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Colorado State Engineers Improve Radar for Military to Use in Urban Areas

Note to Editors: Photos of Professor Edwin Chong and illustrations of his research are available with the news release at http://www.newsinfo.colostate.edu/.

Professor Edwin Chong

Associated images

Professor Edwin Chong

Illustration of radar technology

FORT COLLINS - A Colorado State University engineering team has developed a military radar system that will track enemy movement through cities filled with tall buildings, trees and other obstructions.

Edwin Chong, professor of electrical and computer engineering, led the $1.6 million project for the Defense Advanced Research Projects Agency, or DARPA. Results showed that Chong's team improved the detection of a target - and its tracking - tenfold with the radar system.

"Radar technology has become significantly more agile and flexible," Chong said. "But in urban areas, there are a lot of challenges to overcome with urban clutter and multiple reflections from walls and other objects. We've designed these radar signals so they tell us much more information about the object that is being tracked."

Radar emits a pulse to identify an object's location and speed. The length of time required for the pulse to bounce off the object and return to the radar determines its location. In cities, buildings and trees can confuse the radar and send back multiple pulses, making specific location difficult to pinpoint.

Chong and Louis Scharf, co-principal investigator and professor of electrical and computer engineering at Colorado State, created methods to pinpoint how particular signals or waveforms bounce off buildings. They led a team that includes researchers from Princeton University, Rensselaer Polytechnic Institute, Naval Postgraduate School and Melbourne University.

The U.S. Air Force Research Laboratory in Rome, New York, tested the team's methods, and a final report has been submitted to DARPA.

"This technology could be useful for other purposes beyond the military such as airport or university security or in the mountains," said Chong, who collaborates with companies such as Numerica, a small business in Loveland.

"Dr. Chong's nationally recognized expertise in optimization and sensor resource management is an invaluable help to Numerica in developing sensor resource management expertise in support of national defense," said Aubrey Poore, chief executive officer and chief scientist at Numerica, which works in the area of information science in support of defense and security surveillance. "In signal processing, Numerica also works with Dr. Scharf, one of the nation's foremost experts, on a variety of projects. Both Dr. Chong and Scharf are exceptional people in mentoring our younger staff."

The research represents Chong's sixth DARPA award. Chong and Scharf have received several DARPA

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awards in the past for such projects as network modeling and simulation, military communication systems and active sensing.

Chong joined the Colorado State faculty in 2001. His research interests are primarily in the areas of control, optimization and modeling, with applications to computer/communication and sensor networks. He received a Faculty Early Career Development Award from the National Science Foundation in 1995.

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