

EXPERIMENTAL SCIENCE AT CSAC

To effectively support the Department of Homeland Security (DHS) mission, the DHS Science and Technology Directorate's (S&T) [Chemical Security Analysis Center \(CSAC\)](#) must address complex and increasing chemical threats that require lab experimentation. DHS and its operational components rely on critical data, modeling, simulation, and guidance produced by CSAC to inform their planning and response operations.

In 2022, CSAC stood up its Chemical Security Lab (CSL) as a new capability for experimental analysis of chemicals and hazardous substances. The facility is proximate to CSAC's main building located in Edgewood at the Aberdeen Proving Ground in Maryland. The CSL was established in partnership with the [U.S. Army Combat Capabilities Development Command Chemical Biological Center \(DEVCOM CBC\)](#) and is a unique chemical analysis capability within S&T.

CSL FILLS GAPS AND GENERATES DATA

S&T CSAC is the nation's only federal studies, analysis and knowledge management center for assessing threats and hazards associated with large-scale chemical incidents or acts of terrorism. The CSL provides an ability to fill data gaps quickly and validate basic chemical and physical properties of non-surety chemical threats and hazards. It also improves:

- Availability of service to S&T CSAC projects
- Timely delivery of required experimental results
- Specialized support for DHS priorities
- Evaluation of potential commercial off the shelf chemical detectors and sensors
- Validation of data for risk and consequence models
- Instrumentation capable of measuring physical and chemical properties for various chemical threats of interest.
- Chemical hazard analysis as future projects arise

The CSL will *not* perform surety or regulated chemical hazard investigations.

CSL SPACE AND INSTRUMENTATION

The CSL includes **750 gross square feet** of carefully controlled space, designed and constructed for chemical experimentation and access to an additional 1500 gross square feet of space and special instrumentation shared in partnership with DEVCOM CBC.



CSL: BENEFITS OF A "WET LAB"

The CSL provides the following mission benefits:

- **Expand the core capabilities** already offered at CSAC
- **Train** other DHS agencies and their personnel on chemical security topics
- **Conduct scientific research** that improves the quality of data collected
- **Provide enhanced support** to sister lab facilities managed and operated by the [S&T Office of National Laboratories \(ONL\)](#)

CSL PROJECTS (PLANNED)

Rapid Detection of Cyanide (RAPCYD): This project addresses development of a rapid, noninvasive, and affordable kit to detect cyanide exposure during fire events. Rapid detection of thiocyanide is key during a fire so first responders can administer efficient medical countermeasures.



Electronic Nose (E-nose): This project uses an emerging technology that simulates biological olfactory functions needed to detect various volatile chemical compounds. The detection of volatile compounds is of vital importance to the safety of food, the environment, and the homeland.

Solubility of Chemical Hazards: The solubility properties of hazard chemicals are of vital importance to understand how toxic chemicals behave in different situations. This project will provide experts with data to help safeguard food and agriculture, with adulteration and to step illicit trafficking.