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Scientific Brief

Canadian Safety and Security Investments in S&T and Canada 2014 Federal Budget Allocation to Border Security

Background

The federal government and the RCMP have made extensive efforts in border security between ports of entry. The efforts are sometimes linked to smuggling of contraband tobacco [1],[2] due to the scale of potential lost tax revenues [3] but are of great importance to sovereignty[1] and combating organized crime. In the 2014 budget, the government announced an allocation of $91.7M to enhance the technology for border integrity:

> **Enhancing Support to Combat Contraband Tobacco**
>
> *Economic Action Plan 2014 proposes to allocate $91.7 million over five years to enhance the RCMP's ability to combat contraband tobacco.* Contraband tobacco remains a serious threat to the public safety of Canadians. The illegal manufacture and distribution of this commodity fuels the growth of organized criminal networks. ***Building on recent investments***, Economic Action Plan 2014 proposes to allocate $91.7 million over five years to enhance the RCMP's ability to combat contraband tobacco. The new funding to enhance the RCMP's ability to combat contraband tobacco will be used to increase intelligence-led policing efforts, including the creation of a Geospatial Intelligence and Automated Dispatch Centre and the deployment of a range of sensor devices to detect movement on the border in high-risk areas, from the Maine-Quebec border to Oakville, Ontario. Specifically, these enhancements would involve the deployment of high-end sensor devices including radar, sonar and unmanned ground sensors; mobile workstations; and long-range thermal video cameras to enable RCMP officers to respond in real time to high-risk alerts.
>
> *2014 Budget, page 211*[2]

The statement ***"building on recent investments"*** in the excerpt alludes to investments made by Defence Research and Development Canada's Centre for Security Science (DRDC CSS) and its partners through the Canadian Safety and Security Program (CSSP). The purpose of this Scientific Brief is to show the importance de-risking large investments of this magnitude through

[1] These include mixed smuggling of drugs, weapons and humans, support for other criminal activities, financing terrorism, sovereignty and territorial control, and indirect threat through its impact on the US and the reaction this may provoke [4],[5].

[2] http://www.budget.gc.ca/2014/docs/plan/pdf/budget2014-eng.pdf [16].

an S&T program such as the CSSP, and document that the Budget statement has specific traceability to CSSP investments in four areas from 2009–2013: maritime radar, geospatial intelligence, sonar, and thermal cameras.

CSSP Efforts Referenced in the 2014 Budget Excerpt

Maritime Radar

In 2009/2010, CSS funded a feasibility study [6] on maritime radar in the Great Lakes, and discovered that there was little to no surveillance capability present, especially for small vessels and low-flying aircraft [7]. This study also explored the existing licensed emitters for weather and navigation in the Great Lakes Marine Security Operations Centre (GL MSOC) area of responsibility, and the parameters (frequency band, antenna size and power, etc.) that would give the right range and resolution to detect small vessels.

In 2010, CSS exploited this initial radar network to provide feeds of maritime traffic in the Toronto harbor area for the 2010 G-20 Toronto summit [8]. Following CSSP investments, the RCMP continued to fund the same industrial partner to continue providing data feeds from the radar network as well as AIS (Automatic Identification System) and ADS-B (positional data for aircraft) tracks. In 2013/14, the CSSP invested additional effort to develop specific “apps” for the GL MSOC stakeholders designed to provide the type of intelligence required to detect suspicious behaviour and border incursions [9]. In particular, it supported the Canada Border Services Agency (CBSA) by providing tools to validate remote check-ins at Canadian marinas. In 2014/15, the CSSP is investing in a new pilot project [10] focussing on the Canada/US Shiprider [11] initiative, that will tighten the links between surveillance, intelligence and interdiction operations to improve coordination of resources and shorten response times. A separate series of projects has also enabled collaboration with the Department of Homeland Security to share situational awareness by creating a common operational picture from sensors on both sides of the border [12]. The emerging solution now includes a track management system and the ability to create tailored alerts.

These CSS projects helped the CSSP partners better understand what the technology can do for them and what their operational needs are.

Geospatial Intelligence and Automated Dispatch

A standard surveillance challenge is that of managing the complexity to make sense of large number of diverse sensor feeds such as cameras and unattended ground sensors and make best use of operational personnel by sending them to the most likely incursion points. Labor costs often dominate law enforcement budgets, so optimal use of operational staff is critical. Two ongoing projects in the CSSP, that started April, 2013 [13], are supporting the RCMP Integrated Border Enforcement Teams and core partners CBSA, US Customs and Border Patrol, US Immigration and customs Enforcement and US Coast Guard, by exploring how a map-view can be used to collects sensor information into one geospatial common operating picture, and lead to more effective dispatching. Intelligence information from other sources, such as US partner organizations or local police forces, can be layered on this view to further inform the response to border incursions. The CSSP projects are helping develop these tools, and also supplying scientific rigor to the assessment and documentation of the impact on operational measures of dispatch efficiency and contributions to investigations or interdiction events.

Detection Using Sonar

The CSSP funded three projects [14] that focused on the development of passive sonar (underwater acoustics measured with hydrophones). This particular S&T area required an initial reach-back to the research community at DRDC Atlantic to assess its feasibility and long-term prospects in an operational context. A small pilot study was then funded to test the operation of a prototype in a remote region. Following the success of this first test, trialing of the covert technology continued in several locations in lakes and rivers in Ontario and British Columbia. The pilot projects have answered key risk questions such as whether the sensors work in high traffic zones or in moving water, whether they can transmit over large distances from remote locations, and whether they can operate for a full season without refurbishment. More importantly, the projects demonstrated the cost-savings available through the use of technology. For remote regions, it is very expensive (and operationally ineffective) to have operational staff patrol or provide persistent surveillance. Covert hydrophones are unattended (no on-site staff needed) and provide an indication of activity, which can generate intelligence reports and then cue interdiction operations, smartly.

These CSSP projects have shown that passive sonar technology has been so effective that prototypes are still being exploited operationally and it will certainly form part of an enduring solution of integrated sensors for border surveillance.

Thermal Cameras

A study was conducted in 2011 [15] to explore the capabilities of a state-of-the art laser-gated all-weather camera. While quite capable and sophisticated, the results showed that the technology was too complicated for the application and that the GL MSOC had no means to support it through a technology life cycle.

Subsequently, the CSSP funded the 'technology acquisition' of proven high-end military grade day/night cameras for use in the GL MSOC area of responsibility. These proved to be effective, manageable and sustainable. It is therefore not surprising that there would be mention of this in Canada's Federal Budget.

As such, The CSSP investments helped determine what worked and what didn't work, or in other terms, the analysis helped to determine whether a particular innovative technology can effectively close our partner's operational capability gaps.

Conclusion

New technologies can bring unexpected risks. Consider the example of the state of the art all-weather camera technology initially recommended for border applications. Based on engineering specifications alone, its unparalleled capability would appear to be a good fit. However, its use was not practical for staffing, training and maintenance reasons, and moreover not affordable in the border security setting. In contrast, the simple sonar technology, which proved to be operationally useful, cost-effective, and sustainable and mature in terms of Technology Readiness Level[3], was ultimately more appropriate for the user. These are all considerations that can be explored in S&T studies and pilot projects in an operational environment with mature innovative technology. Moreover, pilot projects also familiarize operational communities with the operations and maintenance aspects of the technology.

[3] Technology Readiness Level or TRL is a scale from 1 to 9 indicating the maturity of any given technology and its readiness for operations. Wikipedia provides language describing various examples of the scale.

The experiences with de-risking border surveillance technology and large follow-on operational investment are examples of S&T producing a great return on investment.

In conclusion, after developing a trusted partnership with border security partners, DRDC CSS was able to invest in the right technologies at the right TRL and usability in order to generate scientific evidence that essentially de-risked technologies so that the RCMP was able to bring together a proposal for the 2014 federal budget that closes gaps in border security. CSSP will continue to provide similar scientific advice to the RCMP in their continuing efforts in the Border Integrity Technology Enhancement Project.

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