD Principal Deputy Assistant Secretary for International Security Affairs
- former Principal Deputy Director of National Intelligence
- former Under Secretary of State for Arms Control and International Security Affairs
- former Under Secretary of Defense for Personnel and Readiness.
What We Do: HSOAC in Action

HSOAC works across DHS mission areas, components, and functional areas to improve operational effectiveness.

1. Prevent terrorism and enhance security
2. Secure and manage our borders
3. Enforce and administer our immigration laws
4. Safeguard and secure cyberspace
5. Ensure resilience to disasters
6. Mature and strengthen the homeland security enterprise

Support provided across DHS missions

1. Acquisition studies
2. R&D studies
3. Innovation and technology acceleration
4. Organizational studies
5. Operational analysis
6. Regulatory, doctrine, and policy studies
7. Homeland security threat and opportunity studies

Support provided across HSOAC research focus areas

Support provided across DHS

*As of October 2, 2017
### Project Highlights as of October 2, 2017

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<thead>
<tr>
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<td>Assessment of DHS Biosurveillance and Biodetection Efforts</td>
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<td>Domestic Response to Cyber-Induced Emergencies</td>
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<td>Analytic Support to Government, Community, Academic Meeting</td>
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<td>Immigration Data Integration Initiative Study</td>
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<td>Integrating Open-Source Data and Social Media into Information Systems</td>
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<td>Review of DHS/S&amp;T Homemade Explosives Laboratories</td>
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<td>Maritime Domain Awareness Strategy Analyses of Alternatives</td>
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<td>Analysis of S&amp;T Resources and Program Risks</td>
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<td>The National Economic Impact from DHS Technology Transfer and Commercialization Efforts 2003–2017</td>
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### Components

- CBP
- DNDOD
- FEMA
- NPPD
- USCG
- Other HQ
- Non-DHS
- USCIS
- OHA
- TSA
- S&T
Balancing Established Tools and Methods with Cutting-Edge Innovation

Today’s and tomorrow’s policy solutions require a diverse analytic toolkit to address the complex nature of U.S. national and global policy challenges. Some of the United States’ most pressing homeland security problems can be addressed using well-vetted existing research methods and technologies. Others may require innovative approaches and capabilities. HSOAC researchers are adept at identifying the most appropriate, rigorous, and cost-effective tools and methods to help DHS find solutions.

How Does HSOAC Innovate?

RAND Methods Centers

As an FFRDC operated for DHS by the RAND Corporation, HSOAC can access RAND’s six interdisciplinary methods centers that facilitate the development and dissemination of analytic tools and methodologies, as well as the deployment of existing tools and methodologies in a collaborative and synergistic fashion across the research and policy domain landscape.

Housed within the Pardee RAND Graduate School, these centers are
- Center for Applied Network Analysis and System Science
- Center for Qualitative and Mixed Methods
- Center for Gaming
- Center for Causal Inference
- Center for Decision Making Under Uncertainty
- Center for Scalable Computing and Analysis.

Rand’s methods centers have the potential to be enormously useful to DHS. For example, methods developed by the Center for Gaming could inform:
- Operational and resource strategies for DHS’s role in the Arctic
- Operational requirements for responses to cyber attacks on critical infrastructure.

Fellowship Program

Each year, RAND hosts DHS fellows—a U.S. Coast Guard officer and a civilian DHS fellow—who work and study with RAND research staff on critical homeland security issues.

These fellowships support the development of up-and-coming leaders with the strategic analysis and planning skills needed to meet the complex challenges of their respective organizations and missions. Working at RAND provides an opportunity for fellows to study with nationally known researchers and form effective partnerships outside of their organizations, as well as explore innovations needed to more effectively and efficiently manage resources. In return, fellows offer HSOAC their understanding of DHS elements and how to make our research more useful to the Department.
Core Research Program

The FFRDC Program Management Office coordinates an effort to identify and fund projects of broad applicability across DHS. Projects are identified through discussions with senior DHS officials from each of the 22 components, the Project Management Office, and S&T Directorate staff.

Current Core Research projects include the following.

FEMA Domestic Cyber Response

**Challenge:** Large-scale cyber attacks in the United States—including those targeting critical infrastructure, financial institutions, and government itself—are a growing risk, with the potential to cause significant economic and social disruption, or even loss of life. Although traditional emergency management provides common reference points that allow government agencies and private-sector organizations to plan collaboratively and share resources fluidly during emergency situations, such collaboration and resource-sharing are not as fluid during cyber emergencies.

**Meeting the challenge:** HSOAC is creating standardized cyber incident scenarios that will support the development of a common lexicon for federal, state, local, tribal, and territorial authorities to utilize in the event of a significant cyber emergency.

**Anticipated completion date:** May 14, 2018

Integrating Open-Source Data and Social Media into Information Systems

**Challenge:** DHS’s Office of Intelligence and Analysis needs a better understanding of requirements for implementing, managing, and investing in a centralized, shared social media vetting and screening capability able to identify possible bad actors with a nexus to homeland security threats.

**Meeting the challenge:** In addition to making recommendations regarding the current best strategy for social media screening and vetting, HSOAC is working to provide the Office of Intelligence and Analysis and the DHS Social Media Task Force with a project management and investment strategy. Furthermore, HSOAC is establishing best practices and strategies for transitioning fiscally realistic requirements with performance targets into sustainable operational capabilities.

**Anticipated completion date:** March 8, 2018
### Immigration Data Integration Initiative Study

**Challenge:** DHS data systems remain decentralized, including at the program level, and the Department currently maintains more than four dozen separate immigration data systems, many of which employ outdated technology. Data sets are organized and managed only for program-level case management and other operational purposes rather than for policy analysis. In addition, DHS Headquarters—and the Office of Policy’s Office of Immigration Statistics in particular—lacks direct access to immigration data and often faces long delays in obtaining critical data sets.

**Meeting the challenge:** To promote a near-real-time, enterprise-wide integrated data environment, HSOAC will support an analysis, review, and assessment of current Office of Immigration Statistics data products. The effort will include identifying barriers to timely consumption of data flows, mismatches in related data fields, and other existing inefficiencies in decentralized data systems.

Anticipated completion date: September 20, 2018

### Building an Analytic Capabilities Inventory and Store

**Challenge:** To achieve its missions, DHS must focus on the analytic efforts necessary to identify, develop, improve, share, and align capabilities that support strategic decisionmaking.

**Meeting the challenge:** To guide this analytic effort, DHS is establishing an analytic agenda whose primary step is a comprehensive inventory of the Department's analytic capabilities. HSOAC will develop such an inventory, including the data, analytic tools, special skills, and human resources available to DHS to support strategic and operational decisionmaking.

Anticipated completion date: January 27, 2019
Senior Leadership

**Terrence Kelly, Ph.D.:** Director, HSOAC
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**Isaac Porche, Ph.D.:** Director, Acquisition and Development Program, HSOAC
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**Lara Schmidt, Ph.D.:** Director, Strategy, Policy, and Operations Program, HSOAC
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**Brian Jackson, Ph.D.:** Director, Security Studies Program, HSOAC
Senior Physical Scientist, RAND Corporation
bjackson@rand.org, (703) 413-1100 x5950

How to Work with HSOAC

HSOAC’s seven functional research areas are spread across three programs. Sponsors interested in working with HSOAC should contact the relevant program director.

---

**Acquisition & Development Program**
- Acquisition studies
- R&D studies
- Innovation and technology acceleration

**Strategy, Policy, and Operations Program**
- Organizational studies
- Operational analysis
- Regulatory, doctrine, and policy studies

**Security Studies Program**
- Homeland security threat and opportunity studies
The RAND Corporation operates HSOAC under contract to DHS. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit www.rand.org/hsrd/hsoac.
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<thead>
<tr>
<th>What is the state of threats to U.S. border security?</th>
<th>Are states prepared to respond to cyber attacks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does the USCG increase retention of women in the service?</td>
<td></td>
</tr>
<tr>
<td>How can DHS do to better leverage research, development, and innovation?</td>
<td>How can DHS use publicly available social media data to make the nation safer?</td>
</tr>
</tbody>
</table>