

### BACKGROUND

Established in 2006, the Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Chemical Security Analysis Center (CSAC) is the nation's only federal studies, analysis, and knowledge management center for assessing critical chemical dependencies, emerging threats and technologies, and accidental or intentional chemical events in the U.S. In December 2022, President Biden signed the National Defense Authorization Act (NDAA) for Fiscal Year 2023 into law, marking a significant milestone in the nation's commitment to comprehensively address chemical security threats. The NDAA included provisions granting full legislative authorization to CSAC by amending the Homeland Security Act of 2002 to add Section 323.

Located on the Edgewood Area of Aberdeen Proving Ground, Maryland, CSAC fosters research collaborations with the U.S. Army Combat Capabilities Development Command Chemical Biological Center; Department of Defense Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense; the U.S. Army Medical Research Institute for Chemical Defense; and the U.S. Army Public Health Center. CSAC collaborates with many federal, state and local agencies, educational institutions, and private industry.

### MISSION

CSAC assesses and addresses chemical threats to the homeland by:

- Acquiring and managing reliable chemical data.
- Generating meaningful assessments, recommendations, and forecasts based on vetted data.
- Identifying, prioritizing, and addressing data gaps through high quality chemical research, development, test, and evaluation.
- Researching current and emerging threats, and mitigating technologies, such as detection and personal protective equipment.

### EXPERTISE

CSAC provides an enduring, science-based threat and hazard analysis capability, with a core focus on six areas of expertise.

- Modeling and Simulation
- Surveillance and Detection

- Hazard Analysis and Characterization
- Acute Toxicology
- Chemical Informatics
- Food Defense and Security

### IMPACT

CSAC serves the Homeland Security Enterprise and its stakeholders by staffing and operating a technical assistance program that provides operational support and subject matter expertise 24/7. CSAC's impact in this program includes designing and executing laboratory and field tests and providing a comprehensive knowledge repository of chemical threat information that is synthesized and updated with data from scientific, intelligence, operational, and private-sector sources.



CSAC empowers relevant DHS components, federal agencies, state and local partners, academia, and private entities with actionable risk assessments, threat characterizations, hazard assessments, and scientific insights. CSAC's partners use these analyses to shape their planning and decision-making, strengthening the overall security of the homeland.

- **Chemical Current Events:** As S&T's chemical advisor to DHS for Chemical Current Events, CSAC provides timely information to Department leadership on events such as the train derailment and vinyl chloride fire in East Palestine, Ohio, in February 2023; the BioLabs fire and chlorine release in Conyers, Georgia, in September 2024; and tropical storms such as Hurricane Helene in September 2024.
- **Strategic International Engagements:** CSAC supports bilateral work with the UK and Australia through the Counter-terrorism Technical Oversight Group, focusing on aviation security, specifically the assessment, detection

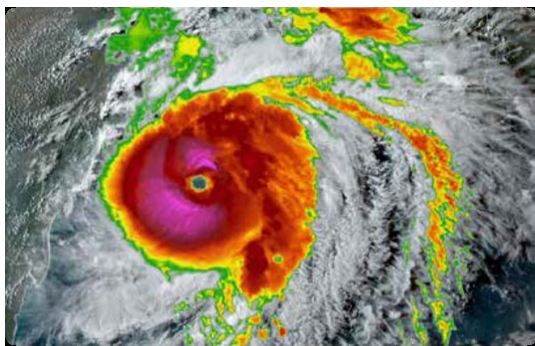
and mitigation of improvised chemical devices in aviation environments. In 2023 and 2024, CSAC engaged and hosted UK scientists from the Defence Science and Technology Laboratory to jointly address this timely problem. In addition to aviation security, CSAC has worked with Australia regarding skin permeation of priority chemicals. CSAC engaged and briefed Republic of Korea scientists regarding chemical surveillance, detection, and response.

### ■ **Strategic Analysis of Opioids for the Intelligence**

**Community:** In addition to playing a leading technical role in an international mail facility analysis with Customs and Border Protection in the DHS Synthetic Opioid Detection at Speed program, CSAC developed knowledge products to serve as resources for detection and interdiction of illicit opioids:

- Fentanyl Synthesis Quick Reference Guide
- Nitazene Benzimidazole Opioid Synthesis Quick Reference Guide
- Memorandum for Record 2.0: Illicit Drug Threats
- Nitazene Synthesis and Reagents Bulletin
- Master Question List for Synthetic Opioids
- Memorandum for Record 2.1: Illicit Drug Threats

### ■ **Providing Chemical Facility Risk Analysis During the 2024 Atlantic Hurricane Season:** CSAC provides local and regional chemical hazard and vulnerability information to inform federal, state, local, tribal, and territorial (SLTT) responders during every hurricane season. At the end of



FY24, the 2024 Atlantic Hurricane Season included 14 named storms resulting in four hurricanes making U.S. landfall. Hurricane Beryl made landfall near Matagorda, TX, as a Category 1 hurricane. Hurricane Debby made an initial landfall near Steinhatchee, FL, and a second landfall in Charleston, SC. Hurricane Francine made landfall in Terrebonne Parish, LA, as a Category 2 hurricane, and

Hurricane Helene made landfall in the Big Bend area of Florida as a Category 4 hurricane. CSAC identified the chemical facilities and infrastructure in the storms' projected paths that store, produce, or transport large quantities of hazardous chemicals.

- **Patents Awarded to CSAC:** CSAC was awarded patents from the U.S. Patent and Trademark Office (USPTO).
  - **HExCAT:** USPTO awarded a patent for the Homeland Explosive Consequence and Threat (HExCAT) tool in September 2023. The patent protects S&T's invention and guarantees the technology can be freely available to the SLTT communities to help plan for explosive events, protect communities, and save lives. HExCAT is a unique modeling system that calculates the damage from explosives, the resources needed for an effective response, and the impact of various mitigation strategies. The tool helps emergency managers prepare communities. The tool is derived from the mandate given by Homeland Security Presidential Directive-19, Combating Terrorist Use of Explosives in the United States and was developed to ensure the United States are better equipped today to handle the threats of tomorrow.
  - **Cyanide Exposure:** U.S. Patent No. 12,023,174 for the invention entitled, "Detecting Cyanide Exposure Based on Thiocyanate Measurement in Saliva," issued to CSAC on July 2, 2024, is the third patent based on this invention. Using the patented method, emergency medical technicians or medical center staff will be able to determine if countermeasure administration is justified quickly, which is of critical importance to improve medical outcomes. The method is valid for all cyanide exposures to include a potential terrorist cyanide gas attack and accidental exposures, and in practice will cost pennies per test and provide results in less than 10 seconds. Additionally, S&T is pursuing a fourth patent based on this invention to monitor treatment effectiveness in clinical settings as well as forensic analysis by detecting cyanide exposure in blood plasma.