

Chemical and Biological Nonproliferation and Security

Center for Strategic Security, Global Security Sciences Division
Argonne National Laboratory

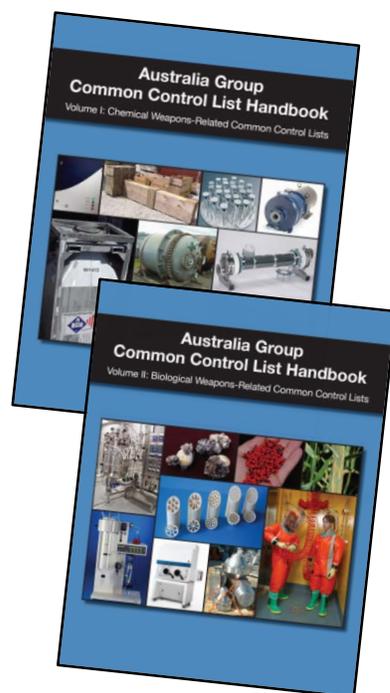
Argonne's Center for Strategic Security (CSS) develops and implements practical approaches and technical solutions to address severe threats to national and global security. Such threats include foreign acquisition of weapons of mass destruction (WMD)-related dual-use materials, equipment, and technology; WMD terrorism by non-State or failed-State actors; naturally occurring infectious disease outbreaks; and supply-chain vulnerabilities, among others. CSS chemical and biological subject matter experts provide science-based, policy-literate solutions to pressing problems in the areas outlined below.

Technical Advisory Services

Members of the Chem-Bio Proliferation & Trade Analysis (PTA) team help implement and strengthen trade controls on strategic materials, equipment, and technologies that are useful in the development of chemical and biological weapons, combining technical expertise with in-depth knowledge of nonproliferation policies and international affairs to help prevent diversion of these items from peaceful uses to weapons development. The team also applies their specialized knowledge of infectious disease agents and security issues to inform the development of policies for addressing a range of biological threats. Likewise, chemical expertise resident in PTA coupled with over a decade of experience in policy support enables the team to anticipate chemical threats and suggest implementable solutions to counter them.

Related Activities

- The PTA team supports U.S. government participation in the Australia Group (AG), a multilateral export control arrangement dedicated to preventing the spread of chemical and biological weapons through the development of control lists of dual-use items and guidelines for their responsible transfer. PTA experts are routinely called upon to provide technical assessments that prove critical to ensuring control lists keep pace with proliferation threats. They also apply their commodity expertise to analyze proliferation risk associated with exports and procurements of dual-use goods and technologies.
- PTA experts also develop resources on strategic, dual-use commodities of chemical and biological weapons proliferation concern. They led the development of a comprehensive *Australia Group Common Control List Handbook*, now available on the AG website at www.australiagroup.net.
- Chemists and biologists in PTA conduct technical studies of emerging technologies which might pose a proliferation threat in the future, providing key insights for policymakers considering trade controls on such items.



Handbook Volumes I and II, which garnered high praise from the AG Chair and Heads of Delegation to the 2014 Plenary

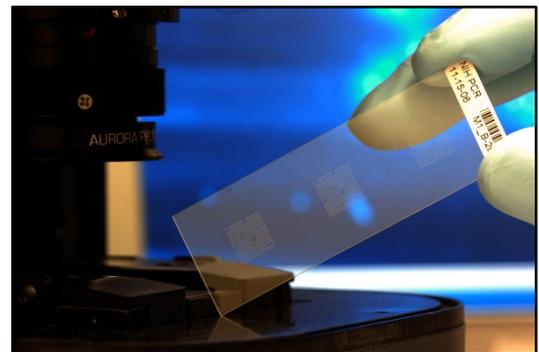
- The PTA team uses its significant knowledge of biological threat agents to provide scientific advisory support to the Argonne Initiative on Infectious Disease Analytics (AIDA) which seeks to understand new and emerging infectious diseases using anticipatory analytics.
- PTA team members additionally contribute their expertise in commodity and proliferation risk analysis to the activities of CSS' Engagement and Capacity Building team, serving as instructors and curriculum developers for workshops designed to strengthen the ability of government officials to implement their national strategic trade control regulations and the ability of scientists to comply with biosecurity regulations.

Technology and Methods Development

Members of the Technology and Methods Development (TMD) team develop science- and engineering-based solutions to address critical needs in combatting chemical and biological threats. Current areas of focus include forensic analysis of biological materials and analysis of biological security threats.

Related Activities

- Enhanced Molecular Attribution through Proteomic Signatures (EMAPS) technology developed by the TMD team provides the ability to determine forensic details of a pathogen's origin. While the initial distinction between, for example, naturally occurring anthrax and intentionally produced anthrax can usually be achieved by traditional genomic (DNA) methods, EMAPS technology uses proteomic signatures (proteins expressed by the pathogen) to provide the forensic analyst with significantly more information about a pathogen under study. The results obtained can identify the technical expertise and laboratory resources available to the perpetrator, including the specific growth media and protocols.
- TMD and PTA teams work closely with decision analytics scientists in Argonne's Risk and Infrastructure Science Center (RISC) developing standardized analytical tools for assessing security risks of chemical and biological threats. This combines the PTA and TMD teams' extensive knowledge of strategic materials, equipment, technologies, and other information of proliferation concern with decision analytics methodologies.



Biochip based on EMAPS technology

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