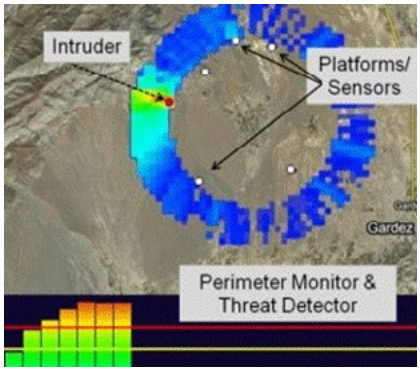
Navy SBIR/STTR Success

SHIFTER Processor for Radio Frequency (RF) Signal Location and Mapping

TICOM Geomatic's SHIFTER processor improves the warfighter capability to find, distinguish and target low power emitters for prosecution.



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TOPIC NUMBER:
N07-187

SBIR INVESTMENT:
$1.1 M

PHASE III REV:
$2.8 M
$1.2 M Navy RIF;
$1.6 M Navy TENCAP MERIT

THE TECHNOLOGY

The SHIFTER processor combines signals from RF or acoustic sensors to produce a map of emitter locations. The technique can work against signals with little known structure, such as analog communications signals or jammers. The technology can locate multiple simultaneous emission sources, find low power sources, improve reliability and discern fast-moving sensors, and monitor specific spatial locations or areas. With SHIFTER you can now simultaneously locate an emitter of interest and an interferer such as a jammer.

THE CHALLENGE

Location of emitters in the same frequency band is a challenging problem for Electronic Warfare operators if there are many emitters or sensors in operation. Traditional systems return the location estimate of the strongest signal only--potentially missing important emitters. Compounding the problem is that computerprocessing increases exponentially as the number of sensors increase. A technique is needed to enable detection and location as the number of sensors and emitters multiply in the search area.

THE NAVAL BENEFIT

SHIFTER provides a means of detecting and locating multiple simultaneous emitters of unknown signal structure, something that is not possible with traditional methods. The variant of SHIFTER that is deployed as part of the Navy's geolocation system increases the ability to locate low power signals, giving improved situational awareness. Traditional processors sometimes return two ambiguous emitter locations where SHIFTER can resolve these ambiguities, which reduces the time required to obtain a high-confidence target fix.

THE TRANSITION

Acquisition Sponsor: Navy PMW 120. Navy PMW-120 SPAWAR provided additional funding to demonstrate the SHIFTER processor on an operational network against multiple emitters. The ability to detect and locate more than one emitter was demonstrated, as well as the perimeter monitoring feature. The disambiguation and improved reliability features were advanced under the Navy Tactical Exploitation of National Capabilities HIGH GEAR project and are currently deployed as part of the Navy geolocation capability. Those features will also be available on JICD 4.2 hubs when deployed.

THE FUTURE

The SHIFTER processing technique is positioned for low power, jamming, unknown communications networks, spoofing transmitters, Internet of Things, and sensor proliferation. Besides Department of Defense clients, Homeland Security applications like port, border and airport security are all growth target areas.

"The R&D investment provided by the Navy SBIR office afforded us the opportunity to focus on developing this technology, which has enabled the Navy to maximize geolocation productivity when using fast-moving sensors." – Dr. George Castle, Principal Investigator, TICOM Geomatics, Inc./CACI

"A SBIR supported the necessary early development efforts that showed proof of concept in the SHIFTER technology, reducing the level of risk to the acquisition program. The Ship's Signals Exploitation Equipment Program of Record is currently assessing transition into its Distributed Operations capability."
– Jon Brewster Science and Technology Assistant Program Manager (S&T APM)