



# S&T STRATEGIC PLAN

# 2021



**Homeland  
Security**

Science and Technology

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## From the Under Secretary (Acting) for Science and Technology



This Strategic Plan aims to guide us in supporting the Doctrine of the Department of Homeland Security, adapting to the massive security and culture changes brought about by the COVID-19 pandemic, and fully embracing our value to the Department and the nation.

S&T is an innovation center. American ingenuity has for centuries contributed immeasurably to the health, welfare, safety, and security of our nation and the world. The role of S&T is to cultivate scientific discovery in the service of national security and to realize the benefits of science in pursuit of the missions of DHS.

Inventiveness and imagination provide rich tools, but they can also pose grave threats to the prosperity and well-being of Americans every day. The widespread access to information through the internet and mobile devices, artificial intelligence, robotics, nanotechnology, biotechnology, and quantum computing each stand to benefit society. Unfortunately, those who wish us harm can also use these things against us. Therefore, we look to scientists not only for discovery but also for protection—from hostile acts as well as natural threats to the nation such as floods, tornados, hurricanes, and pandemics.

This new strategy outlines our way forward in this mission. It lays a path for more than our own research and development; the plan includes leading the Department through our technical expertise; forging vital partnerships; ensuring excellence in programs; and as a necessity, maintaining a strong, well-prepared workforce at S&T. From our vision for success to the core values that guide every process, this strategic plan paves the way for the research, the science, the innovation, and the technology they produce as the keys to securing the America of our future.

Bill Bryan



## EXECUTIVE SUMMARY



### VISION

**A Safer America Through Scientific and Technological Development**

### MISSION

**Safeguarding the nation by answering the threats of tomorrow and the needs of today through science, technology, and innovation.**

This strategy is predicated upon the Doctrine articulated in the current DHS Strategic Plan, but also by the impacts of the current COVID-19 pandemic and the need for national alignment and agility to secure our nation. We need to embrace the rapidly changing environment of threats, resources, and demands on the Directorate and its workforce in a new, remote work environment in the immediate and distant future.

“**The United States must develop new concepts and capabilities to protect our homeland, advance our prosperity, and preserve peace.**”

National Security Strategy, 2017

Scientific and technological advances promise substantial social and economic benefits nationally, including increased efficiency and enhanced productivity, but they also pose significant risks. Thus, S&T's key role is to take full advantage of current and emerging scientific advancements to support immediate DHS needs while preparing for future threats and operations at the same time. In order to fulfill these roles, S&T must fully support DHS doctrine; actively prioritize strategic alignment to DHS missions; become the cornerstone of local, national, and international relationships; improve acquisition for immediate impact; and advance our workforce to *prepare for the future while safeguarding today*.

World-class research and innovation are part of an interconnected system. Success depends on talented teams working across multiple sectors, with access to the right expertise, funding, infrastructure, data, and connections – locally, nationally, and internationally – to get results. This system must work across government, academia, research institutes, businesses, charities, domestic and international investors, and national global networks and partners.

Our **Core Values** express what we collectively believe matters most in the way we go about our mission: **Excellence in Delivery, Innovation, Collaboration, and Service**. These values describe how we work and *how we measure the quality of our process*; they enable us to pursue with confidence what we work toward, the four Strategic Goals which all of our products and services support:



### STRATEGIC GOALS

- 01 LEADERSHIP** – Become the Driving Force of Innovation for the Department of Homeland Security.
- 02 PARTNERSHIP** – Engage in deliberate relationships with Science, Engineering, and Technology Communities to equip DHS for success.
- 03 CAPABILITY DELIVERY** – Become the Authority and Trusted Provider of Science and Technology Expertise and Solutions.
- 04 TOMORROW'S WORKFORCE, TODAY** – Advance the S&T Team to Assume Leadership, Develop Partnerships, and Deliver Solutions to the Department.

We will achieve each of these goals by pursuing specific, actionable objectives aligned closely with the Department's mission and most important needs.



## INTRODUCTION



### VISION

**A Safer America Through Scientific and Technological Development**

### MISSION

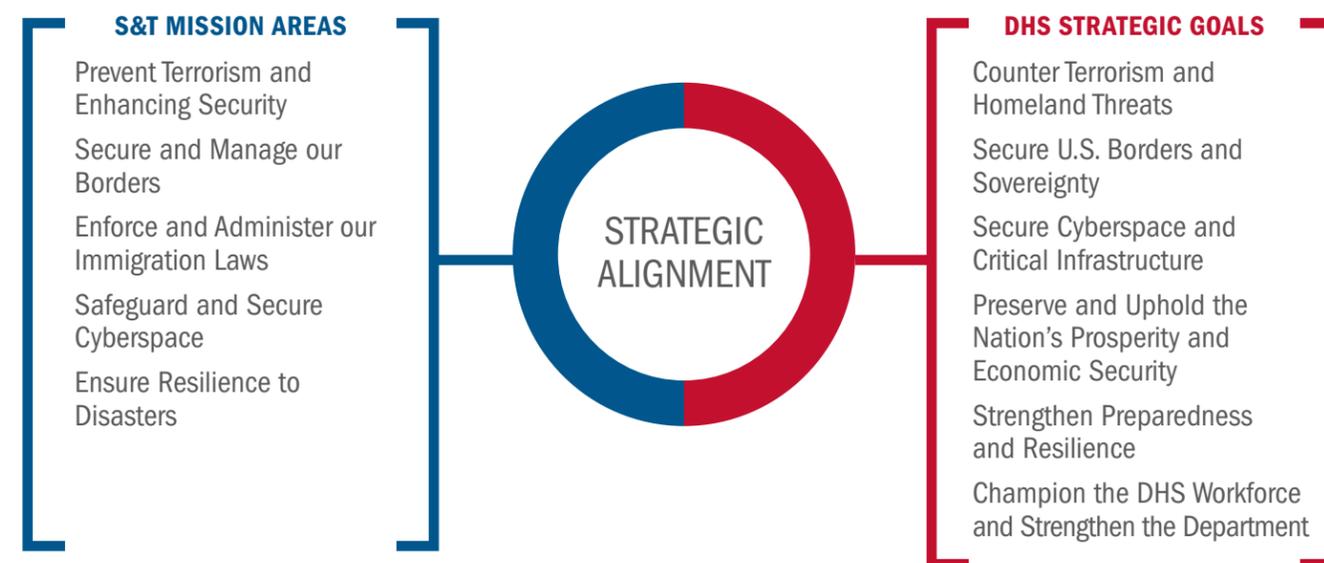
**Safeguarding the nation by answering the threats of tomorrow and the needs of today through science, technology, and innovation.**

Congress established DHS in 2003 as a new Cabinet-level agency to unite the nation's approach to protecting the homeland. DHS combined the functions and authorities of 22 different federal departments and agencies with responsibilities and missions that collectively prevent attacks, mitigate threats, respond to national emergencies, and preserve economic security. With the Strategic Goals below as a guide, DHS S&T will strengthen the execution of its DHS Headquarters' responsibilities by directly leading, deliberately supporting, and proactively contributing to the DHS strategy to centralize and coordinate the Department's many functions to ensure that the whole is greater than the sum of its parts.<sup>1</sup>

This strategy is also motivated by the impacts of the current COVID-19 pandemic and the need for national alignment and agility to secure our nation. We need to embrace the rapidly changing environment of threats, resources, and demands on the Directorate and its workforce in a new, remote work environment in the immediate and distant future.

In order to focus our efforts, support the Doctrine of DHS, and ensure we apply the valuable resources of S&T when and where they are most needed, a new, decisive strategy is necessary. Therefore, our strategic goals guide S&T to support the Department's Doctrine in four ways: become the *leader* of a concerted effort to support R&D aimed at Department-level missions and priorities, engage in purposeful *partnerships* to achieve DHS goals, concentrate *capability* development activities to ensure rapid response to the immediate, unmet needs of DHS, and engage in persistent efforts to *develop the workforce* of S&T and DHS to meet these needs. This entire strategy, then, is motivated by *doctrine* and *department need* and designed to operate as a plan to ensure that S&T operates as a headquarters Directorate aimed resolutely at the needs of the Department of Homeland Security and its missions to *prepare for the future while safeguarding today*.

### ORGANIZATIONAL MISSION AREAS



<sup>1</sup> For additional information on the DHS Doctrine that informs this strategy, see: [The DHS Strategic Plan, Fiscal Years 2020–2024](#)



## SCIENCE AND TECHNOLOGY

The Science and Technology Directorate has Department-wide responsibility to engage in research, development, testing, evaluation, and demonstration of homeland security technologies of relevance and value to DHS. S&T thus acts as the scientific advisor to the Secretary of DHS. This mandate includes all the constituent parts of DHS as well as federal, state, local, tribal, and territorial officials that contribute to the Department's missions and objectives. S&T executes these responsibilities by *applying science and engineering solutions* to complex problems, *ensuring a world class scientific infrastructure* to support DHS, and *combining expertise, independence, and objectivity* to ensure that DHS adopts solutions that accomplish the Department's missions while improving performance and reducing costs to the Department.

S&T applies science and engineering for solutions that secure the nation. The breadth of complex problems faced by DHS often requires complex solutions. S&T delivers the capability for the Department to study and understand a problem, develop more complete answers, inform decision-makers, and develop, test, and deliver solutions. S&T discovers and introduces new technology and develops or integrates near-term solutions. The ways in which S&T can provide these benefits varies, often depending on the nature of the problem, the immediacy of the needs of DHS, and the types of solutions that enhance our ability to secure the nation. For instance, in the case of immediate needs, S&T will employ our network of DHS S&T scientists, engineers, laboratories, or Federally Funded Research and Development Centers to provide near-immediate

information or solutions for national security. In other cases, S&T will use its ability to issue grants and contracts to diverse national and international entities in the science community such as private industry, universities, or research institutions to develop solutions through short-term efforts. These efforts may take the form of development, integration, or evaluation projects to deliver solutions over short periods of time. S&T will collect, catalog, and prioritize departmental needs that are unmet by current knowledge, technologies, or capabilities and address these unmet needs based on DHS goals, overall risks to domestic security, and the degree to which government intervention is required.

S&T's network ensures a world-class science infrastructure that is at the disposal of the Secretary of DHS. S&T maintains this infrastructure to directly represent the needs and interests of the Department, pursue the goals of DHS, and build coalitions that apply science to improve the security and resilience of our nation and allies. This infrastructure provides DHS with representation in the world of science and technology by experts for whom the missions of DHS are their top priority. They also maintain their expertise in their scientific fields with a focus on the threats and benefits of technology, policy, and practice that is vital to the success of DHS.

This infrastructure provides an additional benefit to the Department. It ensures that all external work across the spectrum of DHS missions and needs can be validated and verified with the interests of DHS as the first consideration. These resources inside

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**To answer the call to combat the national opioid crisis, the Transportation Security Laboratory (TSL) is developing screening systems for the CBP to detect illegal drugs such as opioids sent from outside the U.S., especially those artfully concealed. In February 2020, using its expertise with test and evaluation of explosive detection technologies, TSL completed its first technical assessment of a modified TSA Computed Tomography (CT) system, the IDSS Detect 1000, using an automatic opioid detection algorithm. TSL has collected nearly 15,000 CT images of opioids concealed within typical stream-of-commerce shipments.**

DHS include nationally and internationally recognized scientists, engineers, and program managers representing a wide array of skill and experience from physical, natural, and social science; mechanical, electrical, and aeronautical engineering; and privacy, ethics, and legal experts, to name just a few. Outside of DHS, this infrastructure consists of both formal and informal connections and relationships with laboratories and science activities in other federal agencies as well as the science infrastructure of international allies, universities, and private industry. In addition to these obvious benefits of the DHS science infrastructure, S&T also ensures that important ethical guidelines are maintained throughout the Department.

S&T maintains the compliance regime to protect American rights and values by making available to all of DHS experts in the intersection of research and such important areas as privacy, the protection of human subjects, and legal protection in research. These important functions also ensure a broad range of important functions for DHS such as ensuring the security of American invention and research and environmental protections for research. The maintenance and operation of this infrastructure ensures that DHS is always on the forefront of the latest developments that may benefit our mission or threaten our national security.

S&T employs the invaluable resources of expertise, independence, and objectivity to ensure excellence in acquisition, testing and evaluation, and impact and evaluation research to DHS. These activities reduce risks to DHS in the development, purchase, and employment

of major systems. These resources can also inculcate unity across DHS, encouraging interoperability to improve DHS performance or shared technologies that can save billions of dollars. This expertise, independence, and objectivity enable S&T to administer programs like the Support Anti-Terrorism by Fostering Effective Technologies Act (SAFETY Act), which allows new tools, techniques, and technologies to be sold and used to protect Americans efficiently by documenting efficacy and reducing insurance liabilities for those companies. Without the trust and expertise to administer the SAFETY Act, many new and innovative systems that secure the U.S. would never be used because of exorbitant insurance costs. The expertise that resides in S&T as well as the public trust in S&T's independence and objectivity are an invaluable resource to DHS and the nation. These resources save the nation billions of dollars and are fully dedicated to the security of the United States.

**FIGURE 1** S&T Shared Beliefs



As we apply our expertise and resources to these solutions, we do so with the **Core Values** that are the essence of our identity as a Directorate. They maximize mission execution and our collective success. They embody the cultural bedrock of our behaviors, actions, and expectations for ourselves and one another. As ONE S&T, we share these beliefs (Figure 1).

The capabilities of S&T work together to support the Department, ensuring that DHS can anticipate and respond to changes in technology and threats, and respond quickly to answer any unmet needs that hinder the DHS mission. By applying its valuable resources, S&T helps DHS ensure public safety and security to all Americans.

**S&T Systems Engineering and Standards conducted a comprehensive assessment of the Polar Ice Breaker, in collaboration with the USCG, that identified technical risks, mitigation strategies and technology maturation plans, while also pinpointing \$150M in design and manufacturing cost savings. In addition, S&T Test and Evaluation conducted an Early Operational Assessment with experts across the ice breaking community, which identified design risks that will inform the final, critical design. S&T's contributions to the USCG Polar Ice Breaker program will reduce technical risks, lower development costs and improve the acquisition outcome.**

**DHS FIVE MISSION AREAS**





## SCIENCE & HOMELAND SECURITY

# The Changing Threat Landscape

The United States faces a complex and dynamic array of threats to our national security, including our political, economic, and social systems.<sup>2</sup> These threats will continue to evolve as new and resurgent adversaries refine existing capabilities and adapt or develop new capabilities to challenge the security of our nation. Our adversaries may include foreign governments, foreign and domestic violent extremists and ideologies, transnational criminal organizations, and the misuse of corporate resources to amass greater influence than traditional nation states. The threats themselves are as widely varied as the adversaries and may include pandemics, human mass migration events, state sponsored terrorism, homegrown Islamic

inspired terrorism, the rapid resurgence of white supremacy, economic inequality, the use of emerging technological capabilities for adverse and or unintended effects, and finally, climate change and environmental issues. Each of these threats endangers American security, values, and the rule of law, the very foundations of our nation.

The use of research and development to understand and find answers to these threats will become more important than ever. However, technology alone, and its implementation will likely be problematic. Technology is accelerating progress across all parts of society but causing conflict even as it provides solutions. Rapid technological advancements will increase the pace of change and create new opportunities but will aggravate divisions between winners and losers.

**FIGURE 2** Current Homeland Security Threats, Homeland Threat Assessment, DHS, 2020

| POLITICAL AND OPERATIONAL CAPABILITY ENHANCEMENT                        | EMERGING AND DUAL-USE TECHNOLOGIES | WEAPON CAPABILITY ADVANCEMENT AND PROLIFERATION                            | GLOBAL CRISIS EVENTS AND DEMOGRAPHIC SHIFTS                                 |
|---|------------------------------------|--|---|
| Russian & Chinese efforts to influence US politics & domestic will      | Artificial Intelligence            | Weapons of Mass Destruction  | Infectious Diseases & Pandemic Events (Human)                               |
| Terrorism (Sponsored, Inspired, Criminal, Supremacy, Societal Response) | Quantum Information Science        | Electronic Warfare and GPS Threats   | Infectious Diseases & Pandemic Events (Food, Agriculture, and Veterinarian) |
| Transnational Criminal Organizations and Narcoterrorism                 | Nanotechnology                     | Proliferation of advanced weapons to terrorists and criminal organizations | Climate Change  |
| Information Operations  | Autonomous & Unmanned              | ISR proliferation  | Natural Disasters (Earthquakes, Hurricanes, Flood, Fires)                   |
|   | Biotechnology                      | Cyber (State sponsored, Terrorist, Criminal/Financial Social Influence)    | Mass Migration events (Domestic/International)                              |
|   | Internet of Things                 |  |   |

Automation and artificial intelligence will threaten to change industries faster than economies can adjust displacing workers and broadening already growing economic disparity. Biotechnologies such as genome editing will revolutionize medicine and other fields, while sharpening moral differences, increasing tension. The dual-use challenge and the potential for technology to be misused, abused, or exploited will become even more complex and difficult to address.

While it is not possible to predict every threat, we can classify current and projected threats into four broad categories: Political and Operational Capability Enhancement, Emerging & Dual-Use Technologies, Weapon Capability

Advancement & Proliferation, Global Crisis Events & Demographic Shifts. Figure 2 provides examples of threats in each of these categories.

Threats to our nation will become more diffuse, diverse, and disruptive: Diffuse—referring to state, non-state, and substate entities having greater accessibility to means of conducting threat actions; Diverse—referring to the means of action varying across a wider spectrum, from nonmilitary capabilities to advanced conventional weapons and weapons of mass destruction; and Disruptive—referring to a greater emphasis by hostile states, criminal organizations, and terror groups on targeting critical infrastructure, societal cohesion, and stable government functions.

<sup>2</sup> For a more complete discussion of the current threat landscape facing the United States, see: [Homeland Threat Assessment, October 2020](#)



DHS S&T plays a vital role in providing the R&D to make decisions, deliver capabilities, and assess the impact of efforts to address these threats to our citizens, our critical infrastructure, and our fundamental democratic governmental processes. Our efforts directly support reducing our vulnerability to terrorism and providing capabilities to those who respond to and assist in recovering from terrorist events. We provide technology to help undermine connections between illegal drug trafficking and terrorism, human trafficking and child exploitation, and securing and protecting our electoral processes and infrastructure. S&T supports DHS's role as the lead agency

for defense of civilian cyber infrastructure from cyberattacks and for aiding private-sector critical-infrastructure cybersecurity. Our efforts support DHS front-line personnel with the primary responsibility for border and transportation security issues, including interdicting illicit smuggling of humans and contraband into the homeland, traveler security screening, and, via the U.S. Coast Guard, securing the maritime approaches to the homeland. Finally, DHS is responsible for improving the resilience, response, and recovery to communities across our nation that face billions of dollars in losses to property, lives, and productivity each year due to the impact of natural disasters.

# STRATEGIC GOALS

- 01 LEADERSHIP**  
Become the Driving Force of Innovation for the Department of Homeland Security.
- 02 PARTNERSHIP**  
Engage in deliberate relationships with Science, Engineering, and Technology Communities to equip DHS for success.
- 03 CAPABILITY DELIVERY**  
Become the Authority and Trusted Provider of Science and Technology Expertise and Solutions.
- 04 TOMORROW'S WORKFORCE, TODAY**  
Advance the S&T Team to Assume Leadership, Develop Partnerships, and Deliver Solutions to the Department.

Scientific and technological advances promise substantial social and economic benefits nationally, including increased efficiency and enhanced productivity, but also pose significant risks. Thus, the key roles of S&T lie in taking full advantage of current and emerging scientific advancements to support immediate DHS needs while preparing for future threats and operations at the same time. In order to fulfill these roles, S&T must fully support DHS doctrine, actively prioritize strategic alignment to DHS missions; be the cornerstone of local, national, and international relationships; improve acquisition for immediate impact; and advance our workforce to *prepare for the future while safeguarding today*.

# 01 LEADERSHIP

## Become the Driving Force of Innovation for the Department of Homeland Security.



As a part of the Headquarters of the Department of Homeland Security, S&T can realize its role as a leader by prioritizing its investments, partnerships, and collective expertise, as well as its delegated authorities to support the strategic goals of the Department. S&T will select efforts to support the Department based on several criteria: appropriateness as a research and development activity, the likely outcomes

and impact on DHS objectives and missions, and the breadth of that impact across the Department and all of its components. S&T can focus its resources to drive benefits such as interoperability, shared technology, shared knowledge, and singularity of purpose across the Department. S&T will be an instrument of progress based on current and future threats to unify DHS components through the exchange of technology and knowledge to effectively and efficiently meet mission needs.

In order to achieve the scientific and technology leadership that DHS needs, S&T will actively engage and participate with DHS HQ and DHS Components to support *Science Informed Policy* to ensure that departmental decisions about policy Goals and Objectives are achieved with the best available scientific knowledge to meet the missions of DHS. We will achieve this goal through four major activities and functions: Collecting Scientific Evidence, Presenting Evidence, Using Data, and Conducting Impact Assessments. As we perform these, the Directorate will target at least one of the objectives below in pursuit of this goal of Innovation Leadership for DHS.

### 1.1 OBJECTIVE: STRATEGIC MISSION AREAS

*Employ Strategic Mission Areas (SMAs) to systematically prioritize application of S&T resources and efforts according to DHS Goals, Objectives, and Activities to ensure support of Department-level initiatives.*

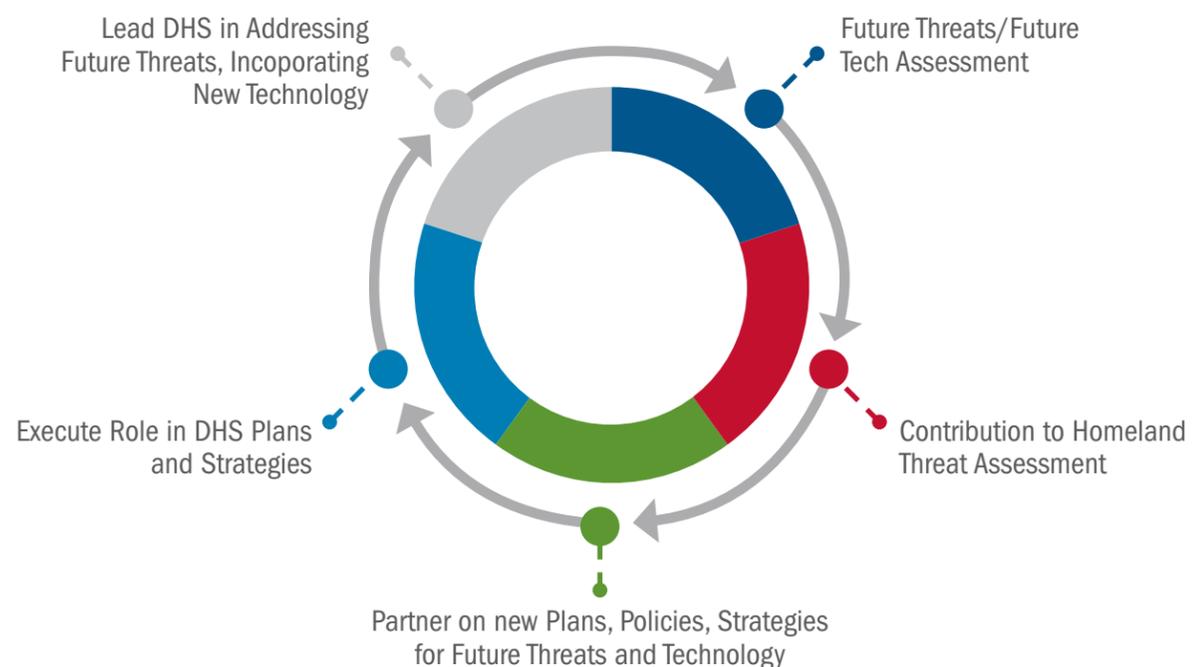
These SMAs define the broad areas of need for the Department that apply broadly across multiple *Components*. In choosing among many valuable directions for research funds and personnel effort, S&T will look to these SMAs as a guide for the kinds of programs and projects in which to invest.

- **Counter Terrorism and Homeland Security Threats**

- + Improve the Department's ability to collect and understand actionable intelligence; detect, manage, and disrupt homeland security threats from terrorists, nation-states, and other threat actors; protect key personnel, events, and soft targets and crowded places within the U.S.; and counter weapons of mass destruction (WMD) and other emerging threats.

**Expected Outcome** S&T is a key contributor to the development, implementation, and success of the Department's strategies, goals, and priorities. S&T is sought after for leadership and advice in all relevant science and technology matters. The role of S&T is universally recognized by leaders in DHS and national and international stakeholders. S&T exercises authority and leadership over major, inter-component and department-wide research and development priorities, decisions, and resourcing.

**FIGURE 3** Innovation and R&D Leadership for DHS



- **Secure U.S. Borders and Approaches**
  - + Facilitate full operational control of the U.S. air, land, and maritime border to prevent illegal entry and illicit activities; to detect, deter, impede, and disrupt transnational organized crime; and to enforce immigration laws and facilitate lawful immigration.
- **Secure Cyberspace and Critical Infrastructure**
  - + Enable the security of cyberspace and critical infrastructure to secure the federal civilian networks from attack, strengthen the security and resilience of critical infrastructure, assess and counter evolving risks, and combat cybercrimes.
- **Preserve and Uphold the Nation’s Prosperity and Economic Security**
  - + Facilitate lawful trade and travel while developing tools to assist in disrupting and dismantling criminals from exploiting the system; protect the U.S. public and institutions by safeguarding the U.S. transportation system, maritime waterways, and resources; and guard the U.S. financial system from terrorist attacks and criminal actors.

- **Strengthen Preparedness and Resilience**
  - + Help local communities prepare and build resiliency through planning and investment in mitigation measures; enable the Department to respond during incidents by providing guidance, tools, equipment, resources, and support for community recovery; train and exercise first responders to respond to persistent and emerging threats and hazards.
- **Champion the DHS Workforce and Strengthen the Department**
  - + Increase integration of DHS components and functions; strengthen departmental governance and management; develop and maintain a high-performing workforce; advance risk-based decision-making; optimize support for mission operations; and promote transparency and accountability before the American people.

**PRIORITY ACTIVITIES**

**1.1.1** S&T leads future Homeland Threat Assessments, providing additional evidence, analytic sophistication, and an assessment of Future Threat, adding more advanced data and methods to ascertain future threats and assess risk and publishing internal and public versions of this document annually. S&T will collaborate with relevant partners in DHS and release the results as an annual S&T publication. S&T leadership will ensure the Department includes assessments of future threats in its action strategies.

**Become the Driving Force of Innovation for the Department of Homeland Security**

**1.1.2** S&T leadership facilitates and communicates across stakeholders to ensure contributions to support DHS missions are understood and valued appropriately. To ensure that S&T can work within the Department to exert this goal, S&T must author and implement a Strategic Plan for Stakeholder Engagement that analyses, documents, and provides specific guidance based on audience segmentation for stakeholders that are important to S&T contributions to DHS missions.

**1.2 OBJECTIVE SCIENCE POLICY ADVISOR**

Strategic objectives, goals, policies, and operations are informed by science throughout DHS, starting from the top of the Department and driving through all levels to impact front-line mission accomplishment. S&T actively collaborates in the development of all DHS Strategies, Policies, and Plans. This process includes providing direct input (informing, designing, writing) as well as executing (R&D activities, outputs, impacts) strategies to clearly support the Department and work to inform DHS partners of emerging technological and scientific needs through execution.

**PRIORITY ACTIVITIES**

**1.2.1** Establish criteria for and executes processes to collect and present scientific evidence, assess and analyze data, and develop measures of success based on mission impact through objective evaluation of efforts.

**1.2.2** Provide the best, most current scientific knowledge available in the context of DHS needs and authorities and identify and communicate gaps in this knowledge that could impact DHS goals. This provision will require closer relationships with DHS HQ Components, as well as a better understanding and prioritization of Department-level needs.

**1.2.3** Establish S&T as the authority for the collection, reporting, and use of official and unofficial scientific data to improve decision-making in DHS.

**1.2.4** Understand and systematically measure the achievements of policy objectives to build coherent and comprehensive evidence on both negative and positive outcomes to document effectiveness and improve DHS policy interventions.

**1.3 OBJECTIVE: INTER-COMPONENT PROGRAMS**

All mission areas enable scientific discovery and technical advancement to support DHS operations and prioritize inter-component programs that lead to Department-level goals.

**PRIORITY ACTIVITY**

**1.3.1** S&T builds infrastructure necessary to achieve DHS priorities in major programing by collecting and assessing all the science and technology needs of DHS through a single function that communicates directly with DHS stakeholders such as the Secretary’s Office, Joint Requirements Council, and Management Directorate.

# 02

## PARTNERSHIP

Engage in deliberate relationships with Science, Engineering, and Technology Communities to equip DHS for success.



S&T will employ its relationships with Interagency, Industry, Academia, Research Institutes, State, Local, Tribal, and Territorial (SLTT), and International Partners to meet Department goals, improve operational performance, and enhance the achievement of mission throughout the Department. These invaluable relationships give the Department access to subject matter experts, external resources, partners that share DHS goals, and cultivate good will nationally and abroad.

Science, technology, and innovation are increasingly intertwined with relations among private industry, inter-government agencies at all levels, and research or academic institutions. In DHS, these issues resonate across all mission sets, from domestic security to disaster resilience. Today, global crises such as the COVID-19 pandemic require national and international coordination of science, policy, and operations between national governments and science institutions. S&T will concentrate on improving relations through closer interactions between science and diplomacy and elevating the role of science in DHS to address departmental, national, and global challenges. The value of scientific cooperation among domestic safety organizations to collaborate and cooperate in shared mission areas such as

public safety, terrorism prevention, border and immigration management, crime prevention, emergency management, and global pandemics is obvious. There are three main ways through which S&T can use its relationships and convening authorities to directly benefit the Department:

- **Science in Partnerships:** Informing DHS, interagency, or public/private objectives with scientific advice
- **Partnerships for Science:** Facilitating science cooperation aimed at DHS goals
- **Science for Mission:** Using science cooperation and partnerships to improve DHS relations between policy or operational partners from all sectors

### DHS S&T'S ROLE IN PARTNERSHIPS AND ENGAGEMENT

Strong partnerships and other relationships already exist between S&T and our interagency and international partners, universities, private research foundations, and industry. S&T will use its formal role in convening or making agreements among all partners to influence and expedite high priority work, share information among peers to improve the rigor of scientific outputs, and increase the efficiency of our efforts. In addition, S&T

has used science cooperation to increase awareness and collaboration outside of the scientific community and enhance the ability of DHS to meet its domestic goals through enhanced relationships in policy and operations. The Directorate will deliberately cultivate these relationships across all sectors to support DHS Strategic Goals and Priorities and to answer inter-component needs that are aligned to Department-level priorities.

Partnerships, when executed deliberately and strategically, can enable S&T to further call attention to its role as a resource that supports DHS while incorporating American and international science and technology leaders to inform cooperative efforts and as a method to establish, improve, or enhance relationships among the policy and operational communities to achieve DHS goals and objectives. S&T will provide the necessary science advice to inform decision-makers in establishing agendas that are beneficial to the Department and the nation. S&T will use existing relationships or create new partnerships between science communities that further national and departmental objectives. With each of the following Objectives, S&T will strive to ensure that Department and important stakeholders fully recognize and utilize the role of R&D, partnerships, and mission impact.

**In 2015, S&T convened government leaders in research, policy, and operations establishing the first Five-Country Research and Development Network for Public Safety (5RD) to develop joint priorities for R&D. As part of this process, S&T developed and solidified relationships among policy and operational partners that improved international cooperation. S&T has since used these relationships to ensure continuity among these nations, especially between the U.S. and partner countries in which key personnel change frequently. These diplomatic relationships have also resulted in the 5RD Network's formal recognition as science advisers to the Five-Country Ministerial on Counterterrorism and Terrorism Prevention related matters.**

**Expected Outcome** S&T will answer the needs of DHS through the development, enhancement, and use of strategic, multisector relationships to enhance the influence of the Department. S&T will be the recognized agent of the Department in pursuit of mission success with international concerns, public and private. The ability of DHS to pursue its missions will be markedly enhanced by S&T relationships in the scientific community.

### 2.1 OBJECTIVE: RELATIONSHIP BUILDING

*Develop and mature relationships that allow S&T to inform DHS goals and provide the best scientific advice to the Department as well as to our allies, interagency partners, state and local partners, academia, and the private sector.*

S&T will be in a position to provide the best and most trusted advice to DHS and all DHS communities of interest through collaborative relationships of mutual respect.

#### PRIORITY ACTIVITIES

**2.1.1** Utilize the various cooperative and convening authorities of S&T to clearly communicate and execute alignment of efforts that will support DHS and our allies and partners. S&T will work closely with DHS stakeholders to identify key priorities that can benefit from scientific advisement and S&T networks.

**2.1.2** Broaden formal and informal engagement to include key industry groups, state and local government associations, and

national organizations that represent the first responder community to pursue the mission goals of DHS through local partnerships. Work through mediating institutions that represent major communities of practice in homeland security or communities of interest in the threats facing our nation will allow for broad audiences to benefit from scientific knowledge and advisement. S&T will be poised to ensure that DHS priorities can be communicated to these groups and that these groups are prepared and equipped to support these priorities for the public good.

### 2.2 OBJECTIVE: COLLABORATION AND COOPERATION

*S&T capabilities are utilized through coordinated and collaborative relationships with government, industry, international, and academic partners to deliver timely, cost-effective capabilities that impact DHS mission needs.*

#### PRIORITY ACTIVITIES

**2.2.1** Facilitate access to methods, capabilities, resources, data, facilities, technology, and knowledge products that augment and complement current and future DHS priorities. Develop systems that capture the contributions of these relationships, their aims, and their outcomes.

**2.2.2** Advance strategic engagements by clearly and consistently communicating with the full range of partners to promote DHS priority needs and for awareness of state of current/future technologies.

### 2.3 OBJECTIVE: SCIENCE TO ADVANCE RELATIONS

*DHS policy and operational relationships are reinforced and enhanced through S&T relationships with international, interagency, industry, academic, and state, local, tribal, and territorial partners to advance departmental missions.*

#### PRIORITY ACTIVITIES

**2.3.1** Incentivize priorities for homeland security through the unique convening authorities, programmatic tools, and contract mechanisms of S&T. Strengthen S&T's strategic partnerships by formalizing and implementing engagement with measurable impact on mission.

**2.3.2** Design industry relationships to maintain awareness of DHS-relevant capabilities and needs and engage stakeholders with innovative homeland security solutions.

**2.3.3** Promote engagements to share and exchange DHS priorities and research needs with interagency partners, international governments, academia, and private industry.

**2.3.4** Facilitate the open communication of Department-level needs and priorities to guide and inform the allocation of S&T resources toward key, strategic partnerships and ensure that the impacts of these partnerships are understood among key DHS leaders. Executing these strategic communications will require concerted participation and effort at all levels of S&T.

### 2.4 OBJECTIVE: PARTNERSHIPS FOR TOMORROW'S NEEDS

*Serve as the primary hub of innovative solutions and drive advancements in homeland security capabilities by connecting DHS to innovative solution developers from interagency, industry, international, and academic partners addressing the evolving world of research and emerging threats.*

S&T is uniquely positioned to make science organizations, private industry, and other partners aware of the needs of DHS as well as to alert DHS to new knowledge or technologies that may benefit the Department in unforeseen ways.

#### PRIORITY ACTIVITIES

**2.4.1** Ensure that relationships with interagency, industry, international, and academic partners result in awareness of key developments that align to strategic priorities and to ensure avoidance of duplicated efforts. S&T will be aware of significant advancements among partners that present new opportunities germane to DHS needs.

**2.4.2** Provide timely and accurate evaluations of interagency, industry, international, and academic science and technology products. S&T will focus expertise and other necessary resources to provide trusted, independent, objective evaluations of solutions' impact on risk, threats, and mission performance. S&T will protect the Department from solutions or investments that do not effectively contribute to mission impact.

# 03

## CAPABILITY DELIVERY

### Become the Authority and Trusted Provider of Science and Technology Expertise and Solutions.



As the primary research and development arm of the Department, S&T provides both rapid and long-range delivery of technology, production of knowledge, and subject matter expertise in response to crises such as the COVID-19 pandemic with an eye toward long-range emerging threats and future mission requirements. Most S&T support involves delivering technical capabilities and knowledge to mitigate Component shortfalls in current mission operations. S&T also exercises technical leadership to support DHS acquisitions regarding requirements, analytic processes, coordination and development, and operational use of standards, measurement science, systems engineering, and test and evaluation. All of these activities share the ultimate goals of reducing technical and operational risk and enabling efficient delivery of solutions for DHS mission operations as well as the operations of partners beyond the Department. Supporting and enabling international, interagency, state, and local partners that contribute to DHS missions is vital to the success of the Department. Lastly, S&T employs long-term, innovative research and development to equip the Department, its constituents, and its partners to confront

the emerging and future threats targeting the Homeland. Prioritizing these activities to achieve departmental goals provides an unprecedented opportunity to enhance and support DHS doctrine, maximize S&T impact, and focus S&T resources on the short-term needs of the Department. S&T will fully utilize the broad range of authorities granted through legislation and delegation to accomplish our mission.

In order to ensure that impact on DHS missions remains at the forefront of R&D and acquisition efforts, S&T will systematically evaluate unmet needs and potential solutions to concentrate resources that are applied *across the Department*. Any research or development activity that does not contribute to one of these overarching goals or missions should not be undertaken by DHS S&T. Furthermore, any effort that engages only with an individual Component should be studied to weigh the potential benefit to overall department goals against the risk of expending effort that could be used to support a departmental objective instead. Urgent R&D needs from a single Component that are vital to DHS missions will continue to be addressed as necessary, but after more considered analysis of Department needs as well.

#### QUESTIONS TO ASK

##### **Does this support or advance the whole of the Department of Homeland Security and its missions?**

The second major consideration implicit in this goal is whether DHS participation in a given research or development activity will impact operational effectiveness. Will DHS be a partner that adds value? Since its creation in 2002, DHS became the department with the most sworn armed federal law enforcement officers and agents in the United States. For this and other reasons of public perception, when DHS participates in activities that require privacy protection, public trust, and the protection of civil liberties, those activities may face undue criticism or scrutiny that could damage the overall objectives of the activity, and may be better addressed by other agencies.

##### **What impact will DHS's participation have on public perception? How will DHS participation affect operational impact?**

Emergent needs, by definition, require the swift recognition of research needs and the ability to obligate funds to an appropriate performer and to conduct research and

development, standards development and integration, testing, and evaluation. In other words, decision-makers at S&T must engage in a clear-eyed, objective examination of the availability of resources and the ability of S&T to successfully engage in research, development, or acquisition support activity in a timely manner.

##### **Does DHS possess the authorities or policies to conduct this research? Can DHS start, complete, and use this research in time to meet the need? Can or should additional authorities be pursued if required?**

Finally, DHS S&T should examine whether we can make a difference. There is an opportunity cost to obligating DHS's resources towards one activity – those resources can no longer go towards the next best activity. DHS S&T will discover the public and private entities also engaging in related research activities and the approximate resources they are putting forward. The federal government is often best positioned to support activities that are public goods. A public good must meet two criteria: non-excludable and non-rival. S&T will strongly prefer activities in which persons cannot be excluded from receiving the

benefits of that good, whether they pay for it or not and where the consumption of the good does not diminish another person's ability to consume the good. Research activities into private goods are most often carried out in the private sector, since the development and sale of private goods can lead to profits. Therefore, the opportunity cost of the federal government investing in private goods is very high and should be avoided.

**What other entities are investing in this research activity? What level of resources are they committing? Will that work address the unique needs of DHS in their outcomes? Can it be modified, or could co-investment enable it to meet DHS needs? Will DHS's investment make a difference? Is the work likely to occur without S&T investment? What is the opportunity cost of investing in this research activity? Does this research activity support a public good?**

With a systematic approach to categorizing its activities, S&T will ensure that we are able to simultaneously address future and near-immediate needs of the Department, systematically prioritize S&T efforts and resources, and maximize impact on the missions of the Department.

**Expected Outcome** *S&T engages in solutions that strengthen and concentrate the influence of DHS Acquisition across all stakeholders. DHS missions are enhanced by timely delivery of advanced scientific and technical solutions to mission needs. DHS benefits from reduction of acquisition risks, leading to lower lifecycle costs. S&T is considered by stakeholders to be the hub of substantive impacts to DHS operations through science-based policy advice, capability development oversight, research capabilities, standardization, and RDT&E infrastructure. DHS benefits from standardization across the Department that supports mission and unity of purpose. S&T provides the infrastructure that allows DHS to reduce risk by avoiding, mitigating, or quickly adapting to strategic surprises.*

**3.1 OBJECTIVE: TECHNICAL EXPERTISE AND SOLUTIONS**

*Provide the expertise for all potential R&D activities within DHS, including the development of DHS needs, capability development, subject matter expertise, technological solutions, and analytical solutions.*

**PRIORITY ACTIVITIES**

**3.1.1** Develop, provide, and communicate to stakeholders the S&T infrastructure for focused, developmental activities to meet urgent, time-critical needs (less than six months) within DHS to ensure that solutions can be rapidly delivered in order to address immediate threats.

**3.1.2** Establish the S&T infrastructure to deliver timely solutions (6-24 months) that are responsive to identified operational needs and acquisition needs across the Department with broad recognition of measured impact and benefit.

**3.1.3** Formalize delivery of extended R&D (3-5 years) solutions to address future threats and ensure that research meets Department mission needs, is technically sound, and has the potential to make a meaningful mission impact.

**3.1.4** Formalize a systematic approach to enduring research (5+ years) solutions that incorporates expert judgement within DHS for projected future threats to ensure that long term DHS strategic needs will be met in the future.

**3.2 OBJECTIVE: MEASURABLE, QUALITY TECHNICAL SOLUTIONS**

*Reduce technical and operational risk and improve the efficient delivery of solutions for DHS mission operations.*

**PRIORITY ACTIVITIES**

**3.2.1** Assess, validate, and prioritize the unmet needs of DHS to identify shared solutions that will inform S&T and DHS investments.

**3.2.2** Provide testing and evaluation, systems engineering, and standards support earlier in the implementation of major DHS projects to reduce risks to programs, avoid unforeseen costs, and increase DHS mission effectiveness.

**3.2.3** Sponsor and conduct technology assessments, test and evaluation activities, operational demonstration experiments, and impact evaluation to increase understanding of and readiness for emerging threats and opportunities across DHS interests.

# 04 TOMORROW'S WORKFORCE, TODAY

## Advance the S&T Team to Assume Leadership, Develop Partnerships, and Deliver Solutions to the Department.



The immense challenges in confronting the pace of technology amidst evolving world events, while also competing for, recruiting, and maintaining a viable total workforce demand a strategic focus on the full integration of talent management at DHS. This is especially challenging for S&T because we are often competing with other government science organizations, private industry, and research universities and institutes when we recruit or retain the best talent for our unique mission. In order to keep pace with the improvements outlined in this strategy, S&T will deliberately place the right people, for the right roles, at the right time to execute these goals. As in many cases across DHS, at S&T *the people are the mission.*

S&T must also embrace the future of work and its associated trends. S&T will implement novel management practices to ensure an always ready, resilient, and agile workforce capable of advancing the Department's mission... anywhere, anytime.

S&T's foundational understanding of scientific and technological advancements will impact homeland security missions and are vital

“ **Maintaining a highly-skilled, diverse, and engaged workforce is critical to accomplishing the homeland security mission, which relies on dedicated personnel who go above and beyond to keep Americans safe from harm.**”

DHS FY20-24 Strategic Plan, Objective 6.2, Develop and Maintain a High Performing Workforce

to the security of the United States. S&T's programmatic and acquisition expertise will ensure the best outcomes. None of these ambitions will be achieved without the dedicated experts necessary to make them a reality, and S&T's overarching talent management strategy will ensure a *Safer America through Scientific and Technological Development.*

**Expected Outcome** *S&T will build a human capital infrastructure to achieve the correct mix, both now and in the future, of personnel resources, knowledge, skills, abilities, and experience in order to provide the best solutions for the safety and security of the nation.*

### 4.1 OBJECTIVE: CUTTING-EDGE RECRUITMENT

*Human capital systems and programs will align with the strategic needs of the Directorate to ensure the best qualified employees will fill all positions at S&T so that we can both support and lead in the Department.*

#### PRIORITY ACTIVITIES

**4.1.1** Establish evidence-based workforce forecasting to identify and evaluate S&T's ongoing staffing requirements and implement effective human capital policies and programs at all phases of the employment lifecycle.

**4.1.2** Develop a robust employer brand in concert with a “future-forward” recruitment and strategic sourcing approach – supporting S&T Goals 1-3 to reach and attract ideal candidates to implement DHS strategic goals.

**4.1.3** Apply leading-edge candidate screening techniques during candidate interviews by critically evaluating the multiple dimensions and factors of optimal person-job-organization “fit.”

### 4.2 OBJECTIVE: WORKPLACE CULTURE AND WORKFORCE ENGAGEMENT

*Make work better for S&T's people, and S&T's people better at work by maintaining, nurturing, and continuously evolving a world-class workforce.*

#### PRIORITY ACTIVITIES

**4.2.1** Implement retention, recognition, and engagement tools to deepen employees' sense of mission and focus on the Department.

**4.2.2** Build a workforce representative of America's diversity and cement a culture of belonging, respect, inclusivity, and courage to drive innovation by harnessing the power of perspective and interconnectedness.

**4.2.3** Implement learning and development programs linked to identified growth areas and organizational competency needs.

**4.2.4** Deliberately plan for succession management for next generation DHS leadership, development, and success to ensure continuity and prevent disruptions in the workforce.

## 04 TOMORROW'S WORKFORCE, TODAY

### 4.3 OBJECTIVE: DEPARTMENT-WIDE HUMAN CAPITAL INVESTMENT

*Assist DHS in meeting its future needs through focused investment in and partnership with diverse talent and educational communities.*

#### PRIORITY ACTIVITIES

**4.3.1** Serve as a resource and advisor to Departmental human capital leaders by providing visibility into emergent science and technology, next generation DHS educational programs, and potential impacts on the future state of DHS work.

**4.3.2** Expand the Department's workforce transition pipeline to shape the next generation of homeland security experts by facilitating internships, scholarships, exposure, and mentorships for students and recent graduates at academic institutions and DHS industry partners.

“Investing in the ability of our workforce to perform to capacity is one of our highest priorities.”

DHS FY20-24 Strategic Plan, Objective 6.2, Develop and Maintain a High Performing Workforce

DHS SCIENCE & TECHNOLOGY STRATEGIC PLAN 2021



**Homeland  
Security**

Science and Technology

