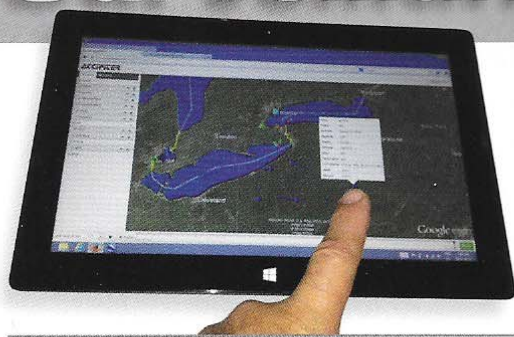


Surveillance-to-Intelligence



Radar S2I Networks for Public Safety

by Richard Bray

Great progress has been made since 2007 when *Frontline Security* first reported on radar surveillance technology designed for use in the homeland by public safety organizations, whose responsibilities include border security, search and rescue, transportation security, and law enforcement.

Operational needs for technology to enable smarter, intelligence-led operations, have been clearly articulated. In response, affordable surveillance-to-intelligence (S2I) solutions have been developed in partnership with the public safety community, and operational pilots have been successfully executed to reduce technical and operational integration risk. At the same time, relevant government policy has supported – and even led – these important operational developments.

OPERATIONAL NEEDS

The Great Lakes St. Lawrence Seaway System (GLSLS), which includes a 3,700 km water border between Canada and the United States, is simply too large to patrol

without surveillance technology that provides maritime and air domain awareness.

Automatic Identification System (AIS) and Automatic Dependent Surveillance – Broadcast (ADS-B) technologies provide awareness of regulated, large commercial vessels and passenger aircraft. However, according to retired U.S. Coast Guard Captain, Jeff Ogden, security and safety personnel have continually asked for tactical, real-time awareness of small pleasure-craft, including snow-mobiles and ATVs in the winter when water freezes over, and low-flying general aviation aircraft such as ultralights.

Furthermore, says Ogden, who is now VP of Homeland Security & Safety Programs at Accipiter Radar, “Due to the vastness of the Great Lakes’ shared maritime system, the number of agencies involved in its security, their limited response assets (vessels, vehicles and aircraft), and the dense target environments, domain awareness from sensor data must be shareable with Canadian and American partners in real-time. That data must also include permanent

target trajectory retention/replay, with user-friendly analytical tools that allow intelligence analysts, investigators and even watch floor personnel to understand target activity patterns, identify targets of interest quickly, and be able to rapidly respond to them.”

This combination of operational and tactical analytical capabilities, and the ability for partners to share a common view of the world enables intelligence-led operations which result in smarter resource allocation with quantifiable risk management; and act as a force multiplier to cash-strapped safety and security personnel.

RADAR S2I NETWORKS

When asked about solutions to this problem, Dr. Tim J. Nohara, P.Eng, President & CEO of Accipiter Radar explained: “We have been privileged to partner with Canadian and American safety and security agencies for over a decade, including RCMP, CCG, USCG, CBSA, CBP, TC, DRDC CSS, DHS S&T, DND, DoD, NAV CANADA and FAA, as well as provincial/state and regional agencies and local police services.



PHOTOS AND IMAGES PROVIDED BY ACCIPITER RADAR



Left: depiction of full-scale, wide-area, radar S2I network on the Great Lakes modelled after cellular networks. Right: photograph of a typical radar node.

We listen to the operational needs of these early adopters, innovating continuously, and working alongside them to pilot our solutions, getting continuous feedback, and iterating until we get it right; then we repeat this process to improve further.” He notes that his company’s vision is directed to wide-area situational awareness of uncooperative targets (vessels or aircraft not broadcasting AIS or ADS-B), and hence is perfectly aligned to his clients. “This is what keeps us focused and in the game for the long-haul.”

To explain the challenge, Dr. Nohara notes that “unlike military theatres where ‘friendly’ targets identify themselves, on the Great Lakes there are thousands of unidentified friendlies. To support proper decision-making and risk mitigation, this means radar surveillance must be coupled with a carefully designed target information system (TIS) that can handle the “big data” problem, support arbitrary, multi-mission analytics, and share radar target data securely in real-time with multi-agency users including front-line operators.

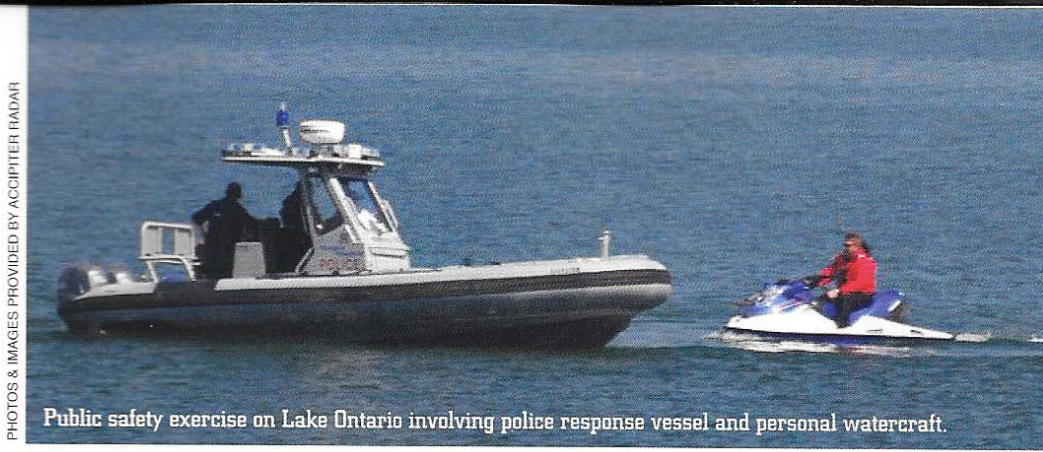
“In short, we needed to bring radar S2I power to the edge, and we’ve done just that. The radar information networks we have pioneered exploit a network of ground-based, waterside, radar sites that are analogous to cellular networks. The broad range of users means the TIS needs to allow agencies to easily develop their own software tools or ‘apps’ to exploit the target data as they see fit.

Flexibility allows easy adaptation to changing threats and priorities. “The big advantage we have over military operations, is that we operate in the homeland; this means we can deploy flexible, land-based radar networks giving us wide-area, persistent monitoring, instead of being forced to rely on less-flexible airborne and space-based sensors which are many times more expensive,” says Nohara.

OPERATIONAL PILOTS

Canada and the United States have made considerable investments in operational pilot projects to mitigate risk in developing and fielding new surveillance technologies for the Great Lakes.

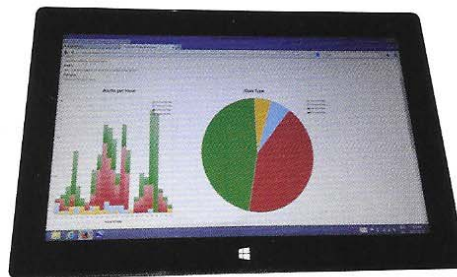
In early 2009, for example, the Honourable Peter MacKay, then Minister of National Defence and the Honourable Peter Van Loan, then Minister of Public Safety, announced approval of a pilot project under the Public Security Technical Program with



Public safety exercise on Lake Ontario involving police response vessel and personal watercraft.

PHOTOS & IMAGES PROVIDED BY ACCIPITER RADAR

Accipiter to examine the feasibility of using radar networks on the St. Lawrence River and the Great Lakes. Following initial success, the scope was expanded in June 2010 by Defence Research Development Canada’s Centre for Security Science (DRDC CSS), and the deployed radar network demonstrated enhanced maritime domain awareness for the G20 Summit in Toronto. This was a multi-agency, multi-jurisdictional operation including the RCMP, the Great Lakes Marine Security Operations Centre, Toronto Police Service, and National Defence.



“Apps” now offer real-time (tactical) vessel or aircraft awareness, activity analytics are readily available at an analyst’s finger-tips.

More recently, Accipiter partnered with DRDC CSS and DHS S&Ts in the Canada and U.S. Sensor Sharing Pilot, a cross-border pilot consisting of sharing sensor information between the RCMP and Customs and Border Protection along the Canada/U.S. border in the area of Swanton, Vermont.

Earlier this year, Defence Minister Rob Nicholson and Public Safety Minister Steven Blaney announced another pilot now underway with Accipiter and Shiprider partners (the RCMP and USCG), under the Canadian Safety and Security Program that will further enhance operational capabilities.

PROGRESS & POTENTIAL

Policy at the federal and international levels has advanced considerably in concert with operational needs. Most importantly, in 2011, Prime Minister Harper and President Obama announced the joint *Beyond the Border: A Shared Vision for Perimeter Security and Economic Competitiveness* declaration and developed an Action Plan to achieve it. This remarkably detailed Action Plan includes a commitment to intelligence-led enforcement and to addressing threats early, through initiatives such as joint risk assessment and border domain awareness, cross-border law enforcement such as the Shiprider program, and coordinated technology procurement. Cross-border operational enforcement integration is clearly the goal for the future.

In this year’s federal budget, it was announced that \$92 Million has been allocated over five years to the RCMP to combat contraband tobacco smuggling with increased, intelligence-led policing efforts, including the creation of a Geospatial Intelligence and Automated Dispatch Centre, and the deployment of sensors, including radar, in high-risk areas from the Maine-Quebec border to Oakville, Ontario.

When asked about what he sees ahead for the future, Dr. Nohara sees a “full-scale roll-out of radar S2I capabilities across key areas of the Great Lakes and Seaway system as well as potential expansion to the Arctic and to our East and West Coasts.” In addition, he notes that end-user tools or apps will greatly enhance search and rescue operations by reducing search time and costs. Also, specialized apps for weather, bird and ice monitoring will improve safety and protect the environment.

While challenging, these goals are eminently practical and entirely achievable in the next seven years, thanks to the investments made and the leadership shown on both sides of the border in the last seven years... and that’s definitely a positive development. **S**

Richard Bray is a FrontLine staff writer.