The Homeland Security Act of 2002 (Section 305 of Public Law 107-296, as codified at 6 U.S.C. § 185) authorizes the Secretary 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 the U.S. Department of Homeland Security (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 HSOAC, see www.rand.org/hsoac.

For more information on this publication, visit www.rand.org/t/CP933

Published in 2020
The researchers, managers, and staff of the Homeland Security Operational Analysis Center (HSOAC) have been honored to work with many of the components and headquarters staff of the U.S. Department of Homeland Security (DHS) in fiscal year 2019 and to produce several important research and analysis products that the department has used to improve the way in which it does business or to make important decisions. This includes congressionally mandated studies; work on recovery in Puerto Rico; and inputs to important technical, operational, and human processes that have helped the department and made a difference. Some of these are noted in the pages that follow.

We’ve been able to do this because the department has trusted us with some of its most important problems—a fact that we find humbling and encouraging. Developing trusted relationships with the department that permit us to fulfill our obligation as a federally funded research and development center (FFRDC) and bring our skills and experience to bear on the department’s hardest problems is the center’s reason for existence. We take this responsibility seriously and strive to make continuous improvement. As has always been the case, we judge our success not by what we have done but how we have helped DHS and its components succeed.

To develop and maintain the capabilities we need to help DHS tackle its challenges, we continue to grow our research staff through targeted recruitment and hiring. These efforts have deepened our staff’s knowledge and experience of the organizations across DHS and their missions. Continued work on critical DHS challenges also helps us grow in our understanding of, and usefulness to, the department and its components. Ensuring that we have a broad bench of team members with security clearances allows us to respond quickly to classified task requests. And we continue to work closely with our DHS counterparts to ensure that relevant staff have DHS fitness.

With the help of the FFRDC Program Management Office in the Science and Technology Directorate, we’ve also continued to improve our processes and help the department understand how best to leverage HSOAC’s capabilities. We look forward to continuing to help DHS succeed in fiscal year 2020 by providing high-quality, actionable research and analysis. By doing so, and by being good stewards of federal resources and confidences, we strive to deepen trust with leaders across the department and so demonstrate to DHS that the center is a trustworthy partner.

In this annual report, we offer an overview of HSOAC capabilities and highlight how we are supporting the DHS mission in keeping the United States safe, secure, and resilient. I can confidently report that, as our relationships across the department mature, we are fully committed to supporting DHS’s challenges through state-of-the-art research and analysis.

With best regards,

Terrence Kelly
HSOAC Director
HSOAC: OUR MISSION

To help the U.S. Department of Homeland Security (DHS) be more effective in making the nation safe, secure, and resilient.

To support DHS across its missions, the Homeland Security Operational Analysis Center (HSOAC) FFRDC, operated by RAND under contract with the department, provides the department and its components with independent and objective analyses and advice in core areas important to DHS (see the functional areas listed below). HSOAC also works with and supports other federal, state, local, tribal, territorial, and public- and private-sector organizations that make up the homeland security enterprise.

Unique Purpose and Operation

HSOAC focuses on seven functional areas that cut across DHS’s mission categories:

- **acquisition studies** that use planning, program management, and cost evaluation expertise to assess DHS’s acquisition needs and apply lessons from past experience
- **homeland security threat and opportunity studies** that use risk assessment and forecasting to track current threats and identify vulnerabilities and potential future risks
- **organizational studies** that use workforce analysis, organizational design, and performance measurement to help improve planning and management across DHS and its components
- **regulatory, doctrine, and policy studies** that use regulatory and policy analysis to offer insight into the potential impact that changes in external regulations, policies, and doctrines can have on DHS missions and activities
- **operational analysis** that uses evaluation and simulation methods to help DHS assess mission requirements, improve operational processes and procedures, and understand operations’ impact on a range of outcomes
- **research and development (R&D) studies** that use portfolio and foresight analysis to help DHS plan for the mix of projects needed to accomplish its missions and transition R&D results into technology and practice
- **innovation and technology acceleration** that use technical analysis to promote integration and adoption of new technologies and identify barriers to adoption.
HSOAC Capabilities

HSOAC is able to draw on RAND’s staff of approximately 1,000 researchers across disciplines, including hard sciences, math, engineering, economics, social sciences, history, and law. HSOAC specializes in multidisciplinary teams, each of which is constructed to answer a DHS research sponsor’s questions. Its researchers can provide both quick-turn answers to pressing questions and longer studies that require new and innovative research and approaches. HSOAC’s management team is available to DHS sponsors on short notice.

Opportunities for Innovation

HSOAC projects take advantage of the many opportunities for innovation available at RAND. For example, RAND’s internal research programs, method centers, and innovation incubator develop and test new analytic methods and tools (e.g., an internally funded project focused on the benefits of 5G cellular technology that will inform our work for DHS). In the Frederick S. Pardee RAND Graduate School’s new Technology and Narrative Lab, policy analysts develop and pilot new applications as potential solutions to emerging policy problems. All of these capabilities can be leveraged to help solve the department’s most important challenges.

On September 17, 2019, the HSOAC Acquisition and Development Program hosted a workshop titled “The Illicit Importation of Synthetic Opioids” at the RAND office in Arlington, Virginia. The workshop focused on the opioid crisis. Participants included representatives from S&T, the DHS Countering Weapons of Mass Destruction Office, U.S. Customs and Border Protection (CBP), U.S. Immigration and Customs Enforcement (ICE), the Substance Abuse and Mental Health Services Administration, the U.S. Food and Drug Administration, the U.S. Department of Justice, and the Fairfax County (Virginia) Police Department.

Panels highlighted recent HSOAC research and provided a detailed overview of production and trafficking trends. Additionally, law enforcement experts discussed the detection and interdiction challenges they face daily, as well as improvements that new technology and policies might offer.
HSOAC’s functional research areas are spread across four programs:

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

- **Personnel and Resources Program**
  - Organizational studies (i.e., workforce analyses, surveys, and organizational assessments)

- **Recovery Cost Analysis Program**
  - Acquisition studies related to recovery cost analysis

- **Strategy, Policy, and Operations Program**
  - Organizational studies
  - Operational analysis
  - Regulatory, doctrine, and policy studies
  - Homeland security threat and opportunity studies

**What We Do**

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

1. Prevent terrorism and enhance security | $6,371,168
2. Secure and manage our borders | $1,784,161
3. Enforce and administer our immigration laws | $312,174
4. Safeguard and secure cyberspace | $10,929,577
5. Strengthen national preparedness and resilience | $13,813,932
6. Mature and strengthen the homeland security enterprise | $17,621,985

Support provided, by DHS mission
What We Do

Support provided, by HSOAC research focus area

1. Acquisition studies | $31,569,185
2. Homeland security and threat studies | $1,595,221
3. Organizational studies | $6,585,080
4. Regulatory, doctrine, and policy studies | $1,725,353
5. Operational studies | $6,894,871
6. R&D studies | $1,957,773
7. Innovation and technology acceleration | $505,515

Support provided, by DHS component

HQ | $1,666,665
S&T | $5,521,989
USCG | $3,620,681
FEMA | $26,673,080
USCG | $3,620,681
CISA | $1,749,574
U.S. Secret Service | $2,380,678
Countering Weapons of Mass Destruction Office | $2,776,080
Management | $3,358,649
Policy | $1,543,647
TSA | $1,371,955

Counter–Unmanned Aircraft System Requirement Analysis

Advances in unmanned aircraft system technologies make these systems a rising threat to DHS missions. In response to this threat, and in coordination with ongoing efforts to align disparate counter-UAS (C-UAS) capability development efforts throughout DHS, HSOAC proposed a core research project to analyze C-UAS capabilities across DHS to identify existing and anticipated C-UAS capability gaps.

What is the challenge?
Unmanned aircraft system technologies are advancing rapidly, resulting in the increased potential for these systems to be used as a threat vector against DHS organizations and missions, many of which have limited or no C-UAS capability or authority. In October 2018, Congress provided the department with new authorities to engage in a variety of C-UAS activities. As a result, DHS needs to field capabilities to mitigate the current and future threats while meeting the mission need in a way that does not lead to duplicative or incompatible capabilities. Component representatives across DHS expressed a need for robust analysis to understand these threats and DHS’s options for mitigating them.

What did HSOAC do?
HSOAC helped DHS by analyzing C-UAS capability requirements across the department. Through cross-component scenario analysis and workshops, HSOAC provided DHS with a common operational understanding of C-UAS capabilities through the development of a C-UAS defense chain; it also identified and informed the prioritization of dozens of necessary capabilities to execute the defense chain. HSOAC assessed this sequence of needed capabilities against current DHS capabilities and identified all the current and anticipated gaps.

Impact
This analysis is serving as the foundation for current and future department efforts to address these gaps through R&D, acquisition, and policy changes and is guiding the DHS budget priorities for fiscal year 2021 and beyond. HSOAC’s analysis contributed to DHS’s report to Congress.

PROJECT LEADERS

Brendan Toland • Senior Operations Researcher

Christopher Adams • Policy Analyst
What is the challenge?
The IP Group recognized the need to more efficiently monitor, budget, manage, and assign new requests related to technology policies and the review of IP material and needed a centralized, comprehensive effort to manage IP and a strategy that organized the department’s IP efforts.

What did HSOAC do?
HSOAC provided analysis to support a comprehensive program review of technology, technology policies, and IP-related processes at DHS related to homeland security and national security interests. HSOAC researched how other agencies provided Invention Secrecy Act reviews of unpublished patent applications, identified which technologies the IP Group should be investigating for Invention Secrecy Act reviews, and examined and reviewed DHS’s IP holistic program needs in support of DHS baseline requirements.

Impact
HSOAC’s recommendations will enable the IP group to better manage operational, innovation, credibility, reputational, and financial and litigation risks associated with IP assets. DHS will also be able to more efficiently budget, monitor, manage, and assign new requests related to technology policies and the review of IP material.

PROJECT LEADER

Geoffrey McGovern • Senior Political Scientist
Characterizing the Synthetic Opioid Threat Profile to Inform Inspection and Detection Solutions

In response to the worsening synthetic opioid overdose crisis, HSOAC worked with DHS to review DHS and stakeholder partner data and other law enforcement information to highlight the regional and national trends in seizures, exposure, emerging analogs, cutting agents, and trafficking of synthetic opioids.

What is the challenge?
Illicit fentanyl and other synthetic opioids are arriving in the United States through ports of entry, including the international mail facility and express consignment carrier systems. The trafficking of these potent substances poses significant challenges for detection because they can be shipped in small quantities made to appear like legitimate goods or correspondence. Small-quantity shipments arrive in large volumes of mail and are difficult to detect using nonintrusive inspections, and many technologies require contact with the substance for identification. Coupled with the fact that the chemical composition of these illicit opioids is rapidly changing, accurate detection remains a constant challenge.

What did HSOAC do?
HSOAC provided DHS with an assessment of the illicit synthetic opioid problem space and recommendations for use in developing requirements and other program planning needs. HSOAC research identified detection options and strategies that correspond to potential investments in new technologies allowing agencies to make informed decisions on capability requirements.

Impact
This research identified hot spots where fentanyl-related deaths are occurring in the United States and determined the related package-handling facilities being used by overseas shippers. HSOAC analysis will enable DHS to develop a strategy on how to better detect incoming shipments of fentanyl through the U.S. package and mail system, provide federal law enforcement a better understanding of the synthetic opioid market, and enhance targeting and detection strategies and policies to counter this fast-moving problem.

PROJECT LEADER

Lois Davis • Senior Policy Researcher
Identity Analytic Support for the Office of Biometric Identity Management

In December 2017, congressional investigators reported that “some of the most valuable information collected by U.S. law enforcement or the military is biometrics.” From individuals applying for immigration benefits to encounters at U.S. borders, among other areas, various DHS components require the collection of a significant amount of biometric information. The Office of Biometric Identity Management plays a critical role in analyzing this information to prevent ineligible individuals from entering the country and obtaining fraudulent immigration benefits.

What is the challenge?

DHS has experienced a surge in migrants seeking admission to the U.S. or immigration benefits based on claimed familial bonds. These applications have overwhelmed traditional fraud vetting methods and sparked interest in biometric means, principally through DNA matching, to assess kinship claims. Simultaneously, the Department of Justice proposed a rule change that would require DHS to collect DNA from all persons detained by DHS law enforcement. These requirements threaten to overburden existing DHS efforts to integrate DNA collection and matching into its missions. DHS requires a coordinated and comprehensive approach to DNA technology to meet these challenges and to manage the changing landscape.

What did HSOAC do?

HSOAC developed a draft DNA strategy for DHS. This strategy was the product of DHS stakeholder interviews and a workshop hosted by HSOAC that convened representatives from the Office of Biometric Identity Management, ICE, the U.S. Secret Service, and CBP. The strategy recommends further analysis for an organic DHS DNA laboratory, coordinated training and manpower development, alignment of privacy safeguards and standards, and continued R&D into rapid DNA technologies.

This analysis examined opportunities across DHS to align policies, maximize acquisition effectiveness, advance interoperability, and implement standards for using biometric information.

Impact

The DHS DNA Strategy will guide department efforts to implement DNA technologies. It will help DHS coordinate a requirements-driven approach to DNA that helps DHS speak with one voice on DNA in the interagency process and to ensure DHS retains public trust as it handles sensitive DNA data.

Supporting the development of a department-wide DNA strategy

PROJECT LEADERS

Ryan Consaul • Senior International and Defense Researcher

Christopher Adams • Policy Analyst
Improving Gender Diversity in the U.S. Coast Guard: Identifying Barriers to Retaining Women

The USCG aims to attract, recruit, and retain a service representing all segments of American society. Currently, however, women leave the active-duty USCG at higher rates than men do. The USCG Office of Diversity and Inclusion asked HSOAC to help identify the root causes of attrition of women in the active-duty USCG and make recommendations for improving retention of women.

What is the challenge?
Research on women in the USCG and gender differences in retention has provided insight into issues related to retaining women. However, the last large-scale USCG-sponsored study on women’s issues was conducted in 1990, leaving a gap in current understanding of the issues women in the USCG face that influence their decisions to remain in the service or leave.

What did HSOAC do?
HSOAC conducted a statistical analysis of USCG personnel data to examine gender differences in retention trends and whether certain career and personnel characteristics could help explain the gender gap in retention. The team also conducted focus groups with 1,010 active-duty USCG women to better understand potential barriers to retention, as well as focus groups with 127 active-duty men to help identify retention factors that resonate with both men and women and those factors that might be unique to women. In their report, the authors provide recommendations to help mitigate barriers and boost retention of active-duty women in the USCG.

Impact
The USCG commandant announced several policy actions informed by HSOAC’s research, including a new program to backfill female personnel during pregnancy and maternity leave and make promotion boards more gender neutral. USCG leaders also commissioned a similar study, now underway, to understand reasons for attrition of racial and ethnic minorities.

Helping the Coast Guard promote diversity across its workforce

PROJECT LEADERS

Kimberly Hall • Senior Policy Researcher

Kirsten Keller • Senior Behavioral and Social Scientist
Staffing Models for the U.S. Secret Service Operational Mission: Support for the Administrative, Professional, and Technical Workforce

The Secret Service’s administrative, professional, and technical (APT) workforce provides critical support for the service’s mission, including recruitment, hiring, training, career progression, workforce engagement, and resource planning. To help acquire, develop, deploy, and retain an APT workforce capable of executing critical core responsibilities of protection and investigations, the Secret Service asked HSOAC to identify APT staffing needs in key functions within the service.

What is the challenge?
APT staffing levels are determined by historical baseline ratios of one APT worker for every 2.5 law enforcement employees. Recognizing that these historical ratios might no longer apply given recent changes in the agency’s workforce composition and organization, the Secret Service is seeking to improve how it determines APT staffing needs and to deploy tools to assess the service’s current and future APT workforce requirements.

What did HSOAC do?
HSOAC developed an in-depth understanding of the APT workforce mission, work processes, workflow, and available data to determine the most appropriate methodology for identifying key staffing needs; collected information from subject-matter experts and analyzed available data to develop a model for calculating the necessary staffing level for each function; recommended staffing profiles that meet acceptable levels of performance given current and future workload drivers; and provided tools for the Secret Service to use in workforce planning efforts.

Impact
The Secret Service’s chief human capital officer has begun using HSOAC-developed research and tools for management of the Secret Service workforce and has commissioned follow-on research to expand application of the HSOAC tools to other offices within the Secret Service.
Investigative Operations Workload Study for the U.S. Customs and Border Protection Office of Professional Responsibility

The CBP Office of Professional Responsibility oversees an Investigative Operations Division (IOD) responsible for investigating allegations of CBP employee and contractor misconduct. DHS gave CBP authority to restructure parts of its workforce, including its investigator workforce. Professional Responsibility asked HSOAC to develop an empirically derived model for staffing and utilization within IOD to support this effort.

What is the challenge?
Historically, IOD staffing levels have been determined by available funds, historical precedent, and broad patterns of utilization. In light of increasing operational demands, fiscal pressure, and a desire to improve investigation queues and quality across the organization, CBP sought to quantify the workload and demand for its IOD investigators, better understand the requirements for this workforce, and inform future efforts to restructure or manage this workforce.

What did HSOAC do?
HSOAC conducted background research to prepare its analysis, then conducted detailed research on IOD, including mapping of organizational processes, work processes, investigative workflows, and analysis of available case management data. HSOAC researchers also used qualitative methods, including a survey of CBP personnel, to collect information from CBP subject-matter experts and rank-and-file investigators about their workload. Informed by this research, HSOAC developed analyses of the IOD workload, including heat-map visualizations, to better understand how IOD’s workload related to the geography of CBP offices around the country.

Impact
HSOAC research has helped catalyze and inform discussions within CBP about how best to align investigators and offices with workload, as well as how best to collect and analyze data about workload in near-real time to support component decisionmaking and resource allocation.

PROJECT LEADERS

Susan Straus • Senior Behavioral and Social Scientist
Natasha Lander • Policy Analyst
Improving Postdisaster Recovery Efforts in Puerto Rico

Responding to the devastation of Hurricanes Irma and Maria in 2017, Puerto Rico chose to participate in alternative procedures for funding recovery construction projects defined under Section 428 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. These alternative procedures were added to the Stafford Act in 2013 and are relatively new and untested.

The procedures are intended to incentivize fiscal responsibility, increase flexibility, expedite assistance to those in need, and provide incentives for the timely completion of projects. FEMA has been tasked with implementing these alternative procedures and asked HSOAC to operate an independent expert panel. The panel was charged with reviewing and validating project cost estimates meeting certain criteria as defined by Section 428 of the Stafford Act.

What is the challenge?

FEMA required an independent expert panel to do cost validation. Additionally, under the alternative cost recovery procedures, Public Assistance projects are funded to an estimated cost. If the actual cost for a project exceeds the estimated cost, the applicant is responsible for funding the difference; if less, the remaining funds may be used to improve the infrastructure to minimize loss from future disasters. While the alternative procedures could improve many aspects of FEMA’s recovery efforts, FEMA needed new methodologies and to provide guidance in order to effectively implement these procedures.

What did HSOAC do?

HSOAC worked with FEMA and the government of Puerto Rico to develop the methods, data, and procedures for cost validation and executed several of them. However, to improve FEMA’s ability to do quality cost estimates, HSOAC also performed economic analysis to build a model of Puerto Rico’s economy. The model estimates changes in prices for building materials, equipment, and labor so these changes can be factored into estimates for recovery-related construction projects.

Impact

In addition to cost validations, HSOAC’s economic analysis is being used to improve the accuracy of cost-estimation techniques.

Developing a new approach to estimating the costs of disaster recovery

PROJECT LEADERS

Paul Brenner • Senior Management Scientist
Kyle Siler-Evans • Engineer
Mike McMahon • Senior Engineer
DHS Data Framework Initiative

The DHS Data Framework is an initiative led by the Information Sharing and Services Office (IS2O) within the DHS Management Directorate’s Office of the Chief Information Officer and the DHS Office of Intelligence and Analysis (I&A). Prior to the framework, the department lacked a systematic capability to share information across components. The framework is intended to eliminate information silos and enhance DHS’s ability to share person-centric information, increasing the speed to decision and enabling swifter action on threats facing the homeland. HSOAC was asked to examine issues surrounding data sharing and aggregation and to assess the initiative’s governance processes, which are intended to optimize the benefits for operational decisionmaking.

What is the challenge?

As part of the framework initiative, IS2O and I&A officials instituted governance processes to develop and implement necessary processes, procedures, and decision-making. This governance structure includes senior-level participants from across DHS. IS2O and I&A officials established the governance process to provide effective oversight, coordination, and direction to ensure the effective and efficient accomplishment of the framework’s goals and requirements. These efforts present challenges in developing common processes and terms and standardizing data quality across components.

What did HSOAC do?

HSOAC examined use cases to identify issues involved with aggregating and standardizing departmental and component data and information in support of urgent strategic and operational needs. HSOAC also developed three candidate governance processes for DHS to consider as the department implements processes for sharing mission-critical data and information in an expedited manner.

Impact

This analysis will inform decisions about establishing a framework for data governance across the department.

Supporting data-driven decisionmaking across the department

PROJECT LEADERS

John Bordeaux • Senior Management Scientist

Ryan Consaul • Senior International and Defense Researcher
The Costs of Human Smuggling

Unlawful migrants from Central America apprehended at the U.S.–Mexico border each year often hire smugglers for assistance or pay others for rights of way at some point during their journey north. Policy-makers face concerns that a substantial share of the money migrants pay for smuggling could be flowing to transnational criminal organizations (TCOs). S&T asked HSOAC to estimate the revenues that TCOs obtain from smuggling migrants to the United States from the Northern Triangle region of Central America (consisting of Guatemala, Honduras, and El Salvador) and to characterize what is known about how TCOs and others that engage in human smuggling operate.

► What is the challenge?
TCOs and other actors that engage in human smuggling are a potential threat to homeland security. A better understanding of the structure, financing, and operations of TCOs and other organizations that participate in human smuggling can inform efforts to investigate and disrupt them and improve decisions about how to allocate resources to those efforts.

► What did HSOAC do?
HSOAC found that human smuggling involves many types of actors. Most TCOs’ activities and revenues cannot be separated from those of other groups that engage in human smuggling. HSOAC developed a preliminary estimate of revenues from human smuggling flowing to all types of smugglers, not just TCOs—ranging from about $200 million to $2.3 billion in 2017—with uncertainty stemming from analytical challenges related to data limitations and time constraints. Separately, HSOAC also produced a preliminary estimate of the fees, or pisos, that migrants pay to drug-trafficking TCOs to pass through their territories, ranging from about $30 million to $180 million annually.

► Impact
The findings reframed the department’s understanding of TCO involvement in human smuggling and are informing ongoing development of strategies to counter this threat.

Helping understand threats of human smuggling from Central America

PROJECT LEADER

Victoria Greenfield • Senior Economist
Assessing the Need for and Uses of SOI Databases: A Report on the Proceedings of a Two-Day Workshop

As biotechnology has matured, the field has seen breakthroughs in a variety of domains, including novel treatments of human diseases, pesticide-resistant agriculture, and animal-less synthesized-meat products. However, these developments have also raised safety and security concerns about the potential for malicious actors to develop new threats or weapons. S&T asked HSOAC to explore the potential value of creating a database of specific genetic elements—known as genetic sequences of interest (SOIs)—that malicious actors could misuse.

What is the challenge?
The synthetic biology industry currently uses databases of SOIs to screen orders for its products, and DHS has its own database of SOIs. However, there has been debate in policy circles about whether it would be prudent for the biodefense community as a whole to have a centralized database (or databases) of SOIs to improve the utility, safety, and security of research endeavors without compromising innovation. In addition, if such a database existed, what purpose would it serve, what would be required to create and maintain it, and who would maintain it?

What did HSOAC do?
HSOAC conducted a two-day workshop to convene key experts from diverse stakeholder groups to address these questions and understand how a database of genetic SOIs could best support stakeholders—government agencies, academic researchers, and commercial groups—in understanding the potential value of SOI databases. The sessions consisted of a mix of presentations, panel discussions, and small- and large-group discussions.

Impact
The study was an exploratory first step in discussing a very complex topic with broad, often conflicting, stakeholder interests, and will inform future research on this critical topic.

Helping DHS advance biotechnology and biosecurity R&D

PROJECT LEADER

Ritika Chaturvedi • Engineer
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.

Core research aims to enhance the effectiveness of the entire homeland security enterprise by
• producing state-of-the-art solutions to complex problems
• developing game-changing improvements to enhance existing capabilities
• leveraging the work performed for individual components—including lessons learned and best practices—for the benefit of DHS more broadly.

Completed Core Research Projects

Integrating Open-Source Data and Social Media into Information Systems

Social media can play a key role in supporting DHS’s responsibility of vetting people seeking entry into the United States. However, using this vast trove of information to identify bad actors in an efficient and effective manner could require the development of an automated bulk social media screening capability that can be used throughout the department.

Leveraging social media and open-source data in immigration vetting

DHS is seeking to develop a screening capability that would enable bulk, automated analysis of social media information and that could be integrated into existing data systems that support vetting functions. DHS asked for HSOAC’s help to understand requirements for implementing, managing, and investing in a centralized social media vetting capability, based on pilots from operational use cases. To do so, HSOAC answered three sets of research questions:
• What should an automated, centralized social media capability look like?
• What are feasible approaches to address the identity resolution challenge? That is, given biographical information, how can technical tools find social media accounts?
• What metrics are appropriate for evaluating analytic and operational outcomes?

PROJECT LEADERS

Sarah Nowak • Information Scientist
Douglas Yeung • Behavioral and Social Scientist
In answering these questions, HSOAC focused on social media (e.g., Facebook) rather than all open-source (publicly available online) data (e.g., blogs). The team also focused on identifying and defining functional requirements, technical approaches, and metrics for social media screening. The task was to determine whether the DHS process was useful and repeatable. HSOAC’s findings present functional requirements, technical approaches, and metrics that can be used to assess the algorithms, technical systems, and organizational structures that collectively make those determinations.

The Immigration Data Integration Initiative Study
DHS data systems remain decentralized, including at the program level, and the department currently maintains more than four dozen 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, not for policy analysis. In addition, DHS HQ—in particular, the Office of Immigration Statistics within the DHS Office of Strategy, Policy, and Plans—lacks direct access to immigration data and often faces long delays in obtaining critical data sets.

To promote a near-real-time, enterprise-wide integrated data environment, HSOAC participated in an analysis, review, and assessment of current Immigration Statistics data products. The effort included identifying barriers to timely consumption of data flows, mismatches in related data fields, and other existing inefficiencies in decentralized data systems.
HELPING PREVENT EXTREMISM AND TERRORIST VIOLENCE

HSOAC work has defined *terrorism prevention* policies as those that seek to broaden the options available to address the risk of individual radicalization and mobilization to ideologically driven violence. These policies provide alternatives to investigating and arresting suspects. They seek to counter recruiting or radicalizing messages, intervene before individuals have committed serious crimes, and support programs that lower the chance that incarcerated people will commit terrorism-related crimes after their release.

However, the U.S. government role in these programs has been controversial because of concerns that these efforts might infringe on constitutionally protected rights and the risk that outreach or intervention activities could stigmatize some communities by associating them with extremism.

The Office of Strategy, Policy, and Plans asked HSOAC to examine past terrorism prevention efforts, evaluate current DHS and interagency efforts in this area, and explore policy options to strengthen future terrorism prevention.

The team found that current terrorism prevention capabilities are limited. Most initiatives are implemented locally or outside government, and only a subset receives federal support. The most effective path for the federal government would be to strengthen, broaden, and sustain this local and nongovernmental capacity. However, doing so will be challenging because concerns about past terrorism prevention have damaged trust in some communities. As a result, terrorism prevention policies and programs will need to focus on building trust locally and designing programs and federal activities to maintain that trust over time. The study’s results have been briefed to Congress and used to inform DHS strategies in this area.

In particular, the team found that terrorism prevention efforts have been hindered by limited program focus and resource constraints since 2014, coupled with some...
community and other stakeholder opposition to terrorism prevention approaches. A promising approach to rectifying this is to invest in federal field staff. Locally based personnel who are aware of the national picture could help to build relationships, strengthen trust, and act as on-the-ground facilitators of local terrorism prevention efforts. This could both deliver immediate results and help build for the longer term.

In addition, experts interviewed for the study identified specific needs in the areas of awareness and training, federal support, federal program development, and research and evaluation:
• Technology companies need objective threat information to guide online prevention efforts.
• Sharing best practices and knowledge would benefit all stakeholder communities.
• Federal action to facilitate local programs and capability-building should be the priority for multiple components of terrorism prevention.
• A more robust and interdisciplinary research community is needed for terrorism prevention. Past efforts were useful and should be continued, but they are not enough.

The team made several recommendations for strengthening terrorism prevention efforts:
• For countermessaging and intervention programming, the federal government should focus on funding and assisting state, local, and nongovernmental organizations and private actors rather than building capabilities itself.
• The federal government should continue to provide community awareness briefings and training exercises to local groups.
• Adapting existing tools, such as tabletop exercises, to help local communities explore the types of terrorism prevention that are appropriate for their circumstances appeared to be promising.
• Openness and transparency in training delivery would help to support trust in a controversial area, and using unclassified and publicly available information that can be shared broadly is more practical than less-sharable information for efforts that must bridge organizational boundaries.
• Pursuing public–private partnerships and broadening support from agencies outside the security sphere would be a practical approach to supporting terrorism prevention efforts in a way that might be more acceptable to communities and members of the public.
• Building and maintaining the bench of expert practitioners will be important in developing programs from the national to the local level.
• Strengthening investment in evaluation would help address criticism of the effectiveness of terrorism prevention efforts in the future.
Each year, RAND hosts DHS fellowships and a USCG fellowship. These fellowships support the development of leaders at DHS by modeling and teaching 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 an operational understanding of DHS elements and how to make HSOAC research more useful to the department.

2018–19 Cohort

Danielle Bean served as a 2018–2019 DHS Fellow at RAND. Bean is a stakeholder manager in the TSA at Los Angeles International Airport (LAX) and is responsible for leading stakeholder engagement, community outreach, TSA–LAX strategic planning, and employee communications. She is also the senior adviser to the TSA’s federal security director. Since joining TSA, Bean has served in various positions across the country, including as a scheduling operations officer responsible for staffing allocation and resource planning in Lansing and Detroit, Michigan, and in Cincinnati, Ohio. She was also a program analyst for the regional director for the State of California. During her fellowship, Bean supported a project on managing strategic risks to critical infrastructure for HSOAC, helped advance and lead a visit by RAND researchers and DHS fellows to the Airport Response Coordination Center at LAX. She also contributed to studies of aircrew flight equipment personnel proficiency and the training and development of the Air Force’s cyber workforce for RAND Project AIR FORCE.

Rick Neiman Jr. served as a 2018–2019 DHS Fellow at RAND. Neiman is a management and program analyst with the National Infrastructure Coordinating Center, a component of the Infrastructure Protection Division of DHS’s CISA. He previously served as the transition lead for combining both the physical and cyber watches, and as the National Protection and Programs Directorate liaison to FEMA. He is a retired captain in the USCG Reserve and was recently the senior reserve officer for Base National Capital Region. While serving on active duty, Neiman managed up to 287 personnel as the Atlantic Area military outload coordinator, and oversaw a $36 million budget as the Transition Action Branch director for the crisis action team responsible for ensuring USCG compliance with U.S. Department of Defense cyber requirements. During his time as a RAND DHS fellow, Neiman contributed to several HSOAC projects, including a study of the impact of CBP procedures for assessing security threats from criminal and terrorist networks through the recently established Counter Network Division, part of the agency’s National Targeting Center. Neiman also supported HSOAC’s efforts to explore new avenues for cooperation with the USCG.
Jonathan D. Theel served as the 2018–2019 USCG Fellow at RAND. Theel most recently served as the assistant commandant of cadets at the USCG Academy and previously served as a strategic analyst to the vice commandant of the USCG, an advanced interdiction program manager, a project manager to realign the USCG’s deployable specialized forces, a personnel specialist, a liaison to U.S. Naval Forces Central Command during Operation Southern Watch, and an intelligence analyst for the National Drug Intelligence Center. His operational assignments have included chief of response for Connecticut and Long Island, New York; commander of a maritime safety and security team; and supervisor of a counterdrug law enforcement team. During his time at RAND, Theel contributed to several studies on issues involving the USCG. For example, he helped develop scenarios for an analysis of USCG airpower and for a study supporting the next phase of the USCG’s Project Evergreen long-range strategic planning program. He also worked alongside RAND research teams that are using traffic data to enhance the USCG’s maritime domain awareness, investigating the recruitment and retention of women in the USCG, and evaluating the cost and effectiveness of potential backup systems for global positioning systems.

Marc Thibault served as a 2018–2019 DHS Fellow at RAND. Thibault is a program analyst in the Office of Performance Management and Assessment in the USCG office of the deputy commandant for operations. His HQ work included leading the completion of mission analysis reports on acquisitions, serving as a technical consultant on various USCG analyses, and supporting the USCG Aids to Navigation Division and the icebreaker program. Thibault is a USCG veteran who served aboard the USCG Cutter Harriet Lane and in the Acquisition Directorate. During his fellowship, Thibault contributed to projects on a variety of topics, including long-range strategic planning, airpower analysis, the use of open-source social media to support DHS missions, performance measurement, and requirement analysis. He shared valuable insights on USCG processes, participated in scenario development and workshops, and provided input for technical and theoretical analyses for several studies.

2019-2020 Cohort

DHS Fellows: In the coming year, RAND will welcome three DHS fellows, representing the Financial Operations Division, Mission Readiness Operations Directorate, at U.S. Border Patrol HQ in Washington, D.C.; the Capabilities Management Division of TSA’s Office of Requirements and Capability Analysis; and the Nuclear Section chief at CISA.

USCG Fellow: RAND will also welcome a senior commander from the Office of Response Policy under the deputy commandant for operations as a fellow in the coming year.
Senior Leadership

Terrence Kelly, PhD: vice president and director, HSOAC
tkelly@rand.org, 412.683.2300 x4905

Henry Willis, PhD: acting deputy director, HSOAC; director, Strategy, Policy, and Operations Program, HSOAC
hwillis@rand.org, 412.683.2300 x4650

Phillip Carter: director, Personnel and Resources Program, HSOAC; senior policy researcher, RAND Corporation
phillipc@rand.org, 703.413.1100 x5760

Jessie Riposo, MS: director, Recovery Cost Analysis Program, HSOAC; senior operations researcher, RAND Corporation
riposo@rand.org, 703.413.1100 x5162

Emma Westerman, MS: director, Acquisition and Development Program, HSOAC; mathematician, RAND Corporation
emma@rand.org, 703.413.1100 x5660

PHOTO CREDITS

FRONT COVER
Top row: Charles Reed/ICE; Jetta Disco/DHS; Jaime Rodriguez Sr/CBP; joyfotoliakid/Adobe Stock.
Bottom row: Petty Officer 1ST Class Justin Munk/USCG; Kenneth Wilsey/FEMA;
Journalist 2nd Class Mark O’Donnell/U.S. Navy via Wikimedia; DHS.

INTERIOR
Page 4, left to right: Keith Gardner/ICE; USCG photo courtesy of Petty Officer 1st Class Mark Ward.
Page 5, left to right: DHS photo by Tim D. Godbee; Photo by J. T. Blatty/FEMA | Sidebar, clockwise from top left: RAND images.
Page 22, left to right: kerkezz/Adobe Stock; SDI Productions/GettyImages; official DHS photo by Jetta Disco.
Page 23-24: RAND images

HSOAC is an FFRDC operated by the RAND Corporation under contract with 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 about HSOAC, visit www.rand.org/hsrd/hsoac.
<table>
<thead>
<tr>
<th>Who are the bad actors engaged in human smuggling from Central America?</th>
<th>How can DHS strengthen terrorism prevention?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What would help the Coast Guard retain more women?</td>
<td></td>
</tr>
<tr>
<td>What tools are needed to disrupt the inflow of illegal synthetic opioids?</td>
<td>Can biotechnology research be made safer and more secure?</td>
</tr>
</tbody>
</table>