



Homeland
Security

Science and Technology

BATTLING THE INVISIBLE ENEMY

The Department of Homeland Security Science
and Technology Directorate's COVID-19 Response

www.dhs.gov/science-and-technology/st-support-covid-19-response



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MESSAGE FROM BILL BRYAN



The COVID-19 pandemic is a global threat with life and death consequences. The enormity of the situation is something many of us have never seen before. It is also a scientific challenge in need of innovative solutions—something quite familiar to the Department of Homeland Security (DHS) Science and Technology Directorate (S&T).

S&T was built to take on complex issues of vital importance. It is our mission to enable effective, efficient, and secure operations across the homeland security enterprise and we're certainly not backing down now. We're using every tool at our disposal and calling on every member of our dedicated workforce to join the fight. For many, that means full-time teleworking from home, supporting continuity of operations in this time of crisis. For others, it means using research and development expertise to battle this invisible enemy directly.

Our rigorous research and development efforts are bolstered through close collaboration across S&T, our fellow DHS components, other U.S. federal agencies, and our international partners around the world. S&T's research laboratories, centers of excellence, and federally funded research and development centers are sharply focused on COVID-19, with diverse projects underway analyzing various aspects of the pandemic. We're looking at the actual virus and studying its characteristics to better understand infection and transmission. We're investigating effective public health policies to help slow the spread. We're seeing how the pandemic is impacting infrastructure resilience and supply chains. We're also leveraging past successes.

Numerous information sharing technologies created with S&T funding have found new applications during the COVID-19 era. In addition to these preexisting capabilities that enable enhanced collaboration through communication, S&T maintains an up-to-date online repository of useful COVID-19 information. We've curated and consolidated practical guidance, including first responder safety precautions—highlighting the efforts of our colleagues and bringing stakeholders together in a united effort.

Teamwork is foundational to our ability to innovate our way out of a crisis. I am incredibly proud of how S&T has risen to the challenge we're all facing. I am humbled by the privilege of leading this organization and grateful for the above and beyond efforts I have seen. This report represents a snapshot of the S&T response so far.

We must continue to work together to achieve mission success. We will provide timely data and share best practices to drive decision-making. We will review promising technologies from private industry, scouting for solutions to difficult problems such as disease surveillance. We will sponsor compelling projects with innovative ideas. We will do whatever we can to fight COVID-19 and come out the other side stronger.

A handwritten signature in black ink, appearing to read "Bill Bryan".

BILL BRYAN
DHS Senior Official Performing the Duties of the
Under Secretary for Science and Technology (SOPDUSST)



S&T RESEARCH

S&T continues to deploy its vast research and development expertise to support ongoing efforts of federal agencies, health organizations, and private sector partners to end the global pandemic. This includes identifying knowledge gaps about the virus that directly affect response operations, tracking the COVID-19 outbreak to help bridge these gaps, and delivering tools to help decision-makers take decisive action.

SCIENTIFIC RESEARCH

World-class S&T facilities are coordinating efforts within DHS, the federal government, and the wider scientific community to conduct scientific research in support of the United States' coronavirus response. The better we understand the enemy, the more effective we can be at defeating it.

National Biodefense Analysis and Countermeasures Center (NBACC)



Hazard Awareness & Characterization Technology Center (HAC-TC)



Probabilistic Analysis for National Threats, Hazards, and Risks (PANTHR) Program



Office of National Laboratories (ONL)



IMPACTS OF THE ENVIRONMENT ON COVID-19

S&T, in partnership with other qualified organizations, is rapidly executing laboratory studies at NBACC to produce unique data on COVID-19 environmental stability and decontamination.

In early February, NBACC began receiving samples of the SARS-CoV-2 virus and initiated research on the impact of environmental factors and decontamination effectiveness. Laboratory studies investigated survivability of the virus on commonly-used surfaces, in the air, and in human saliva and respiratory fluids. In March, S&T **published a news release announcing the work being conducted**; and in April, DHS SOPDUSST **Bill Bryan participated in President Trump's press briefing** to announce preliminary results from the NBACC research. More recently, the findings have been peer-reviewed and published in major scientific publications, including the **Journal of Infectious Diseases** and the American Society for Microbiology's **mSphere®**.





NBACC KEY FINDINGS



Solar radiation rapidly reduces virus stability on outdoor surfaces. Data suggests that outdoor surfaces exposed to direct sunlight are at lower risk for virus transmission.



Higher humidity may reduce virus survival. Data indicates that the virus is more likely to be stable and persist in climates with lower humidity, like most U.S. winter climates and airplane cabins. Increasing indoor humidity levels may speed virus decay, as with change in seasonal humidity.



The virus dies faster at higher temperatures. Data indicates that the virus dies faster in saliva droplets at increased temperatures, indicating that heat may help kill the virus and reduce transmission.



Bleach and Isopropyl Alcohol (IPA) are effective decontamination solutions. This reinforces the effectiveness of recommended disinfectants to clean and sanitize facilities.



Virus stability in saliva is not dependent on droplet size. There is no statistical difference in half-life as a function of droplet size in saliva. Surface stability data is applicable to a broad range of droplets generated by infected individuals (e.g., talking, coughing, medical procedures).

NBACC continues to execute laboratory research to refine and expand its results. Anticipated advancements include: additional survival data on commonly-used surfaces at different temperatures and humidity levels, airborne particles survival data for indoor and outdoor conditions (including the effect of temperature, humidity, and sunlight to inactivate the virus), and effectiveness of disinfectants to kill the virus in simulated saliva and respiratory fluids on surfaces.



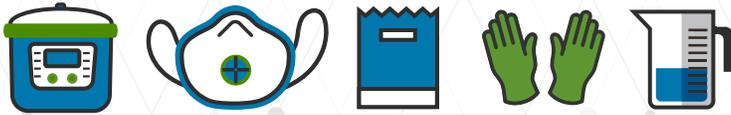
STUDYING DECONTAMINATION METHODS FOR PERSONAL PROTECTIVE EQUIPMENT (PPE)

S&T's PANTHR team is collaborating with partners to determine how long various surfaces and fluids remain contaminated and which type of decontamination products/methods should be used at home, in medical settings, and by field operators. This critical information has been **published in a report that will help federal leaders, public health officials, and front-line operators make informed decisions** about the guidance, types of equipment, and protocols needed to combat the spread of SARS-CoV-2. **It will also help decision-makers extend the amount and lifespan of PPE available to health care workers** by providing scientifically-backed methods to decontaminate and re-use equipment.

Additionally, lab results generated by S&T can improve accuracy of public health modeling predictions for potential spread (illnesses/deaths) and improve understanding of the impact that specific interventions (social distancing, individual PPE, etc.) may have on combatting the pandemic.

PREDICTIVE MODELING LOOKS AT VIRUS BEHAVIOR ON AIRCRAFT

S&T's Chemical Security Analysis Center (CSAC) is working with the Transportation Security Administration and the DHS Combatting Terrorism Technical Support Office, as well as the United Kingdom's Centre for the Protection of National Infrastructure and Department for Transport, to evaluate airborne particles transmission in aircraft cabins to identify potential mitigation measures.



'COOKING UP' A WAY TO DECONTAMINATE PPE WITH EVERYDAY TECHNOLOGY

It's all tech on deck for battling a global pandemic, and sometimes all it takes is a little creative thinking to help those on the front lines safely reuse their N95 masks. S&T found that a household appliance that many already own—a multicooker—can now be used as a powerful do-it-yourself tool in the fight to control COVID-19.

RECIPE

- 1** Pour water in the pot and insert rack so it will keep the mask and bag above the water. If the rack is not tall enough, use binder clips to raise it.
- 2** Wearing gloves, open the paper bag and carefully place up to three masks inside. Fold the bag closed and secure it with a staple or paper clip.
- 3** Place the sealed paper bag into the multicooker and close the lid securely.
- 4** Select the sous vide (or similar) function and manually set the temperature to 149°F (65°C) for 30 minutes. Press start.
- 5** Once the cycle is complete, remove the lid and then remove the paper bag from the multicooker.
- 6** Allow the mask(s) to dry on a clean, dry surface for up to an hour.
- 7** Once dry, examine the mask(s) for any potential damage to the nose foam or straps. Discard if there is any damage.
- 8** If everything looks good, the PPE is ready for reuse!

INGREDIENTS

- Multicooker with a sous vide function or equivalent
- A rack to place in the multicooker
- Clean disposable or reusable gloves
- Measuring cup
- Distilled or bottled water
- Paper bag
- A stapler or paper clip
- N95 mask(s)

! Before you attempt this recipe for success, visit [S&T's Multicooker Decontamination of N95 Respirators](#) site to watch the full instructional video and read FAQs!



“Given the significance of this outbreak and importance of respiratory protection for first responders and medical professionals, we're investigating simple, low-cost means to sanitize potentially contaminated N95 respirators. We hope front line personnel who need to use them can take advantage of this approach to extend the life of their limited supply of this critical piece of PPE.”

Dr. Lloyd Hough
S&T General Biological Scientist



% Virus Decay	Minutes	Hours
50% (half life)	4.12	0.07
90%	13.69	0.23
99%	27.38	0.46

INTERACTIVE CALCULATORS HELP DETERMINE VIRUS LIFE SPAN ON SURFACES AND IN THE AIR

S&T released **new online predictive modeling tools that estimate the natural decay of the virus under a limited range of environmental conditions.** The tools are designed to assist response efforts and estimate the persistence of the virus on surfaces and in airborne particles under certain combinations of sunlight, temperature, and humidity.

The first tool, made available in May, is a **calculator** populated with data on **survivability of the virus on three non-porous surfaces:** stainless steel, ABS plastic (phones, computer keyboards), and nitrile rubber (disposable gloves). Future iterations will expand temperature range and surface comparisons. As transmission of the virus is believed to occur through respiratory particles produced during breathing, talking, and coughing, a **second calculator**, made available in June, leverages data from studies of the **stability of SARS-CoV-2 in airborne particles generated from simulated saliva** across a range of environmental conditions.

The tools **provide decision-makers with essential information to protect those on the front lines** responding to the COVID-19 pandemic, including first responders and health care providers, as well as best practices for individuals to reduce potential for contamination.

“If you look at the coronavirus as a chain with many links, what we’ve done through our study is we’ve identified some of the weak links in that chain that the transmission of the virus depends upon. We’ve identified that heat and humidity is a weakness in that chain. We’ve identified that sunlight, solar light, and UV rays are a weakness in that chain. That doesn’t take away from the other activities and guidelines from the White House, the guidance from the CDC, and others on the actions and steps that people need to take to protect themselves. This is just another tool on our tool belt. Another weapon in the fight, that we can add to it.”

BILL BRYAN

WHITE HOUSE PRESS CONFERENCE 4/23

RESOURCES

[S&T Mobilizes Key Data to Inform COVID-19 Response](#)

[PANTHR Fact Sheet](#)

[SARS-CoV-2 Indoor Environmental Stability Predictive Model Fact Sheet](#)

[Predicting the Decay of SARS-CoV-2 in Airborne Particles](#)

[Disinfection and Reuse of Personal Protective Equipment](#)

[Inside the DHS lab where researchers study coronavirus](#)

[“Simulated Sunlight Rapidly Inactivates SARS-CoV-2 on Surfaces”](#)

[“Airborne SARS-CoV-2 is Rapidly Inactivated by Simulated Sunlight”](#)

[“Increasing Temperature and Relative Humidity Accelerates Inactivation of SARS-CoV-2 on Surfaces”](#)



ACADEMIC RESEARCH

S&T regularly partners with a host of academic research organizations across the nation to address specific homeland security topics and threats. The extreme circumstance of a global pandemic requires every resource at our disposal to bring innovative solutions to the evolving challenge of fighting COVID-19. S&T's **Centers of Excellence (COE)** have heeded the call—two current and four emeritus COEs are managing a total of 32 projects in five areas of research vital to the COVID-19 response: **biodefense, economic impact, preparedness and resilience, supply chain, and threat detection.**

Centers of Excellence (COE)



Minority Serving Institutions Program



GAUGING THE ECONOMIC IMPACT OF COVID-19

The **Center for Accelerating Operational Efficiency (CAOE)**, led by Arizona State University, is working with the DHS Cybersecurity and Infrastructure Security Agency (CISA) to gauge the economic impact of COVID-19. Although many organizations and agencies are conducting similar analyses, CAOE and CISA are using new, novel methodologies to improve projections. These state-of-the-art models will assess impacts to the national economy while in the throes of disaster and **provide policymakers with usable information to respond to short- and long-term economic challenges** caused by the pandemic.

ASSESSING CONSEQUENCES FOR SUPPLY CHAINS

The **Cross-Border Threat Screening and Supply Chain Defense (CBTS)** COE, led by Texas A&M University, is uniquely positioned to forecast stressors challenging the health of the nation and the security of the supply chain. Established in 2018, CBTS specializes in agriculture, operational logistics, public health, workforce health, disaster medicine, biodefense, and supply chain defense. CBTS is in the process of developing several research projects that focus on **national food security and supply chains**. These projects will assess impacts on prices and availability—identifying hypothetical challenges and interruptions to the nation's agriculture, food, and commercial supply chains and their vulnerabilities during the COVID-19 pandemic.

VISUALIZING VIRUS TRANSMISSION TO INFORM DECISION-MAKERS

S&T's **Minority Serving Institutions Program** is partnering with the University of Texas at San Antonio to support the Federal Emergency Management Agency (FEMA), U.S. Customs and Border Protection, and CISA in the development of scalable models to test transmission dynamics of COVID-19. These models will leverage data visualization tools to disseminate real-time information on **infection progression** to clinical and public health collaborators at the tribal, local, state, and federal levels.

GENERAL RESEARCH

As the pandemic continues to evolve, S&T continues to tap into its network of industry; national laboratory; and tribal, local, state, and federal government partners to seek solutions for capability gaps, fast-track processes, and to define topics for future research.

Federally Funded Research and Development Centers



Technology Scouting



Industry Partnerships



Technology Centers





STREAMLINING PROCESSES FOR ACCELERATED RESULTS

In anticipation of requests for quick responses to emerging issues, S&T's Federally Funded Research and Development Center (FFRDC) Program Management Office established a framework to **quickly place and execute task orders** through a unilateral award process. Thanks to this added agility, S&T is able to issue an award within 24-36 hours of determining a need. Both FFRDCs—the **Homeland Security Systems Engineering and Development Institute (HSSEDI)** and the **Homeland Security Operational Analysis Center (HSOAC)**—have already leveraged this new process in response to the COVID-19 pandemic.

Similarly, S&T's Office of Industry Partnerships (OIP) worked to deliver Cooperative Research and Development Agreements with private sector partners in less than 24 hours for testing promising biotechnology solutions that would allow NBACC to **facilitate the evaluation of a rapid COVID-19 test kit**, providing data for an Emergency Use Authorization application to the Food and Drug Administration.

SUPPORTING PUBLIC SAFETY GUIDANCE

The DHS Chief Medical Officer asked HSSEDI to assist in the development of triggers and reverse triggers to **guide state and local leadership as they strive to mitigate the spread of COVID-19**.

Triggers are events or milestones that require state and local officials to take certain actions. For example, a certain number of reported cases of COVID-19 triggers school closings and travel restrictions. HSSEDI stepped up and helped determine these vital mitigation parameters within days of the request.

STUDYING THE FAR-REACHING EFFECTS OF COVID-19

HSOAC is assisting CISA through collaboration with its **National Risk Management Center (NRMCC)**. The NRMCC works to identify and address the most significant risks to our nation's critical infrastructure and recently received a request from CISA to gain access to HSOAC resources as part of their COVID-19 response. HSOAC is currently helping researchers **understand how the outbreak is affecting national critical functions** that infrastructure provides and the range of mitigation options available to address these effects.

TECHNOLOGY SCOUTING AND ANALYSIS SUPPORTS S&T STAKEHOLDERS

S&T's Technology Centers, OIP, and the Technology Scouting and Transition (TST) team have been busy researching technologies currently in the marketplace as well as investigating unsolicited proposals submitted by entrepreneurs and private companies seeking to speed our return to normalcy.

Over the past few months, **hundreds of possible solutions for addressing critical response needs have been reviewed**, including decontamination technologies; cutting-edge ventilators and respirators; contactless screening of passengers at TSA checkpoints; thermal devices to detect fevers; contact tracing; detection of SARS-CoV-2 in waste water; health information management systems and database platforms; and expanded manufacturing capabilities for the production of PPE for first responders. TST has also provided DHS components and homeland security stakeholders with a detailed understanding of existing technologies that show promise in helping solve difficult pandemic-related problems, such as **disease surveillance and vehicle decontamination**.

Quick-look reports for use only by the first responder community have been published on S&T's [Technology Clearinghouse](#).

“The FFRDCs provide independent, objective advice and quick response on critical issues throughout the Homeland Security Enterprise. COVID-19 definitely qualifies as one such issue. HSSEDI and HSOAC will continue to perform high-quality research and provide authoritative expertise as we all fight this pandemic.”

SCOTT RANDELS
S&T FFRDC PROGRAM MANAGEMENT
OFFICE DIRECTOR

RESOURCES

[S&T Finding Ways to Fight COVID-19](#)

MASTER QUESTION LIST FOR COVID-19

Back in January, S&T developed the first iteration of the Master Question List for COVID-19 (MQL), which identifies current knowledge and research questions to help inform decision-making in response to the pandemic. The MQL is updated weekly, and as of July 1 the document has been accessed nearly 50,000 times.



How does it spread from one host to another?



What are effective methods to kill the agent in the environment?



What are the signs and symptoms of an infected person?



How long after infection do symptoms appear?



Are there effective treatments? Vaccines?

TO LEARN MORE, VISIT

WWW.DHS.GOV/PUBLICATION/ST-MASTER-QUESTION-LIST-COVID-19



INFORMATION SHARING

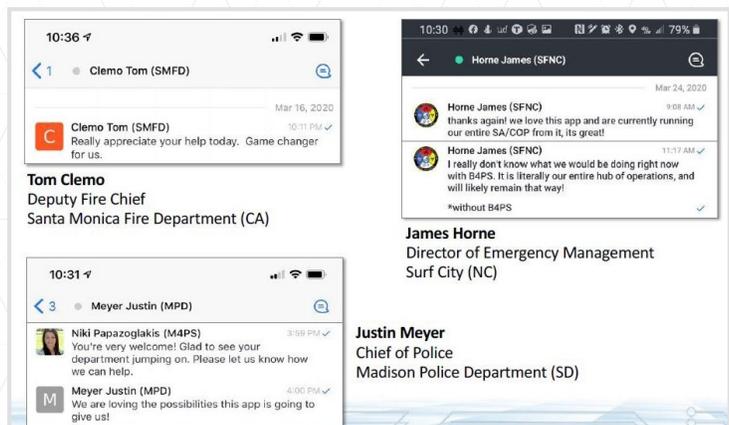


As COVID-19 data constantly evolves, having access to as much real-time information as possible is essential to making life-saving decisions at every level. And having the right tools to aggregate, process, and share the information with other decision-makers is vital to allocating staff and resources appropriately. Several S&T-funded technologies have been deployed to support ongoing response efforts by our colleagues in government, academia, the national labs, and industry.

USING APPS TO BRIDGE COMMUNICATIONS DURING THE PANDEMIC

S&T-funded app **Bridge for Public Safety (Bridge4PS)**, part of the **Mobility Acceleration Coalition**, is serving as a collaborative tool for preparedness and response during the rapid escalation of the COVID-19 pandemic. The emergency response community's **adoption of the app has increased 20%** since the coronavirus outbreak began in the United States.

The app is being used to quickly broadcast COVID-19-related announcements, including post-exposure procedures; changes in state, local, and department policies/procedures; updates on the availability of PPE and testing sites; and staffing assignments. Additionally, the app has been useful in facilitating regional coordination among emergency operations centers, public information officers, and planners for public messaging and policy decisions. It has also helped in streamlining communications for an increasingly remote workforce.



Tom Clemo
Deputy Fire Chief
Santa Monica Fire Department (CA)

James Horne
Director of Emergency Management
Surf City (NC)

Justin Meyer
Chief of Police
Madison Police Department (SD)

S&T TOOL HELPS AGENCIES ASSESS CAPABILITY GAPS

In day-to-day activities or large-scale incidents like the current COVID-19 pandemic, effective information-sharing capabilities allow public safety and emergency management agencies to act fast and make the right decisions. Dependable communication systems can directly lead to saving lives.



The **Information Sharing Assessment Tool (ISAT)** is a free, web-based self-assessment tool that **helps public safety, emergency managers, and health agencies understand their most pressing information-sharing capabilities and gaps**. All users who complete the ISAT, which takes about 20 minutes, receive a customized report and a list of helpful resources and reference materials such as templates, case-studies, and best practices that can be used to assist in action planning. S&T recently **integrated a pandemic scenario into the updated ISAT 2.0**, working with subject matter experts on the ground to operationalize the line of questioning and offer a consistent frame of reference for users.

■ PLATFORMS IMPROVE DATA SHARING AND RESOURCE ALLOCATION

Since January, the **Single Automated Business Exchange for Reporting (SABER)**, a free open-source software that enables businesses to report their operating status both during and after a disaster, has been deployed in several ways. Initially, SABER charted emergency declarations made by cities, counties, and states in one central location. As the emergency declarations forced businesses to close, the SABER platform began to also track closures. **SABER has been especially helpful for businesses deemed essential**—like grocery or convenience stores—by developing a new set of pandemic-specific queries to track what some businesses are doing differently. This includes measures like curbside pickup, physical barriers for cashiers, limits on customers in store, taking employee temperatures, and more. SABER has compiled a list of “Pandemic Practices” **that over 130,000 groceries, convenience stores, gas stations, and other establishments adopted to stay in business while keeping customers and employees safe**. Users are also collaborating with the academic community, including Johns Hopkins University, to share regional epidemiological data.

S&T’s **Regional Information Sharing Portal (RISP)** enables users to collaborate and share information at the tribal, local, state, and federal levels. It is typically used with resource tracking boards to **help users make crucial decisions related to the movement of commodities and deploying resources** in the field. During the pandemic, RISP has allowed users to identify resource statuses and needs; to pull resources together; and to deploy resources to where they are needed the most.

■ ALERT SYSTEM USED NATIONWIDE FOR CORONAVIRUS MESSAGING

Emergency officials across the country have used **Wireless Emergency Alerts** to send important COVID-19 safety messages to local residents. FEMA’s **Integrated Public Alert and Warning System (IPAWS)** is a national system for local alerting that provides authenticated emergency alert and information messaging to the public through cell phones and internet applications. On March 30, 50 agencies across 15 states, the District of Columbia, the Navajo Nation, and the Commonwealth of Puerto Rico sent dozens of these alert messages about the coronavirus pandemic via Wireless Emergency Alerts, in addition to sending messages to radios and televisions over the Emergency Alert System.

“Thank you for this work. I have found the calculators and the Master Question List invaluable when making management decisions.”

ERIC WEAVER

NATIONAL RESOURCES CHIEF,
EL MALPAIS AND EL MORRO NATIONAL
MONUMENTS (NEW MEXICO)

RESOURCES

[S&T-Funded Technologies Help Government Agencies and Businesses Coordinate COVID-19 Response](#)



FIRST RESPONDERS

While many people across the globe have self-quarantined to ride out the storm of COVID-19 as best they can, first responders and other essential personnel do not have that luxury. Police, fire, emergency medical services personnel and others are still out there, protecting and serving their communities on the front lines. They're performing functions that are potentially dangerous even under normal circumstances, but now have the added risk of coronavirus infection looming like a dark cloud. S&T salutes their bravery and shows enduring support through innovative solutions that help make their jobs safer, easier, or more efficient.

■ PROVIDING UP-TO-DATE ONLINE RESOURCES

To assist first responders in conducting activities as safely and efficiently as possible, S&T is providing links to **authoritative resources to help inform and guide response plans**. S&T also compiled a **consolidated list** of innovative public-private partnerships specifically **helping address first responder protective equipment (PPE) challenges** during the COVID-19 pandemic.

S&T is curating this collection of information to assist in the rapid development of innovative PPE designs and subsequent production and manufacturing. These resources include links to existing public-private partnerships, open-source designs and data, 3-D printing and materials instructions, guidelines, and other information.

■ S&T PRESENTS AT NATIONAL DISASTER RESPONSE EVENT

The annual “EMS Today: National Disaster Response Symposium” in Tampa, Florida, took place just a week before a state of emergency was declared over coronavirus. Jay Martin, Principal Director for S&T's Office of Mission & Capability Support, was there to speak about emerging technologies; opportunities and risks; and S&T's role in supporting first responders, emergency management, and disaster response.

■ COLLABORATING ON COVID-19 DASHBOARDS FOR LAW ENFORCEMENT

S&T and the National Alliance for Public Safety GIS (NAPSG) Foundation teamed up with the National Police Foundation and the National Sheriffs Association to develop and implement a **standardized framework to collect and analyze data on how COVID-19 is impacting law enforcement** personnel—including the status and demand on limited personal protective equipment supplies.



The framework allows police officers and sheriffs to collect, analyze, and visualize real-time local law enforcement data and make it **available to the entire U.S. law enforcement community**. For the first time ever, the collection of reporting data from local police and sheriff departments will be in consistent formats. This means seamless information sharing and data fusion to achieve a national operating picture. It also helps law enforcement leaders to track, understand, and manage personnel and critical resources across communities as we continue our response to COVID-19.

“We are eager to support the first responder community. They’re always there for us in times of crisis, and we need to be there for them now more than ever.”

GREG PRICE

FIRST RESPONDER PORTFOLIO
DIRECTOR FOR S&T

RESOURCES

[COVID-19 Information for the First Responder Community](#)

[Innovative Public-Private Partnerships Help to Address First Responder Protective Equipment Challenges During COVID-19 Pandemic](#)

[COVID-19 Law Enforcement Impact Dashboard](#)

[Sheriff Personnel Assigned to Law Enforcement Duties Dashboard](#)



INTERNATIONAL COLLABORATION

S&T's collaborative activities with foreign government partners provide a foundation and network to rapidly engage during times of crisis and enhance interoperability during emergency operations. At the onset of the COVID-19 global pandemic, S&T immediately began coordinating with public safety and technical subject matter experts worldwide, sharing test methods, biological materials, and the results of research. Using similar materials and methods enables S&T and its foreign partners to align research activities, directly compare the results of independent research efforts, derive a larger set of collective data, and ultimately develop a more robust understanding of high-risk biological agents.

S&T CONVENES GLOBAL PARTNERS FOR SWIFT, COORDINATED RESPONSE

Within days of the National Emergency declaration, S&T called for the Five Nation Research and Development Council (5RD) and bilateral partners to collectively address the COVID-19 challenge. S&T engaged with top biomedical experts from **Australia** (Defence Science and Technology Group and the Australia Animal Health Laboratory), **Canada** (Defence Research and Development Canada and Canadian Food Inspection Agency), **New Zealand** (Ministry of Health and Health Research Council), and the **United Kingdom** (Home Office and Defence Science and Technology Laboratory).

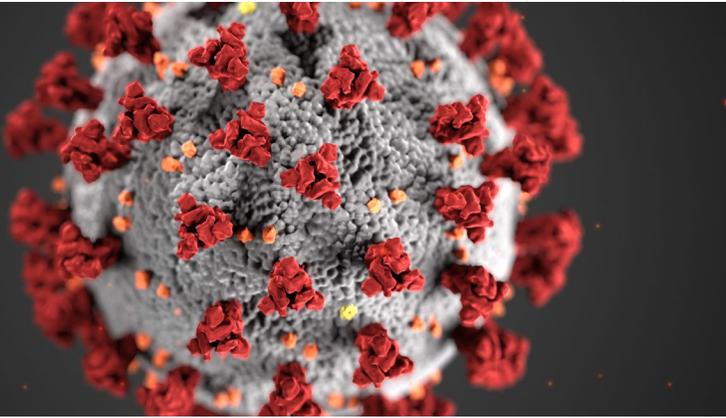


S&T and its 5RD partners convene on a weekly basis to identify complementary R&D activities (decontamination of PPE, surface and airborne particles stability studies, and animal susceptibility); share emerging test results and assessments; and validate and verify initial results, protocols, assessments, and tests with the international technical community.

SHARING RESEARCH AND BEST PRACTICES TO COMBAT COVID-19 GLOBALLY

S&T is establishing a process with our partners in the United Kingdom to share biological samples and related information and is working with other 5RD partners to do the same. In addition, the **European Commission** has shared information with S&T regarding their ongoing response efforts to better understand COVID-19, improve clinical management of infected patients, and increase public health preparedness.

S&T's 5RD COVID-19 activity also incorporates technical expertise from the Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet), a global alliance of high-containment laboratories in the United States, United Kingdom, Canada, Australia, and Germany. Aimed at **strengthening international coordination, improving knowledge sharing, and expanding capacity**, the BSL4ZNet contributes insight into assessments underway at various organizations and further expands the coordination of current global research activities that are being conducted to address and understand the ongoing pandemic.



S&T TECHNOLOGIES DEPLOYED FOR REAL-TIME MONITORING

The **Next-Generation Incident Command System (NICS)** is a web-based emergency response platform that **enables first responders to coordinate effectively during a crisis**. It is used to manage and distribute real-time feeds (airborne images and video) to responder decision-makers. NICS integrates these feeds as part of an online map using a geographic information system.

Since the start of the COVID-19 outbreak, NATO's Science for Peace and Security (SPS) Programme has been utilizing NICS in the Balkan Peninsula of North Macedonia to **coordinate emergency services, inform the public about ongoing COVID-19 cases, and post locations of health resources**. NICS has given North Macedonia the ability to provide its public with real-time information. It has also enabled all North Macedonian institutions, as well as the Red Cross, to communicate and coordinate their response activities as effectively and efficiently as possible during this time.

“In our discussions, I noted how impressed I am by the cooperation between our defence science and technology experts in response to the COVID-19 crisis. Australian and US researchers, with the Five Nation Research and Development Council, are examining the survival of the virus that causes COVID-19 on various surfaces, and how it is impacted by environmental factors such as temperature and humidity.”

HON. LINDA REYNOLDS CSC

MINISTER FOR DEFENCE, AUSTRALIA

<https://www.minister.defence.gov.au/minister/lreynolds/media-releases/alliance-cooperation-continues-amidst-pandemic-and-marine-rotation>

RESOURCES

[How S&T Collaborates with International Partners During a Global Pandemic](#)



S&T JOINS THE FIGHT

PIADC PROVIDES SUPPLIES TO LOCAL RESPONSE EFFORTS

In March, the **Plum Island Animal Disease Center (PIADC)** answered the call for help from New York State and Suffolk County Emergency Management by **loaning the center's ventilator** to the Peconic Bay Medical Center in Riverhead, New York. PIADC also donated a supply of Tyvek® suits to Long Island first responders, many of whom are volunteers, for protection against exposure to COVID-19 from patients they are treating or transporting. Routinely used by laboratory staff for research, diagnostics, and training, the suits are costly and in high demand. On March 30, the Plum Island Fire Department chief **hand-delivered 400 of PIADC's Tyvek® suits** to the Southold Town Police Department, Southold Fire Department, and East Marion Fire Department.

NUSTL STAFF VOLUNTEER FOR NEW YORK COVID-19 RESPONSE

A team member at S&T's **National Urban Security Technology Laboratory (NUSTL)** was activated by the New Jersey Army National Guard to assist in **supporting local emergency management agencies with response planning and execution**. His unit is among thousands of Guardsmen mobilized across the state to support testing facilities, assist with disinfecting/cleaning of common public areas, deliver food to hard-hit communities, and provide transportation and assessment support to health care providers. Behind the scenes at the New York City Emergency Management's activated Emergency Operations Center, another NUSTL staffer is working alongside government representatives to **support COVID-19 interagency coordination**. On weekends, he volunteers with the agency's coordinated emergency functions and task force initiatives, including those related to health care surge, mortuary capacity, mass sheltering programs, and resource requests.

S&T DONATES MASKS TO SUPPORT BATTELLE RESEARCH

Battelle Memorial Institute is deploying a system to decontaminate and reuse N95 masks to extend their useful life using vaporous hydrogen peroxide (VHP), a common laboratory sterilization method. S&T is working with Battelle to understand in more detail the effect that VHP has on a variety of different masks, and how the process works against COVID-19. This includes "worst-case" scenarios from ongoing testing conducted at NBACC. To do this, S&T and Battelle needed to find approximately 300 N95 respirators for use in this testing. Battelle was unable to find any available on the open market due to the national shortage. One of S&T's Compliance Assurance Program Managers stepped up and **provided 116 masks** normally used for laboratory inspections at NBACC, PIADC, and all extramural laboratories that DHS funds for life sciences. These masks enabled the important research to continue.



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