

New software helps with anti-terrorism planning

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New software can help anti-terrorism planners determine how best to allocate limited resources to defend military bases, industrial parks and civic facilities from terrorist attacks, according to the Penn State researchers who built the system. The software, developed for and beta-tested by the U.S. Marine Corps, prioritizes resources using objective criteria and provides a cost-benefit analysis for various mitigations. Based on these results, the software can help determine resource allocations across competing anti-terrorism projects.

"Organizations have limited budgets to protect their assets from terrorist attacks," said Steven Haynes, assistant professor in the School of Information Sciences and Technology (IST) and lead researcher. "People need help in deciding which proposed projects to fund when each responds to a need and has its own benefits."

The cognitive-support system makes those decisions less subjective and helps more people understand how and on what basis resource allocation decisions were made, Haynes said.

The software is described in a paper titled "Optimizing Anti-Terrorism Resource Allocation" that appears in a special issue (Vol. 56, Issue 3) of the Journal of the American Society for Information Science and Technology. The issue, "Intelligence and Security Informatics," recently was published.

Co-authors are Thomas G. Kannampallil, an IST doctoral student; Nitesh

Garg, who earned his master's degree at Penn State; and Lawrence Larson, retired Marine Corps colonel now with the Marine Corps Research University at Penn State.

Protecting buildings from terrorist attacks can include anything from blast-resistant glazing of windows to enhanced lighting and additional guards. Because anti-terrorist mitigations are expensive, deciding what, how, where and when to allocate resources to protect critical infrastructure is a challenge, according to the researchers. Considerations include protecting people, mission importance, cost and time to replace and access to and location of alternative facilities.

To build the software, the researchers visited Marine bases and talked with commanders, anti-terrorism officers and facilities planners about what technologies could best assist them in prioritizing their assets. Researchers also conducted focus groups and "walk-throughs" or on-site evaluations of the system.

The system also considers acceptable risks and acceptable losses in terms of money. The researchers note similar judgments occur in medical research allocations, transportation safety programs and in seismic retrofits for earthquake damage mitigation.

"The system is designed to guide users toward more rigorous and justifiable resource allocation decisions in a domain where emotion and uncertainty play a major role," Haynes said.

The decision elements -- asset prioritization, cost-benefit analysis and determination of resource allocation -- can be implemented alone or in combination as required for more complex scenarios.

While the researchers' cognitive support software was designed for the military, it can be applied to protect government facilities, commercial

buildings, public sites such as convention centers or installations from hydroelectric dams to power plants.

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