



A New World Is Here: Guest Editor's Introduction

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This issue of the *Johns Hopkins APL Technical Digest* on “Counterterrorism and Homeland Security” highlights some investigations that focus on the security of the United States against potential biological and chemical terrorism. *Counterproliferation*, as defined by the DoD in the late 1980s, describes activities directed toward preventing the proliferation of weapons of mass destruction. In counterproliferation, much attention is placed on countering the large-scale, state-sponsored weaponization (e.g., artillery, missiles) of biological, chemical, and nuclear substances. Counterterrorism as used here generally refers to deterrence of the use of asymmetrical, smaller-scale weapons of mass destruction (and weapons of mass disruption) by subculture players whose motives are not necessarily military- or state-related.

Our work in these areas started in 1994 with a Defense Advanced Research Projects Agency (DARPA) task to develop a plan for sensors for biodefense and counterproliferation.¹ This plan recruited the talents of many professionals across APL and elsewhere to help DARPA launch a biosensor program to rapidly develop a variety of high-risk, high-payoff sensors that could collectively deal with the broad spectrum of threat agents.² Today, the Laboratory's activities have gone far beyond the sensor developments for DARPA to a range of investigations for over a dozen sponsors working in the fields of biosurveillance, background characterization, signal processing, test and evaluation, systems engineering, and emergency medical response.

The expansion of APL work from biodefense sensors in the battlefield to more encompassing investigations occurred about 1996, spurred by the realization that the use of biological and chemical agents against U.S. civilian and military infrastructures was more feasible and imminent than was commonly understood. The 1995 sarin nerve gas attack on the Tokyo subway by the Aum Shinryko cult raised the consciousness of the public to chemical terrorism and recalled the 1984 salmonellosis biological contamination of Oregon salad bars by the Rajneeshpuram cult. These incidents caused a dozen deaths and sickened thousands of people, and the public began to hear about numerous other previously unpublicized chemical and biological events. Professional concern was accentuated by the August 1997 issue of the *Journal of the American Medical*

Association on biological terrorism and biological warfare. The 1998 APL initiative, Counterthreat 21, served to mobilize the Laboratory's resources onto these concerns by applying internal funds to explore several technological countermeasure approaches, resulting in several new programs.

In 1999, a report commissioned by the U.S. Congress entitled *New World Coming: American Security in the 21st Century* had 14 conclusions, the first of which said: "America will become increasingly vulnerable to hostile attack on our homeland, and our military superiority will not entirely protect us." It went on to say that "Americans will likely die on American soil, possibly in large numbers."³ Today, after the 9/11 airplane attacks, the anthrax attacks, and the ricin incident, we all realize that the "new world is here."

No single countermeasure or response will blunt the effects of a chemical or biological attack. Rather, a spectrum of activities contributes to the nation's ability to thwart the use and reduce the morbid effects of chemical and biological agents. Each of these activities (whether concentrated on intelligence, threat avoidance, response, or treatment) requires a variety of technologies, used together with operational tactics, to add more degrees of freedom in practical detection with low false alarms and to achieve operational efficiency.

Development and synergistic use of technological tools and operational tactics is an underlying theme in the articles in this issue of the *Digest*, which address consequence management, biosurveillance, and building protection. The first article, on the Johns Hopkins Office of Critical Event Preparedness and Response, describes the evolution of planning activities, structured by APL, that has led to the ability of the Johns Hopkins network of medical care facilities to effectively respond to a biological or chemical disaster in coordination with local, state, and federal resources. APL biosurveillance work is described in several articles that deal with the biosurveillance system architecture, operational inputs,

and analysis algorithms to provide public health professionals earlier indications and warning of a bioterrorism attack in our communities than possible before. The articles on building protection describe the potential biological and chemical threat hazards inside buildings and offer a systems approach for countermeasures encompassing modeling, sensors, test and evaluation, concepts of operation, and rules of engagement. An upcoming companion issue of the *Digest* on "Counterproliferation" will concentrate on sensor developments that are important for the measurement of biological and chemical substances in both civilian and military counterterrorism and counterproliferation activities.

It is worth noting that several of the APL developments described in these pages are in fact serving to provide an initial operating capability in the communities surrounding the Laboratory. This is consistent with APL's sense of urgency in the new world and its build-test-build practice embedded into its systems engineering philosophy—"the best is the enemy of the good enough." Also note that the biographical sketches of the authors show competencies in engineering, physics, and mathematics, along with expertise in epidemiology, public health, medicine, and biomedical engineering. This underscores the need to mobilize a new mix of skills and cultures to confront the challenges, rapidly expand the utility of the disciplines developed for the DoD into the civilian venue, and recruit the diversity in thought and practice required to succeed in providing a greater measure of safety in this new world.

REFERENCES

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