

At a Glance

What it is

- Sciences Addressing Asymmetric Explosive Threats (SAAET) is the systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental and life sciences related to long-term national security needs. It is far-sighted, high-payoff research that provides the basis for technological progress.

How it works

- Anticipate-affect:** Fundamental research program of theory-driven work that will provide knowledge and models that enable U.S. forces to anticipate and affect asymmetric explosive events with a focus on the human element
- Detect:** Through strategically directed basic research, provide future warfighters with abilities to detect and identify, from safe standoff distances, all explosives by sensing their signatures from manufacturing and concealed deployment
- Neutralize:** Swiftly and safely neutralize (or prevent the use of) all IEDs—proud, flush and buried—at standoff distances with or without direct knowledge of the IED's location
- Mitigate:** Protect personnel and/or materiel from detonation effects (blast, fragmentation, thermal, etc.) of explosive threats

What it will achieve

- SAAET's fundamental solutions will result in the development of future technologies inherently resistant to adversarial adaptation.

Points of Contact

Dr. Dan Prono
daniel.prono@navy.mil

Capt. Charles Gunzel
charles.gunzel@navy.mil

Background

The Office of Naval Research (ONR) Counter-Improvised Explosive Device (IED) Basic Research Program was initiated in 2005 to provide naval science and technology solutions to the IED problem. Starting with a core group of five University Affiliated Research Centers, the program has grown to include more than 80 scientific efforts involving industry, academia, government and international partners.



Research Investment Areas—Challenges and Opportunities

Each SAAET tenet pursues a prioritized research strategy (willful intent) that addresses the toughest challenges of the IED problem.

Anticipate-Affect:

- (1) Socio-cultural theory and models—Identify the social and cultural components that influence, characterize and enable human networks to carry out asymmetric acts.
- (2) Data collection and analytics—Generate and validate novel approaches for collection and analysis of social, cultural and behavior data.
- (3) Indicators of human behavior—Identify detectable human behaviors associated with asymmetric explosive act.

Detect:

- (1) Standoff high selectivity trace generalized spectroscopy of explosive vapors/residues/bulk
- (2) Standoff stimulation of signatures released from explosive bulks
- (3) Remote selective trace detection of explosive vapors/residues
- (4) Optimized combinations of sensors measuring orthogonal parameters
- (5) Science of environmental aging of background signatures from previous detonations, including vapors, residues, by-products and residual binder/plasticizer debris
- (6) Fundamental improvements to existing technologies

Neutralize:

- (1) Electromagnetic energy (EME) coupling
- (2) Near-Earth EME propagation
- (3) Electromagnetic sources
- (4) Disruptive technologies for counter-radio controlled IED

Mitigate:

- (1) High-performance multifunctional materials
- (2) Blast event shaping