



Biosurveillance and Security Test Capability

December 7, 2022

Fiscal Year 2022 Report to Congress



**Homeland
Security**

Science and Technology Directorate

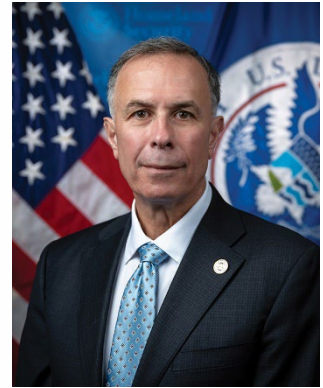
Message from the Under Secretary for Science and Technology

December 7, 2022

I am pleased to submit the following report, “Biosurveillance and Security Test Capability,” which has been prepared by the Science and Technology Directorate (S&T).

This document was compiled pursuant to a requirement in the Joint Explanatory Statement, which accompanies the Fiscal Year (FY) 2022 Department of Homeland Security (DHS) Appropriations Act (P.L. 117-103).

Pursuant to congressional requirements, this report is being provided to the following Members of Congress:



The Honorable Lucille Roybal-Allard
Chairwoman, House Appropriations Subcommittee on Homeland Security

The Honorable Chuck Fleischmann
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable Chris Murphy
Chair, Senate Appropriations Subcommittee on Homeland Security

The Honorable Shelley Moore Capito
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

Inquiries about this report may be directed to the Office of Legislative Affairs at 202-447-5890.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dimitri Kusnezov". The signature is fluid and stylized, with a long horizontal stroke extending to the right.

Dimitri Kusnezov, Ph.D.
Under Secretary for Science and Technology

Executive Summary

DHS has a mission to prevent large number of casualties and damage to critical infrastructure that could result from a chemical or biological incident (e.g., the release of biological threat agents to cause intentional harm or endemic outbreaks, respectively). DHS works with state, local, tribal, and territorial end-users and other federal agencies to accomplish this mission through operational component programs that detect biological threats released into the environment and through programs that provide integrated situational awareness of biological threats and disease. In order to further this mission and to improve related operational programs, S&T will support the development of a national testing capacity to assess vulnerabilities and to mitigate biological risks in building air and water handling systems, multi-building facilities, and wastewater systems.

S&T is engaging with the Department of Energy (DOE) Idaho National Lab (INL) and its university partners, Montana State University and Northwestern University, to determine the scope and feasibility of a national testing capacity that would assess vulnerabilities and would mitigate biological risks in building air and water handling systems, multi-building facilities, and wastewater systems.

DOE INL will assist DHS in assessing stakeholder requirements and in developing an associated business case model for operational facilities that are needed for integrated indoor, built environment testing of biological pathogen detection and surveillance technologies from point of release through water or air distribution systems to detection. DOE INL will deliver demonstrated capabilities to advance reliable approaches to monitoring and controlling pathogen fate and to transport from bench to full-scale buildings. DOE INL will work with DHS to identify organizations, national labs, and government and academic institutions to partner with, and will engage with industry. Finally, DOE INL can serve as support for needed interagency coordination for test bed requirements development.



Biosurveillance and Security Test Capability

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I. Legislative Language

The report was compiled pursuant to a requirement in the Joint Explanatory Statement, which accompanies the Fiscal Year (FY) 2022 Department of Homeland Security (DHS) Appropriations Act (P.L. 117-103), and which states:

Biosurveillance and Security Test Capability.—S&T shall work with the Office of Countering Weapons of Mass Destruction to determine whether this capability is supportive of the Biological Detection for the 21st Century program within its current development cycle. Within 90 days of the date of enactment of this Act, S&T shall provide the Committees the results of the evaluation and a plan for test bed capabilities that takes into account the development of capability requirements and a bench scale testing plan to model this capability.

II. Background

DHS has a mission to prevent large numbers of casualties and damage to critical infrastructure that could result from a chemical or biological incident (e.g., the release of biological threat agents to cause intentional harm or endemic outbreaks, respectively). DHS works with state, local, tribal, and territorial end-users and other federal agencies to accomplish this mission through operational programs that detect biological threats released into the environment and through programs that provide integrated situational awareness of biological threats and disease. In order to further this mission and to improve related operational programs, the Science and Technology Directorate (S&T) will support the development of a national testing capacity to assess vulnerabilities and to mitigate biological risks, including Coronavirus Disease 2019 (COVID-19), in building air and water handling systems, multi-building facilities, and wastewater systems.

The mission of S&T is to safeguard the Nation by answering the threats of tomorrow and the needs of today through science, technology, and innovation. S&T's mission is accomplished through four strategic goals:

1. Become the driving force of innovation for DHS.
2. Engage in deliberate relationships with the science, engineering, and technology communities to equip DHS for success.
3. Become the authority and trusted provider of science and technology expertise and solutions.
4. Advance the S&T team to assume leadership, to develop partnerships, and to deliver solutions to the Department.

S&T is engaging with the Department of Energy (DOE) Idaho National Lab (INL) and its university partners, Montana State University and Northwestern University, to determine the scope and feasibility of a national testing capacity that would assess vulnerabilities and would mitigate biological risks in building air and water handling systems, multi-building facilities, and wastewater systems.

DOE INL will assist DHS in assessing stakeholder requirements and in developing an associated business case model for operational facilities that are needed for integrated indoor, built environment testing of biological pathogen detection and surveillance technologies from point of release through water or air distribution systems to detection. DOE INL will deliver demonstrated capabilities to advance reliable approaches to monitoring and controlling pathogen fate and to transport from bench to full-scale buildings. DOE INL will work with DHS to identify organizations, national labs, and government, and academic institutions, and will engage with industry to be a part of the working group that will develop use-cases and requirements for a potential test bed. Finally, DOE INL can serve as support for needed interagency coordination for test bed requirements development.

S&T is pursuing the national test bed capability, colloquially known in-house as the Built Testbed Environment, as instructed in Congressional requirements. S&T did not receive this

work as a customer capability gap to address through its research, development, test, and evaluation (RDT&E) initiatives. Therefore, the initial plan is to scope the initiative to confirm its nature and long-term feasibility. S&T is providing \$500,000 to DOE INL for: developing use-case scenarios, analyzing business cases, gathering data and partner feedback, establishing operational requirements, and developing the execution strategy.

S&T is establishing an interagency agreement with DOE INL. This funding package is currently undergoing DHS internal review with an anticipated award by October 31, 2023.

III. Expenditure Plan

S&T's Office of Mission and Capability Support executes RDT&E to support closure of DHS Component prioritized capability gaps.

The interagency agreement between S&T and DOE INL is being finalized. The initial scope of the effort would be to assess test capacity needs, including space requirements, air and water system handling, accessibility, people interactions/movement, accuracy and timeliness of operator decision-making, security, and communications equipment such as frequency and cybersecurity. This would include the following action items:

1. Develop and Collect Requirements

- 1.1. Work with DHS to identify the requirements gathering process across government, industry, and academia. Define and list the use-case scenarios (i.e., operations, maintenance, and support) for test and evaluation of technology.
- 1.2. Define the gaps that need to be fulfilled to support stakeholders' requirements for a national test bed, identify current test and evaluation infrastructure, and identify test and evaluation gaps in infrastructure including methods, processes, procedures, and guidance.
- 1.3. Develop and deliver a technology use-case landscape assessment and gaps analysis.

2. Provide Capability Assessment and Business Case Analysis

- 2.1. Assess available test and evaluation infrastructure including standards, methods, data, processes, procedures, and guidance as identified in task 1.3. Identify community-accepted methods for application to test bed operational use-case scenarios as identified in task 1.1. Determine gaps and deliver an Experimental Design Development Plan.
- 2.2. Produce a business model to include capital investment, experimental design development, operations, maintenance, and sustainment costs.

IV. Conclusion/DHS Action Plan

The goal of the Built Testbed Environment is to establish a framework for a national testing capability to assess vulnerabilities and mitigate biological risks, including COVID-19, in building air and water handling systems, multi-building facilities, and wastewater systems. S&T and DOE INL will work together to identify gaps and user requirements, and to develop a use-case landscape and gap analysis. S&T looks forward to the results of the initial scoping initiative, given that test beds in the past have had sustainment problems. The outputs of the use-cases scenarios, business case analysis, and execution strategy will enable S&T to confirm the best potential path forward.

Appendix: Abbreviations

Abbreviations	Definitions
COVID-19	Coronavirus Disease 2019
DHS	Department of Homeland Security
DOE	Department of Energy
FY	Fiscal Year
INL	Idaho National Laboratory
RDT&E	Research, Development, Test, and Evaluation
S&T	DHS Science & Technology Directorate