

CANADIAN  
POLICE  
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CENTRE

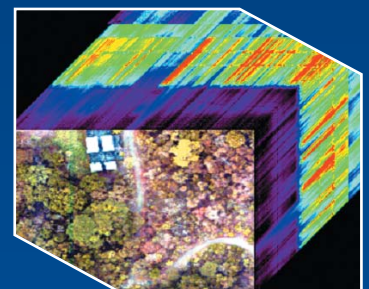
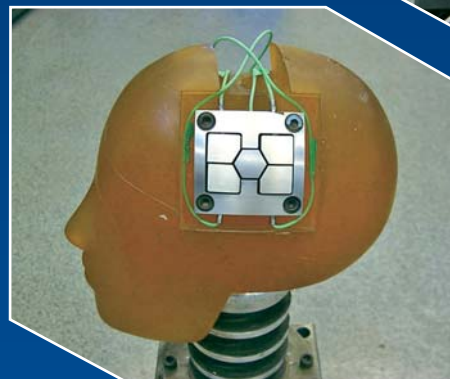


CENTRE  
CANADIEN DE  
RECHERCHES  
POLICIÈRES

ANNUAL REPORT

2005 - 2006

[www.cprc.org](http://www.cprc.org)



National Research Council Canada  
Conseil national de recherches Canada



Royal Canadian Mounted Police  
Gendarmerie royale du Canada



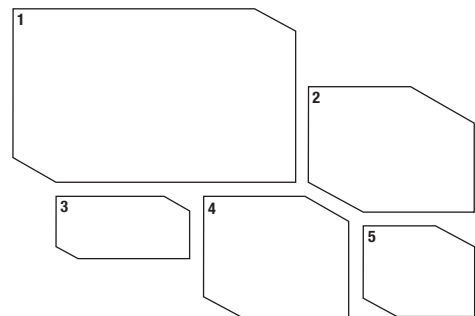
Canadian Association of Chiefs of Police  
L'Association canadienne des chefs de police



Canadian Professional Police Association  
Association canadienne de la police professionnelle

Canada

## Cover photos



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1. *An officer arrests a resistive subject during trials of CEDs (conductive energy devices). The CPRC's CED safety study has helped set protocols for their use worldwide. See pages 9 and 22.*

Montreal Police Service

2. *Developed in Canada for use by the armed forces, the Ferret™ can determine the location of small arms fire. It is now being tested for use on police boats in coastal regions. See page 14.*

Sheldon Dickie, CPRC

3. *Studies of gunshot wound decomposition can help forensic experts interpret valuable evidence in gun crimes. See page 12.*

Lauren E. MacAulay, St. Mary's University

4. *Testing equipment used as part of a project to create a new performance standard for ballistic helmets. See pages 6 and 16.*

Biokinetics and Associates Ltd.

5. *Spectrometry data satellite images such as this one are helping police to identify clandestine outdoor crops of Cannabis. See page 20.*

CPRC

The background of the entire page is a monochromatic blue-tinted image of several maple leaves. The leaves are scattered across the frame, with some in sharp focus and others blurred, creating a sense of depth and texture. The overall tone is professional and clean.

**V I S I O N**

*A safer Canada through science and technology*

**M I S S I O N**

*To provide leadership and focus for science and technology  
in policing and public safety across Canada through research,  
development, standards, evaluation, and commercialization*



## INTRODUCTION

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## A MESSAGE FROM THE CHAIRMAN

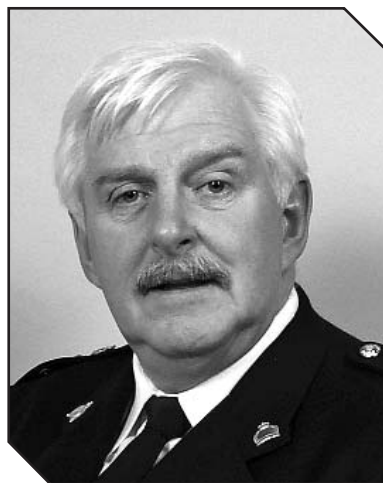
### Focus on the Future

This has been an eventful year at the Canadian Police Research Centre (CPRC). In particular, there is activity under way that will affect the future governance and funding of the organization. As Chairman, I want to take this opportunity to bring you up to date on the year's developments and how they will affect the future activities of this important national organization.

For over 25 years, the CPRC has focused on public safety technologies, including some of the kind featured in popular television programs. Police, firefighters, and emergency medical personnel use these tools every day to protect Canada's communities and to provide assistance in times of crisis.

Last year I announced that the CPRC Advisory Board, partners, and staff would be working in 2005–2006 to strengthen the organization. As a result, the CPRC is now well positioned to lead efforts to meet the technology needs of first responders across Canada. Now more than ever, as the threats and risks that our first responders encounter become increasingly complex, the CPRC plays an essential role in bringing together government, science, industry, and first response organizations to make Canada safer through science and technology.

The Government of Canada is currently reviewing a proposal from the police community to increase Canada's investment in public safety and first responder technologies. If enacted, this proposal would expand the work of the CPRC and establish a dedicated research facility in Regina, Saskatchewan. Pending a final decision on this proposal, in March 2006 the government announced a commitment to provide interim funding for the CPRC, enabling it to continue its current research work in such areas as port security, respirators for firefighters, and development of standards for police and first responder clothing and equipment.



Chief Jim Cessford

I am very proud of our achievements this year, which include completing the Ferret™ project for the localization of small arms fire, approving a protective equipment standard for blunt trauma, and launching a roadside drug testing project, to name just a few. One of the highlights of the year was the August 2005 presentation to the Canadian Association of Chiefs of

Police of the final report from an independent medical and scientific review on the safety of conducted energy devices (CEDs), such as Tasers. The results of this review are now informing CED use and policies both across Canada and around the world.

I encourage you to read about these and other examples of the CPRC's collaborative work with the police community, universities, and industry in this Annual Report.

In the coming year, the CPRC will continue its efforts to establish a national research facility to serve both police and first responder communities in Canada. It will build on its existing network of partner

organizations across the country and internationally. In addition, it will establish a national resource centre to help both first responders and industry develop and evaluate new technologies.

Given the current global security climate, the time is right for this initiative, and the CPRC is well positioned nationally and on the world market to help Canada benefit. At a time when public safety and security are of utmost importance to Canadians, I look forward to our working together to ensure continued support for the valiant men and women who are the first to respond in times of crisis, and for the citizens they protect in communities across Canada.

We greatly appreciate your continued interest and support.

### Chief Jim Cessford

Chief Constable, Delta Police Department  
Chairman, Canadian Police Research Centre

## A MESSAGE FROM THE EXECUTIVE DIRECTOR

### Addressing Public Safety from the First Responder's Perspective

The CPRC is the manifestation of a long-standing partnership between the National Research Council, the RCMP, the Canadian Association of Chiefs of Police, and the Canadian Professional Police Association. For over 25 years the CPRC has nurtured the development of new technologies that help to protect Canadian communities and first responders in times of crisis. Many CPRC projects have resulted in innovative tools, approaches, and practices that are now used every day by police, firefighters, and emergency medical personnel across the country.

The CPRC is recognized around the world for its research and its leadership in employing science and technology for policing and public safety. It plays a key role in facilitating cross-jurisdictional cooperation, linking government departments, law enforcement agencies, industry, and other private and public sector interests and nongovernmental organizations. It provides focus and direction through support for, and development of, industry standards, and through the evaluation of new technologies. It guides and supports the creation, evaluation, commercialization, and dissemination of new technologies and products that support the brave men and women on the front lines.

The key to the CPRC's success is the constant involvement of front-line officers, whose knowledge and experience informs all its initiatives from start to finish. The CPRC actively seeks interested partners, collaborators, and stakeholders for its projects, and encourages them to contribute throughout the entire



*Steve Palmer*

process. A recent independent evaluation of the CPRC confirmed that there is strong, ongoing support from the law enforcement and first responder communities for its work to date, and excitement about the possibilities for the future.

With this annual report we present to you the results of the CPRC's efforts this past year, and invite you to join us in embracing the challenges that lie ahead for the coming year.

#### **Steve Palmer**

*Executive Director;  
Canadian Police Research Centre*



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Members of the CPRC Advisory Board and Staff, October, 2005

CPRC

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**R E S E A R C H   A N D   D E V E L O P M E N T**



## PROJECTS

CPRC research and development projects from the past year are listed here in alphabetical order. Any technical reports and memoranda associated with a project are noted here under its project heading; a complete list of the CPRC's technical reports and memoranda for 2005 and 2006 can also be found on page 24.

For more detailed information on a particular project, please contact the project manager, or contact the CPRC at [cprc@cprc.org](mailto:cprc@cprc.org).

### Project Categories

**Category A:** Health and Safety—protecting the police in hazardous situations

**Category B:** Operational Effectiveness—fighting crime and gathering information, intelligence, and evidence

**Category C:** Protecting the Public—traffic, custody, and crime prevention

### Ballistic Helmet Standard

*Active—Category A*

#### Project Managers

**Julie Graham**, CPRC  
(613) 949-4173

**Walter Dick**, Canadian Standards Association  
(416) 747-5563

This project will develop a standard similar to CAN/CSA-Z611, "Riot Helmets and Faceshield Protection," but will focus on the latest technology for protecting police and civil defenders against impacts from small arms projectiles such as bullets, shrapnel, pellets, shot, etc. Initial meetings were held in February 2006 and it is expected that the new standard, to be identified as CAN/CSA-Z613, will be completed by mid-2007.



*The CAN/CSA-Z613 Technical Advisory Committee*

### Biometric Access Cards

*Active—Category B*

#### Project Manager

**John Evans**, CPRC  
(780) 554-2329

In today's world of highly secured physical premises and the proliferation of information systems, police are increasingly required to have multiple access devices, such as swipe cards and computer tokens. This is a concern as some of these traditional devices provide low-quality security, and the need for several of them often creates substantial administrative overheads. A new access card that uses biometric (fingerprint) activation has recently come on the market and may be capable of replacing several existing access devices. The Edmonton Police Service is conducting a trial on these cards for the CPRC in order to assess their suitability for the police environment.

## Blunt Trauma Protective Equipment Performance Standards

*Concluded—Category A*

### Project Managers

**Julie Graham**, CPRC

(613) 949-4173

**Randy Gaw**, Correctional Service Canada

(613) 995-3981

**Dave Shanahan**, Canadian Standards Association

Correctional Service Canada, the RCMP, other user agencies, and representatives of industry were involved in the creation of a new standard for protective equipment used by police and correctional officials as a defence against blunt trauma. In March of 2006, the Canadian Standards Association published this standard as CAN/CSA-Z617, "Personal Protective Equipment (PPE) for Blunt Trauma."

## Canadian Forensic Capability Inventory and Gap Analysis

*Concluded—Category B*

### Project Managers

**Steve Palmer**, CPRC

(613) 993-3996

**Karen Branston**, Rencon Consulting

### Report

TR-04-2006R (Restricted) "Canadian Forensic Capability Inventory and Gap Analysis"

The CPRC, with the support of the Chemical Biological Radiological Nuclear Research and Technology Initiative (CRTI) and the RCMP, conducted a Canadian Forensic Capability Inventory to develop a database of existing Canadian forensic analysis facilities that are specifically applicable to chemical, biological, radiological, and nuclear (CBRN) evidence in order to identify gaps within the community.

The report will be used for future priority setting by the CRTI Forensic cluster.

## Chemical Development for Fingerprint Detection

*Active—Category B*

### Project Managers

**Julie Graham**, CPRC

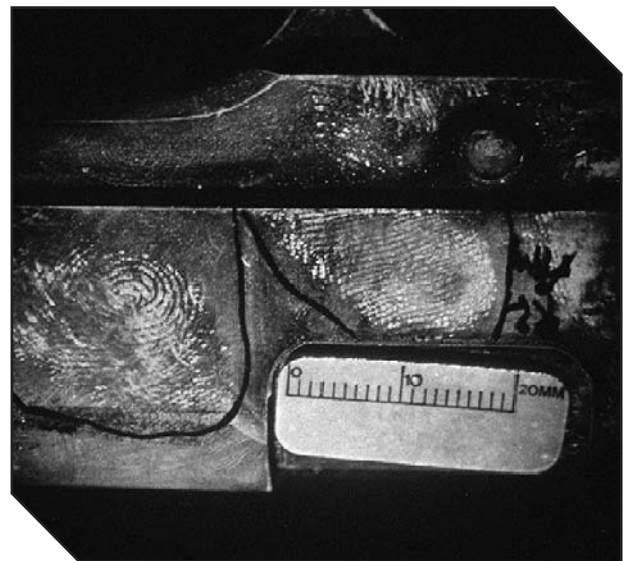
(613) 949-4173

**Dr. Della Wilkinson**, RCMP Forensic Identification

Research Section

(613) 993-3059

For several years, forensic identification specialists have observed inconsistencies in the operational performance of the chemical formulations used to detect fingerprints on paper. These chemicals react with the amino acids that are secreted from sweat pores onto fingerprint ridges. The amino acids are transferred to the porous surface through handling, and absorbed into the substrate. This project investigates the effect of different substrates, forensic light sources, and even kinds of sweat on the performance of several amino acid reagents. This project involves the RCMP's Forensic Identification Research Services, the Ontario Police College, and the Canadian Police College.



*Various chemicals can help to detect latent fingerprints on paper*

Dr. Della Wilkinson, RCMP

SUCCESS STORY

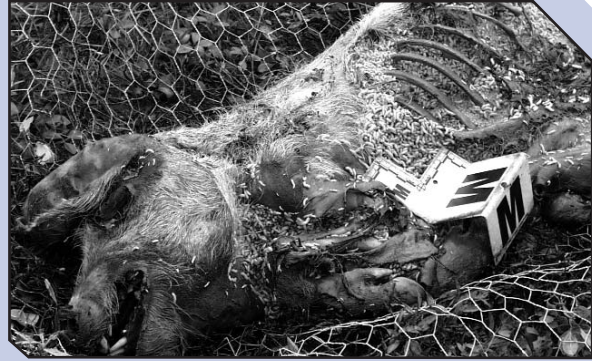
**Flies on the Body:  
Forensic Entomology**

Since 1993, the CPRC has supported research into determining time since death. Led by Dr. Gail Anderson of Simon Fraser University, a dedicated team of scientists and graduate students has conducted studies in different regions all across Canada.

These studies have used the carcasses of young pigs, which closely approximate the size of the human torso.

The decomposing pigs have been studied under many different conditions: left in sun or shade above ground, partially buried, clothed and unclothed and submerged in fresh water or salt water. Climatic conditions and local vegetation have also been varied.

For each situation, the rate and pattern of decomposition and the succession of insects and other scavengers found on the carcasses have been carefully examined; the resulting data is used to help determine time of death for human bodies found in similar circumstances.



*Insect succession on pig carcass, Day 7. Results of studies such as this can help determine time of death in humans*

Dr. Doug Strongman, Saint Mary's University



*Adult blowfly (calliphora vicina)*

Dr. Doug Strongman, Saint Mary's University



*Green urchin (strongylocentrotus droebachiensis)*

Dr. Gail Anderson, Simon Fraser University

The 11 technical reports resulting from this project are among the most popular downloads from the CPRC website. They include the following:

- TR-06-2005 "Decomposition and Arthropod Succession on Above Ground Pig Carrion in Rural Manitoba"
- TR-09-97 "Aquatic Forensics: Determination of Time Since Submergence Using Aquatic Invertebrates"
- TR-02-96 "Forensic Entomology: Determining Time of Death in Buried Homicide Victims Using Insect Succession"

A full list of related technical reports is available on the CPRC website at [www.cprc.org](http://www.cprc.org).

## Chemical, Biological, Radiological, and Nuclear (CBRN) Crime Scene Modeller

*Active—Category A*

### Project Manager

**Julie Graham**, CPRC  
(613) 949-4173

Investigating crime scenes where chemical, biological, radiological, and nuclear (CBRN) agents have been used poses great dangers to the first responder community. Decontaminating the scene is not always feasible because it may result in the loss of potentially vital evidence, and personal protection is next to impossible to achieve in cases of radiological or nuclear contaminated scenes. Technologies are therefore required to

- reduce the need for first responders to enter the scene
- maximize productivity while minimizing time spent at the scene
- allow tasks to be performed from the relative safety of longer distances or by using mobile platforms

This project will develop a multi-sensor system for collecting evidence at CBRN-contaminated crime scenes with minimum exposure of first responders. The system will

- model the scene as it existed when the first responders arrived
- record and map the contamination levels of CBRN agents
- make data available to staff at safe locations
- allow investigators and courts to view the models

Project partners include the RCMP, Defence Research and Development Canada, MacDonald Dettwiler and Associates Ltd., Toronto Police Services, the Vancouver Police Department, and York University. Project completion is expected by the summer of 2008.

## Conducted Energy Device (CED) National Test Facility

*Active—Category A*

### Project Managers

**Steve Palmer**, CPRC  
(613) 993-3996  
**Rick Shaw**, RCMP

Police Services across Canada have asked the CPRC to set up an independent facility to evaluate the energy output and waveform of CEDs (conducted energy devices), such as Tasers, which are used by many security and law-enforcement organizations to subdue suspects.

The CPRC has purchased the necessary equipment and is now working with the RCMP and other police services to set up testing protocols and benchmarks for both the M26 and the X26 Taser CED. The lab will measure the power and frequency of the energy discharge of the devices, and provide a certified comparison with the manufacturer's specifications.

It is anticipated that police services will use the facility, which is expected to be in service by the summer of 2006, for quality assurance of CEDs and for post-incident verification.

## Development of a Canadian Standard for Protection of First Responders from Chemical, Biological, Radiological, and Nuclear (CBRN) Events

*Active—Category A*

### Project Manager

**Steve Palmer**, CPRC  
(613) 993-3996

First responders to chemical, biological, radiological, and nuclear (CBRN) events must have equipment that combines functionality with protection. They also need information to help them prepare and respond as effectively as possible in their work of protecting Canadians. There are currently no standards in Canada that provide the critical information and guidance necessary to ensure that the appropriate protective equipment is selected and used in CBRN events.

Therefore, CPRC is working with the several partners in the development of a voluntary national standard for protecting first responders against CBRN events. A national standard will also help first responders mitigate risks, thus reducing liabilities and providing a means to demonstrate due diligence. It will bridge the gap between research and first responders, and accelerate the use of approved technologies.

This project is supported under the Chemical, Biological, Radiological, and Nuclear Research and Technology Initiative (CRTI) established in response to the events of September 11, 2001. Key project components include

- an evaluation of current subject-matter material
- technical development of the standard using a consensus approach
- an implementation strategy

The standard will be developed through a joint process with the Canadian General Standards Board and the Canadian Standards Association. Other participating agencies, along with CRTI, are Public Works and Government Services Canada, Royal Military College, Public Safety and Emergency Preparedness Canada, the Canadian Public Health Association, the Paramedic Association of Canada, and the Canadian Association of Fire Chiefs.

## DNA Sampling from the Trigger and Handgrip of Discharged Firearms

*Concluded—Category B*

### Project Managers

**Julie Graham**, CPRC  
(613) 949-4173

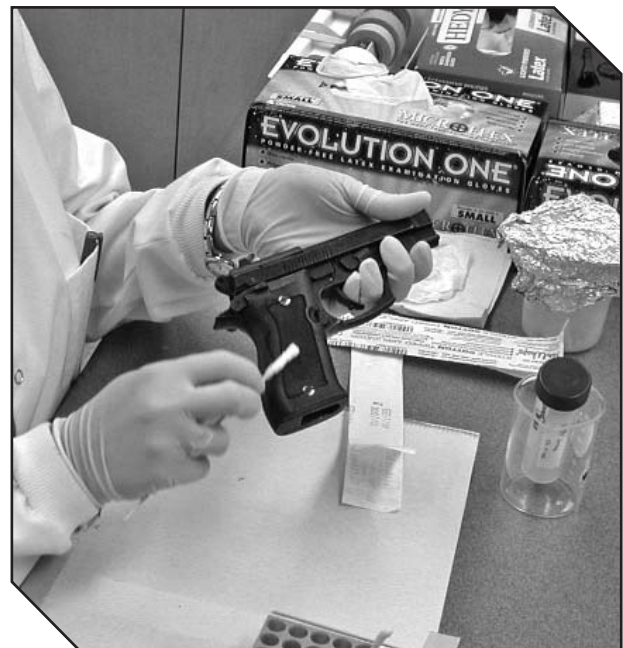
**Dr. Dean Hildebrand**,  
British Columbia Institute of Technology  
(604) 451-7027

### Report

TR-01-2004 “DNA Sampling from the Trigger and Handgrip of Discharged Firearms”

Since firearms are used in many criminal acts, investigators need methods to obtain DNA-based identifications from firearms.

The researchers on this project have found a way to maximize the recovery of DNA from discharged firearms in order to generate a profile of the person who handled the weapon. Following an initial report, additional work has been done investigating the recovery of DNA from bullets. A final report is expected in the near future.



*Collecting a DNA sample from the handgrip of a discharged firearm*

Dr. Dean Hildebrand, British Columbia Institute of Technology



**Draganbot**

*Active—Category B*

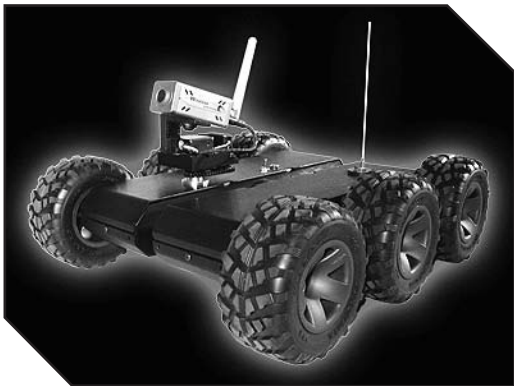
**Project Managers**

**John Evans, CPRC**  
 (780) 554-2329  
**Draganfly Innovations Inc.**  
 1-(800) 979-9794

This early-stage project involves field-testing and enhancing a small, inexpensive, and highly mobile remote-control vehicle for a variety of tasks related to tactical, security, or other police uses.

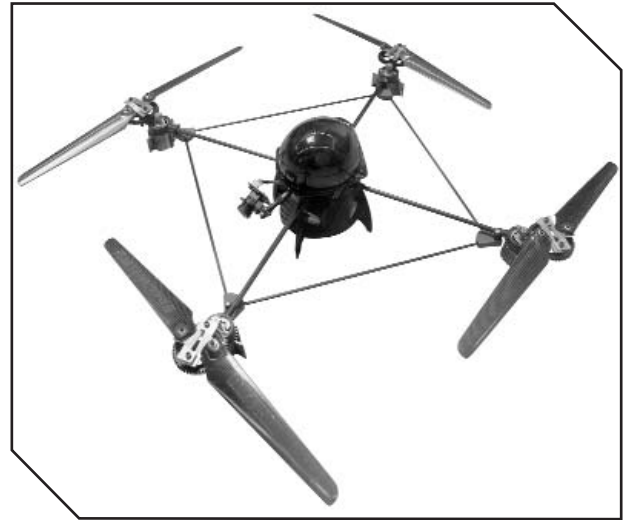
This robot's small size, simple operation, and low cost allow it to be used in a wide variety of situations, augmenting larger and more sophisticated police robots. The base unit is presently available as either a small, inexpensive unit or a mid-size platform. Both come with a high-quality streaming video unit that has remote-control tilt and pan. Other accessories are being considered.

The RCMP "K" Division Tactical Unit is assisting in the evaluation of this product.



Draganfly Innovations Inc.

*The Draganbot*



Draganfly Innovations Inc.

*The Draganfly*

**Draganfly**

*Active—Category B*

**Project Managers**

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This project involves evaluating and helping to further develop miniature remote-control helicopters, equipped with video transmitters, which have been specifically tailored for the police and military markets.

Initial trials demonstrated strong interest in these units but highlighted specific difficulties in introducing them to widespread police application. Modifications to the unit have been made and a more sophisticated software training package for operators has been developed to address the identified issues. Project researchers are now testing the new versions.

The RCMP "K" Division Tactical Unit and the Edmonton Police Service Air Support Unit are assisting with this process.

## Excited Delirium Study, Deaths Proximal to Restraint

*Active—Category A*

### Project Managers

**Steve Palmer**, CPRC

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**John Evans**, CPRC

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**Dr. Christine Hall**, Calgary Health Region

### Report

TR-02-2005 “Excited Delirium and Its Correlation to Sudden and Unexpected Death Proximal to Restraint”

When a person dies while, or shortly after, being restrained by police, the consequences are devastating. Such deaths are extensively reported in the media and invoke serious and immediate concerns for the general public, for medical practitioners, and for police personnel. Yet actual investigations of these deaths have been largely limited to local inquiries and to the reporting of adverse outcomes immediately after an event. No database of information relating to such deaths exists, and no study has been conducted on the topic using standardized methodology.

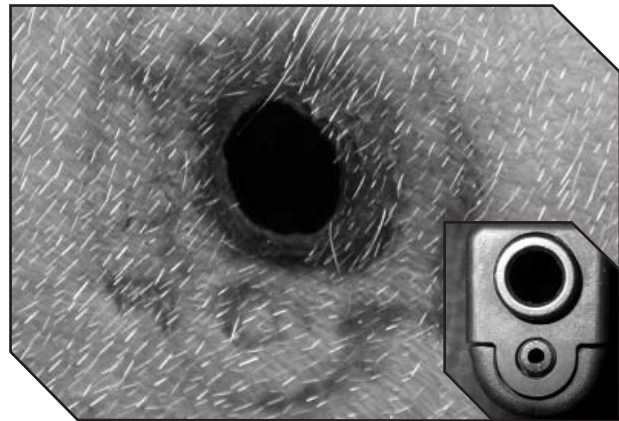
One of the recommendations of the CPRC’s study of CEDs (conductive energy devices, such as Tasers) was to conduct an epidemiological study of individuals resisting arrest, in order to gather data around all features of these subjects, including those dying in police custody, to fully understand these events.

The CPRC is developing such an international study, under the leadership of Dr. Christine Hall, Calgary Health Region, to determine whether there are features of the subject and/or the situation that are predictive of a fatal outcome.



*Gunshot wound decomposition study, Day 2*

Lauren E. MacAulay, St. Mary's University



Lauren E. MacAulay, St. Mary's University

*The impression of a gun muzzle is still clearly visible on this gunshot wound on Day 4*

## Gunshot Wound Decomposition

*Concluded—Category B*

### Project Managers

**Julie Graham**, CPRC

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**Dr. Doug Strongman**, St. Mary's University

(902) 420-5754

### Report

TR-07-2006 “The Effects of Decomposition on Gunshot Wound Characteristics”

Firearms examiners can use the physical characteristics of gunshot wounds to help

- identify the weapon used
- understand the circumstances of how the wound was inflicted
- determine the angle of the gunshot

The quality and nature of information that can be retrieved from gunshot wound evidence is affected by how much decomposition has occurred by the time the wound is examined. This in turn depends largely on when the body was discovered, as well as on such factors as the location of the body, the local environmental conditions, and the time of year.

This study examined the effects of early-stage decomposition on the appearance and characteristics of gunshot wounds. The data collected will help examiners interpret this type of evidence, allowing them to refine their findings based on the state of decomposition of the body.

## Improvised Explosives Capability Analysis

*Concluded—Category B*

### Project Managers

**Steve Palmer**, CPRC

(613) 993-3996

**John Bureaux**, RCMP, Canadian Bomb Data Centre

**Alain Goudreau**, Public Security Technical Program

### Report

TR-03-2006R (Restricted) "Improvised Explosives Capability Analysis"

Working with the RCMP Canadian Bomb Data Centre and the Public Security Technical Program (PSTP), the CPRC developed an Explosives Cluster Capability Roadmap to identify the current Canadian capabilities for detecting, analysing, and mitigating the damage from explosives. A survey was submitted to all law enforcement organizations that have specialists in improvised explosive devices.

The report will be used to guide the project and investment decisions of the new PSTP Explosives cluster.

## Large Vehicle Bomb Disruptor

*Active—Category A*

### Project Managers

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**Mark Asselin**, U.S. Department of Defence  
Technical Support Working Group

**Rob Keewatin**, RCMP

**Chris Tillery**, U.S. National Institute of Justice

The PCD-LV Large Vehicle Bomb Disrupter™ was developed by MREL Specialty Explosive Products Limited with the help of the CPRC. This unique system uses explosively driven water to disrupt the contents of vehicles containing large quantities of explosives, doing so in a controlled manner with minimal collateral effects. This project is continuing with an evaluation of the viability of using binary explosives to disrupt bombs in increasingly larger vehicles.

For more information, please contact

### MREL Specialty Explosives Products Ltd.

(613) 545-0466 ext. 111, or toll-free in Canada and the U.S.: (877) 544-MREL ext. 111

Email: [bbauer@mrel.com](mailto:bbauer@mrel.com)

Website: [www.mrel.com](http://www.mrel.com)



*The PCD-LV Large Vehicle Bomb Disrupter*

MREL Specialty Explosive Products Ltd.

## Law Against Child Exploitation (LACE)

*Active—Category B*

### Project Managers

**John Evans**, CPRC

(780) 554-2329

**Philip Shrewsbury-Gee**, York Regional Police

The investigation of child pornography cases is a very labour-intensive process, as seized computer hard drives often contain enormous numbers of images that must be reviewed. Since current investigative practices are aimed at the possession of this material, they do little to identify the culprits producing the images or the child victims used in making them.

LACE is a specialized configuration of BlueBear software (see CPRC report TR-01-2004) that is being developed and tested to address these problems. Early indications are that LACE is able to work with existing software investigative tools to improve results and dramatically reduce the demands on investigators' time. It also demonstrates the potential to create a national and international linkage system to make it

easier to identify suspects and victims involved in the making of this material. The CPRC assisted in demonstrating LACE to several European partners and is working with its Canadian partners to facilitate a national field test of the system.

More information on BlueBear software is also available on the BlueBear Network International website at [www.bbinternational.com](http://www.bbinternational.com).

### Localization of Small Arms Fire from a Small Boat in Coastal Regions (Ferret™)

*Concluded—Category A*

#### Project Managers

**Sheldon Dickie**, CPRC  
(613) 949-4174

**Dr. Jacques Bedard**, Defence Research and Development Canada—Valcartier

**Gary Davis**, U.S. Department of Defence Technical Support Working Group

**Simon Jacques**, MacDonald Dettwiler and Associates Ltd.



Testing the Ferret™ with small arms fire from land

Sheldon Dickie, CPRC

The Ferret™ is a Canadian product originally developed for armed forces operations. It is used to identify the location of gunfire as land vehicles move on missions and encounter unexpected resistance. The current work on the project has the aim of validating the usefulness of such technology in helping law enforcement officers who work on small patrol boats on inland waterways.

Work on the project included

- fitting up two boats—one Canadian and one U.S.—that normally work together

## AU REVOIR

### John Arnold

After 40 years of working in support of the Canadian law enforcement community at the National Research Council (NRC), John Arnold retired from the NRC and the CPRC in October 2005.

John holds the unique distinction of being the only charter member of the CPRC. He was there from the beginning, when, in the early 1970s, as law enforcement agencies were facing new and difficult technological challenges, the Canadian Association of Chiefs of Police approached the NRC for assistance. After several successful joint projects, the RCMP joined in the collaboration, and the Canadian Program of Science and Technology in Support of Law Enforcement (CPOSTISOLE) was created. In 1990, this organization became the CPRC.

In recognition of his decades of labour in support of the CPRC, John has been named its Chief Scientist Emeritus.



John Arnold (4<sup>th</sup> from left, front row) with CPRC staff and Board members at CACP Annual General Meeting in August 2005

CPRC

Although retired, he is still working on behalf of the public safety community; he is now the President of the Canadian Police Knowledge Network.

- verifying the scientific and technological aspects of the product
- verifying its ongoing practicality and the overall effect on enforcement, including worker safety and increases in efficiency in apprehending suspects who fire on law enforcement officers

Short-term testing by the RCMP and the U.S. Border Patrol revealed some issues that need to be addressed but fell outside of the original project's scope. These issues, along with several others, including an analysis of whether the forensic capture of "signature" shots would be useful in the judicial process, are expected to be examined under a new project in the 2007–2008 fiscal year.



Sheldon Dickie, CPRC

*The Ferret™ mounted on a small patrol boat*

## Low-Cost Nuclear Detection Web for the Rapid and Accurate Detection of Radiological/Nuclear (RN) Materials

*Active—Category A*

### Project Managers

**Dave Scott**, CPRC

(613) 990-4318

**Steve Palmer**, CPRC

(613) 993-3996

### CRTI Project 03-0025TA Defender Nuclear Detection Web

The goal of this CRTI project, which is supported by the CPRC, is to create an ultra-sensitive, low-cost system for detecting radiological/nuclear (RN) materials rapidly and accurately.

It will result in both the technological advancement of a unique, highly sensitive neutron detector and the development of a novel, scalable data management network.

The work has centred around advancement in a technology known as a bubble detector, which is used by nuclear facilities, military personnel, the medical community, and others as a personal dosimeter (an instrument that measures doses of radiation). Developed and commercialized by Bubble Technology Industries, the bubble detector requires no power and can be re-used repeatedly. The device's simple, reliable design has allowed it to be adopted readily by users with little to no training.

New, highly sensitive bubble detectors have been developed in various models and sizes. These new devices are expected to have a wide range of applications, including

- continuous surveillance by authorities using a pocket detector
- personal and vehicle inspections using a handheld detector
- border checks using a fixed-installation detector
- real-time worldwide monitoring of shipping containers

The CPRC and the Toronto Fire Service helped to field-test the equipment by deploying the units for 10 days in an operational environment with the Toronto Fire Service Heavy Hazards unit.

Other organizations participating in the project are the Toronto Fire Service, Bubble Technology Inc., Xwave, the Radiation Protection Bureau, Health Canada, Public Works and Government Services Canada, the Canada Border Services Agency, the Department of National Defence, and Transport Canada.



Bubble Technology Inc.

*The Defender neutron detector from Bubble Technology Industries*

## Maritime and Port Demonstration Workshop

Active—Category C

### Project Managers

**Brian Thiessen**, CPRC

(604) 528-5817

**Tim Walzak**, COIN Pacific Technology Inc.

(250) 721-6500

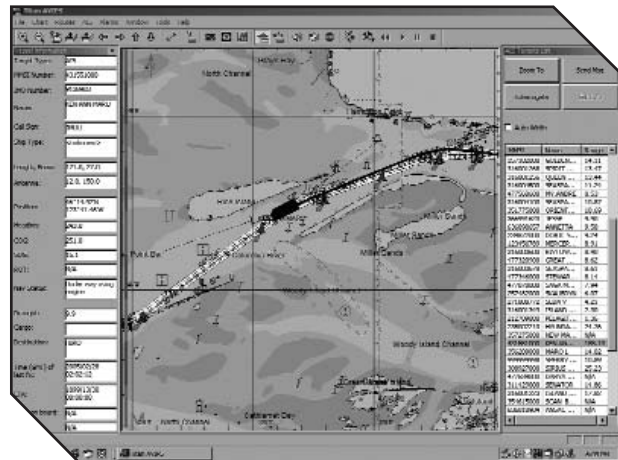
**Gary Garnett**, CFN Consultants

(613) 232-1576

Canada, like all maritime nations, faces unprecedented challenges today in ensuring that ports and harbours and their approaches are secure. As a trading nation bordered on three sides by ocean, containing within its boundaries one of the most active international inland waterways on the planet, Canada's economic well-being greatly depends on the secure transportation of goods by sea. At the same time, the country's unique geographic and strategic position provides an opportunity to leverage the application of maritime security solutions into a competitive business opportunity. There is a window of opportunity for the Canadian security technology industry to move to the forefront in this growing sector.

Within Canada, over 200 high-technology firms have been identified that produce goods and services related to enhancing maritime security. Many of these firms are small and medium-sized enterprises that produce innovative world-class products. The fact that these firms report that between 80 and 90 percent of their markets are outside of Canada is a testament to their excellent standing in a competitive international business area.

The objective of this project is to organize a national workshop that brings together the stakeholders from industry, government, and other user groups.



Brian Thiessen, CPRC

The Titan Automated Vessel Identification for Ports and Surveillance (AVIPS) can help authorities monitor vessels in small and medium ports

## SUCCESS STORY

### Ballistic Helmet Performance

In situations where guns are fired, police officers depend on ballistic helmets to protect their lives. It's crucial, therefore, that these helmets provide reliable protection and that they be tested rigorously.

The standards for ballistic helmets require that they meet a certain level of performance in terms of preventing penetration of various types of bullets. Today's helmets are capable of meeting these standards, but a secondary problem is now becoming evident: the deformation caused in the helmet by stopping a projectile can itself result in serious head injury.

Working with the CPRC, Defence R&D Canada, and the Technical Support Working Group of the Canada-U.S. counterterrorism R&D agreement, Biokinetics developed a new method for measuring the force applied to the skull by ballistic helmet backface deformation.



Biokinetics and Associates Ltd.

Ballistic testing equipment and helmets used in creating a new performance standard

This new test and measurement technology will be used as the basis for a new standard specifying improved performance in ballistic helmets.

## Mirror Image

Active—Category C

### Project Managers

**John Evans**, CPRC  
(780) 554-2329

**Arni Stinnissen**, Ontario Provincial Police,  
e-Crime Section

**Angie Howe**, Ontario Provincial Police,  
Child Pornography Section

**Dr. Rick Mrazek**, Assistant Dean,  
Faculty of Education, University of Lethbridge

Following the international success of MISSING, LiveWires Design Ltd. was commissioned to develop a new series of Internet safety courseware for middle and high schools. The first application in this new series, Mirror Image, has recently been released, and the next game, AirDogs, is nearing completion.

Over 38 million high school students are expected to play these games by the upcoming school year, helping to make them safer users of the Internet.

With the assistance of the CPRC, the Ontario Provincial Police, the University of Lethbridge, and others, LiveWires also undertook an additional support project to provide distance learning for police and teachers who will use these games in the classroom.

For information on how schools can obtain this new series, please contact

### LiveWires Design Ltd.

Phone: (604) 687-5046

Email: info@livewwwires.com

Website: www.livewwwires.com

## Multi-Hit Standard, Police Soft Body Armour

Active—Category A

### Project Managers

**Sheldon Dickie**, CPRC  
(613) 949-4174

**Tony Bosik**, Bosik Technologies

**Gary Davis**, U.S. Department of Justice  
Technical Support Working Group

**Chris Tillery and Kirk Rice**, National Institute  
of Standards and Technology, Office of Law  
Enforcement Standards

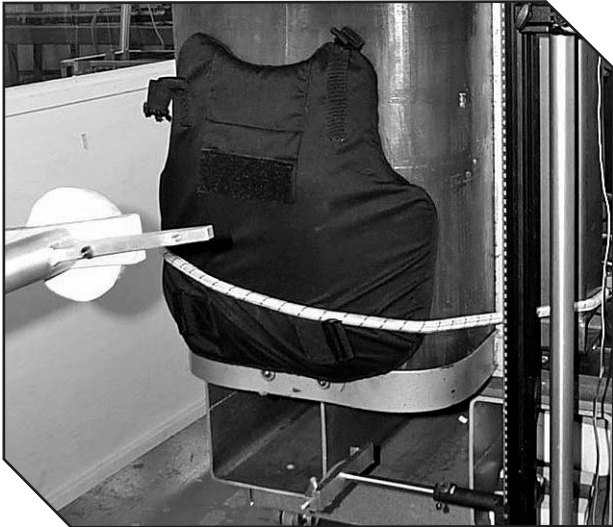
An earlier CPRC project developed a standard for police soft body armour with the Canadian General Standards Board (CAN/CGSB-179.1, documented in the 2002–2003 CPRC Annual Report). A number of promising repeatable procedures and fixtures for testing police armour resulted from that work, but several areas were identified that required further exploration:

- method of attaching armoured vests
- effects of angle shots
- effects of shot sequence or pattern orientation
- effects of shot firing rates
- results of different body armour designs and materials



Poster for the Internet safety game Mirror Image by LiveWires Design

OnDesign Creative Resources



Biokinetics & Associates Ltd.

*Testing police soft body armour*

- clay-equivalent back armour measurement and assessment for multiple hits
- multi-hit testing of hard armour

The preliminary administration work on these areas began in March 2006. All seven tasks are funded; the first five are scheduled to be completed by the time of the 2006–2007 Annual Report.

## Night Vision Goggle Use in the Law Enforcement Environment

*Active—Category B*

### Project Managers

**Dave Scott**, CPRC  
(613) 990-4318

**Greg Lester**, RCMP  
(519) 451-7021

**Dr. Todd Macuda**, NRC, Flight Research Laboratory  
(613) 998-3014

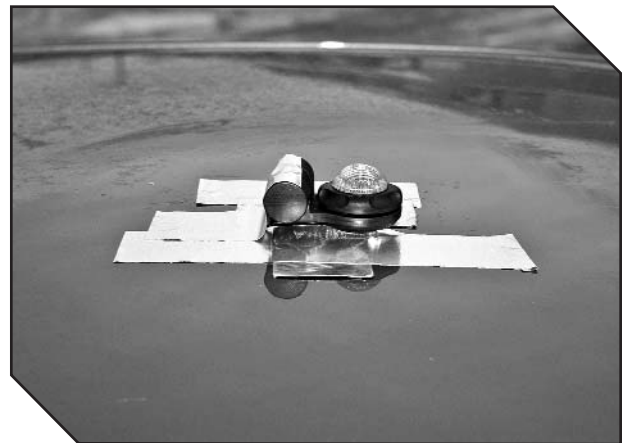
There is currently a limited understanding of night vision goggle (NVG) use in law enforcement environments. To address this issue, the Institute of Aerospace Research, the Flight Research Laboratory (FRL) of the National Research Council Canada (NRC), led a test-flight-based needs analysis designed to evaluate the utility and limitations of NVG-aided flight

versus unaided flight (both day and night) in the context of border enforcement.

The project was entitled “Assessing Image Intensifier Integration in Security and Emergency Response.” This work involved a broad collaborative team with membership consisting of FRL, the CPRC, York University, the RCMP, Transport Canada, the Ontario Ministry of Natural Resources, and Adventure Lighting (a manufacturer of tactical NVG lighting). The work was supported by NRC and by an Ontario Centres of Excellence Centre for Earth and Environmental Technologies security grant to Dr. Robert Allison of York University.

Project members conducted flight trials at NRC at the end of February 2006 and examined three scenarios: tracking a target, searching for a target, and approaching and identifying a target. The results are currently under preparation.

These preliminary flight trials, however, have already provided initial lessons and data to help support further development of a tactical airborne lighting system by Adventure Lights. FRL and the CPRC will continue to support development of a custom-tailored tactical NVG lighting system for the RCMP and related Canadian law enforcement agencies. FRL and the CPRC hope to expand their efforts with increased funding in this area.



Dave Scott, CPRC

*An infrared beacon attached to the roof of a patrol car was used in tracking exercises for NVGs*



## Neck Restraints

*Active—Category A*

### Project Managers

**John Evans**, CPRC  
(780) 554-2329

**Chris Butler**, Calgary Police Service

Some police agencies have re-adopted the use of neck restraints in response to an increase in the number of subjects that officers encounter who do not respond to any type of pain compliance, where close-quarter combat situations prevent the use of a CED (a conducted energy device, such as a Taser). Therefore, a review has been undertaken of the existing research literature to determine the impact of using this type of restraint on safety, training, and policy.

## Police Mental Readiness and Performance Excellence Study

*Concluded—Category B*

### Project Managers

**Julie Graham**, CPRC  
(613) 949-4173

**Judy McDonald**, University of Ottawa  
(613) 562-5800

The objective of the study was to investigate how a front-line uniformed officer best performs in seven challenging operational situations. It examined the high level of mental readiness required of officers who perform to a superior standard on a daily basis. The aim was to recognize officer contributions, retain corporate memory, and create practical mentoring benchmarks.

The resulting report of best operational practices from a front-line perspective has been published by the University of Ottawa. See also the Partnership Case Study on page 32.

## Police Response to Excited Delirium

*Concluded—Category A*

### Project Manager

**Chris Lawrence**, CPRC Guest Worker

### Report

TR-06-2006 "Police Response to Excited Delirium"

In this project, which formed part of a graduate thesis, the researcher reviewed coroners' reports on 31 deaths between 1988 and 2004 that were linked to excited delirium. The resulting study identifies knowledge gaps and proposes solutions for police services responding to individuals demonstrating excited delirium behaviour. The recommendations of this study have already been implemented by several police services in North America.

## Pursuit Management

*Active—Category A*

### Project Manager

**Sheldon Dickie**, CPRC  
(613) 949-4174

Preliminary work is under way to ascertain if there is a way to remotely manipulate the performance of electronically controlled motors. The purpose of this work is to determine the most effective way to reduce the number of high-speed pursuits involving police. This project is still in the initial feasibility assessment stage, pending assignment of additional resources.

## Radio Interoperability Demonstration

Completed—Category B

### Project Manager

**Brian Thiessen**, CPRC  
(604) 528-5817

### Report

TM-01-2006 “Radio Interoperability  
Equipment Evaluation”

Emergency responders often experience difficulty in communicating with those in other agencies. This problem has been encountered in a wide range of emergency efforts, from the Vancouver Stanley Cup riots of 1994 to the Katrina hurricane of 2005. The same problem also effects day-to-day operations, including police pursuits into other jurisdictions, crash scenes with paramedics and fire and rescue in attendance, search and rescue with the assistance of volunteer groups, and cross-jurisdictional police investigations.

One response tried in some jurisdictions has been to establish centralized communications networks that all agencies belong to. However, the potential participants are autonomous cities, municipalities, and agencies, each with its own issues. Often the result has been that some organizations do not join the centralized agency, and the problem remains.

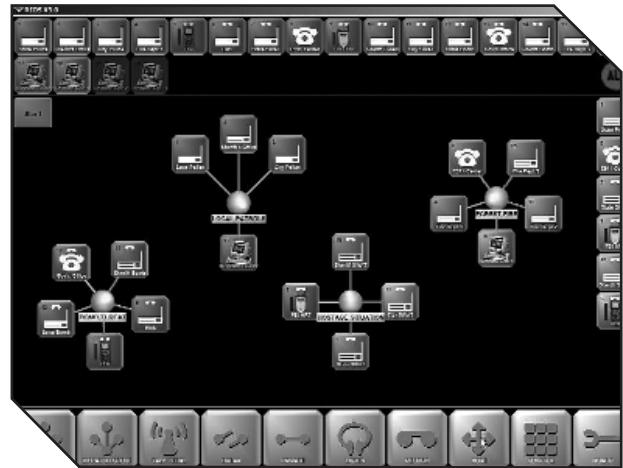
In search of a better solution, BC Technology Partner Associates asked the CPRC to locate and demonstrate inexpensive radio interoperability systems that could be used with the existing technologies of all agencies.

Two such systems were demonstrated in this project: the Radio Inter Operability System (RIOS) from SyTech and the InfiniMUX G4 by Infinimode Systems.



SyTech's portable Radio Inter Operability System (RIOS)

Brian Thiessen, CPRC



Screen shot from portable RIOS. Interoperability of communications systems is important for first responders in an emergency

SyTech

## Remote Detection of Outdoor Cannabis Sativa through Satellite Imagery

Active—Category B

### Project Manager

**Brian Thiessen**, CPRC  
(604) 528-5817

There is little doubt that the cultivation and trafficking of marijuana is exploding in this country. According to an RCMP report on the state of drug enforcement in Canada, an average of 1.1 million plants were seized annually over the past five years—a six-fold increase from 1993. Pot seizures by U.S. customs officials at the Canadian border also surged by a factor of seven between 2000 and 2003. Outdoor marijuana growing operations are a significant part of the problem.

The use of spectrometry and image data taken from the air or by satellites to monitor the growth of illicit crops such as marijuana, opium, and coca has proven to be highly useful for the U.N. Office on Drugs and Crime and the U.S. Drug Enforcement Agency.

This project will generate a retrospective assessment for one or two regions within Canada to determine whether this technology might be useful in this country to locate clandestine outdoor grow-ops of cannabis sativa.

## SUCCESS STORY

### Canadian Police Knowledge Network (CPKN)

The Canadian Police Knowledge Network (CPKN) is a collaborative network established to identify the needs for and coordinate the development of e-learning products for the Canadian police community. Police organizations provide the content and CPKN provides the resources and expertise, through the Justice Knowledge Network, to develop and deliver the material online.

To date, CPKN has built e-learning courses with the RCMP, the Winnipeg Police Service, the Cape Breton Regional Police Service, the Edmonton Police Service, the Atlantic Police Academy, and the Ontario Police College. CPKN also has agreements with third-party private sector organizations to deliver their training through the CPKN portal.

CPKN currently offers the following products:

- Basic Investigation Skills
- CBRN First Responder
- Domestic Violence Investigations
- Electronic Crime Scene Investigation
- Emergency First Aid/CPR training for Police Officers (Active Canadian)
- Ethics, Values, and Principles (Magna Carta)
- Investigative Communications
- Managing Workplace Harassment (Hicks Morley)
- Missing Child First Responder
- National Sex Offender Registry
- Methamphetamine Lab First Responder
- Collision Investigation Level II
- Hate and Bias Crime
- Niche Records Management System
- Search and Seizure: Warrantless Authorities

CANADIAN  
POLICE  
KNOWLEDGE  
NETWORK



RÉSEAU  
CANADIEN DU  
SAVOIR  
POLICIER

The following courses are currently in development:

- BAC DataMaster C/Intoxilyzer
- Advanced Patrol Training
- General Investigations Training
- Suspect Apprehension Pursuits
- St. John Ambulance First Aid
- Search and Seizure
- Use of Force (Baton, Pepper Spray, Firearms, Excited Delirium)
- Gang Dynamics

There are also more than 30 job aids and e-working tools available.

CPKN continues to look for new courses to develop.

To learn more about CPKN's innovative products or about how your organization could collaborate with CPKN as a content provider, visit [www.cpkn.ca](http://www.cpkn.ca).

SUCCESS STORY

**Safety of Conductive Energy Devices (CED)**

In August 2005 CPRC presented the report from its review of the safety of conductive energy devices (CEDs), such as Tasers, to the Canadian Association of Chiefs of Police (CACPP). It concluded that “definitive research or evidence does not exist that implicates a causal relationship between the use of a CED and death. On the other side of the coin, evidence to the advantages to society in making the CED available to our law enforcement officers is clear. Since the introduction of the CED there have been fewer injuries to officers and perpetrators.”

Since its publication, over 50 000 copies of this report and associated documentation have been downloaded from the CPRC website. Several U.S. States and European countries have adopted a modified protocol for the use of force and CEDs based on the findings put forth in the CPRC study.

To complement this work, the CPRC plans to establish of a national CED test facility to ensure that testing on this equipment can be performed objectively and accurately here in Canada.



Harry Turner, NRC

*A Taser conductive energy device (CED)*

An added outcome of the CED review was the identification of another common factor in the alleged CED related deaths, a condition known as excited delirium. This medical condition may be linked to some psychiatric illnesses and may be triggered by the use of illicit drugs and forcible restraint.

As a result, the CPRC is spearheading a national epidemiological study on the subject of excited delirium. The primary objective of the study is to identify and achieve a better understanding of the possible predictive factors and/or characteristics suggestive to excited delirium. Situational factors, personal characteristics, and methods of restraint will also be evaluated to better understand what triggers excited delirium in one individual and not in another in the same scenario.



CPRC

*The CED evaluation team*

## Strobe Flashlight

*Active—Category A*

### Project Manager

**John Evans**, CPRC  
(780) 554-2329

New technologies in flashlights include an option for a high-intensity strobe light effect that can be used to momentarily disorient aggressive individuals. Trials of such flashlights are being undertaken to examine their practicality and effectiveness. The Edmonton Police Service, Officer Safety Unit, is assisting with this project.

## Technology Gap Analysis

*Concluded—Category B*

### Project Managers

**Steve Palmer**, CPRC  
(613) 993-3996

**Karen Branston**, Rencon Consulting

### Report

TR-02-2006R (Restricted) "Technology and Policing: A Technology Gap Analysis"

The impact of technological change on policing during the past 25 years has been enormous. The introduction of computers has revolutionized the collection, storage, and retrieval of data, and the continuing evolution of digital technology is affecting almost every aspect of law enforcement and the administration of justice.

To gauge how police services are responding to technological change, the CPRC conducted a survey of police services in Canada to assess the gaps between their needs and their technical capabilities, with particular reference to future trends.

This survey covered municipal, provincial, and federal police forces, both large and small, across Canada. It was conducted in part through interviews with senior representatives of police services, public safety agencies, and industry, and in part through a questionnaire (which can be accessed on the CPRC website).

Of the 49 technology areas identified by participants, 92 percent had significant technology gaps, nearly 50 percent had severe gaps, and 2 percent had critical gaps. The CPRC is using the results of this survey to define and select future projects.

## ViCLAS Reliability and Validity Study

*Active—Category B*

### Project Managers

**Julie Graham**, CPRC  
(613) 949-4173

**Melissa Martineau**, RCMP,  
Behavioural Sciences Branch  
(613) 993-8673

The Behavioural Sciences branches of the RCMP and the Ontario Provincial Police are collaborating to conduct this study, which involves a review of the case information recorded by field officers in their ViCLAS booklets. The study has two main goals: first, to assess the how accurate these notes are (their validity), and second, to discover how consistent the recorded information is across field officers (its reliability).

The study is scheduled to be completed in the fall of 2006 and a report will be made available at that time.

## Voice Enabled Patrol Car Evaluation

*Active—Category B*

### Project Manager

**John Evans**, CPRC  
(780) 554-2329

This is a pilot project to evaluate technology that would equip patrol cars with voice command systems. Such systems would allow patrol officers, while driving, to control the emergency equipment of their cars and execute computer queries with voice commands. This would help avoid the dangerous distraction of taking their eyes off of the road or a suspect, or their hands off the steering wheel.

## TECHNICAL REPORTS AND MEMORANDA

The list below shows all of the technical reports and memoranda that the CPRC has published in the past two years. These documents are available on the CPRC website at [www.cprc.org](http://www.cprc.org), as is a list of earlier reports and memoranda.

Technical reports (which have codes that begin with TR) are long reports that include detailed scientific and technical information. Technical memoranda (which have codes that begin with TM) are shorter summary reports that contain important information but only limited scientific or technical detail.

Some reports (those with codes that end with R) are restricted due to their sensitive content. Please contact the CPRC at [cprc@cprc.org](mailto:cprc@cprc.org) or (613) 949-4173 to request copies of a restricted document.

### 2006

TR/TM	Language	Title
TR-01-2006	English	Review of Conducted Energy Devices
TR-01-2006	French	Étude sur les dispositifs à impulsions
TR-02-2006 R	English	Technology and Policing: A Technology Gap Analysis
TR-02-2006 R	French	La technologie et l'application de la loi: Analyse des lacunes technologiques
TR-03-2006 R	English	Explosives Capability Analysis
TR-04-2006 R	English	Canadian Forensic Capability Inventory and Gap Analysis
TR-05-2006	English	A Needs Analysis of Canada's First Responder Vendor Community
TR-06-2006	English	Police Response to Excited Delirium
TR-07-2006	English	The Effects of Decomposition on Gunshot Wound Characteristics
TR-08-2006	English	Distribution of Heteroplasmy in Mitochondrial DNA from Skeletal Remains
TM-01-2006	English	Radio Interoperability Equipment Evaluation
TM-02-2006	English	Explosives Practices: Lessons Learned
TM-03-2006	English	Technology Evaluation: Shockknife
TM-04-2006	English	Technology Evaluation: Nuclear Defender

### 2005

TR/TM	Language	Title
TR-01-2005	English	The Effectiveness of Use of Force Simulation Training
TR-02-2005	English	Excited Delirium and its Correlation to Sudden and Unexpected Death Proximal to Restraint
TR-03-2005	English	The Results from a Canadian National Field Trial Comparing 1,8-Diazafluoren-9-one (DFO) with Ninhydrin and the Sequence DFO Followed by Ninhydrin
TR-03-2005	French	Résultats d'essais sur le terrain à l'échelle du Canada visant à comparer la 1,8-diazafluorén-9-one (DFO), la ninhydrine et la séquence DFO suivie de la ninhydrine
TR-04-2005	English	Developmental Rate of <i>Protophormia terraenovae</i> (R-D) Raised Under Constant and Fluctuating Temperatures, for Use Determining Time Since Death in Natural Outdoor Conditions, in the Early Post Mortem Interval
TR-05-2005	English	Warning Shot Target Ballistic Test Evaluation
TR-06-2005	English	Decomposition and Arthropod Succession on Above Ground Pig Carrion in Rural Manitoba
TM-01-2005	English	CPRC Survey of Canadian Police Services on OC Spray Experience
TM-02-2005	English	Pedestrian Crash Test Dummy

SUCCESS STORY

**The Chameleon RS3P**

The Chameleon RS3P (Removable Surveillance Suite Support Package) is a modular system of police equipment for covert surveillance operations. It can be deployed rapidly, allowing officers to move quickly and easily between observation platforms without compromising the safety of the equipment or themselves.

The initial phase of this project, during the winter and spring of 2000–2001, involved developing detailed requirements and performance specifications.

Then, in June 2002, the CPRC entered into an agreement with two Canadian firms—Davtair and Vernac—to develop a prototype of the Chameleon RS3P. The goal of the program was to complete the detailed design needed to fabricate three prototype units: two to be tested by participating police services and one to be evaluated in service by CSIS (Criminal Intelligence Service Canada).

The detailed design work was completed by July 2002, and a single prototype was created and evaluated in-house. Surveillance professionals at two external venues—the Ontario Technical Investigators Association conference and the Western Canadian Technical Conference—also provided comments. The project team then fabricated the three prototypes and delivered them to the requesting police services, where they have been in service since November 2002.

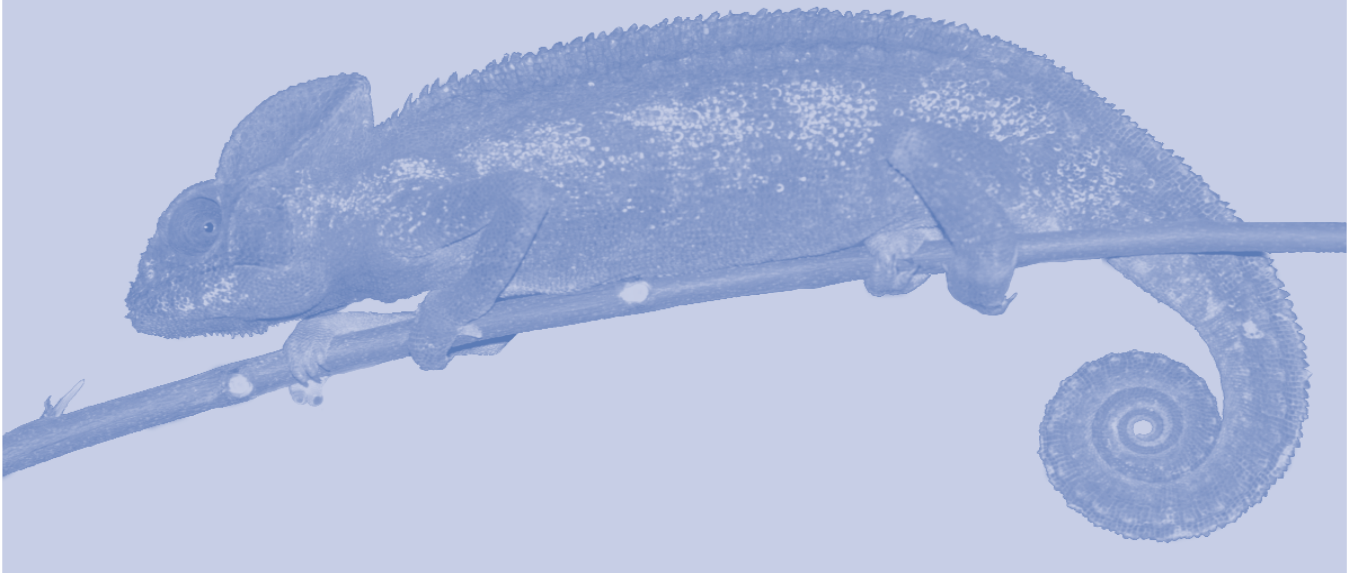


*Officials from Vernac and CPRC sign the Chameleon RS3P licensing agreement*

CPRC

The response from the police and security services using the Chameleon has been enthusiastic, and their user feedback has been invaluable in preparing for final production of a commercial product.

A technology licensing agreement for commercialization was signed by Vernac and the CPRC in Ottawa in March 2005.



## SUBMITTING R&D PROPOSALS

The CPRC welcomes proposals for research and development projects. An application form is available at [www.cprc.ca](http://www.cprc.ca).

When completing a research application, please note the following:

- You must indicate whether the project is in category A, B, or C (see below).
- Multiple projects may not be submitted on a single form. A separate proposal must be submitted for each project.
- Proposals should be as complete as possible, with all necessary documentation attached.
- An executive officer (Chief of Police, Commanding Officer, or equivalent) must sign the form.

### How are projects approved?

The focus of the CPRC is research, development, and evaluation of equipment for police and other first responders.

Each project proposal will be reviewed by CPRC Technology Partner Associates and by a panel of experts. Project proposals receive a priority ranking based on the following criteria:

- **Risk factor:** frequency of potential use or occurrence
- **Operational impact:** how widespread is the need in the community?
- **Dollar implications:** resource savings potential/dollar cost
- **Progress/innovation:** operational effectiveness and innovation
- **Attainability:** technical risks and costs (adapt or create?)
- **Partnerships:** potential for risk and cost sharing, degree of commercial viability

## Project Categories

**Category A:** Health and safety—protecting the police in hazardous situations

**Category B:** Operational effectiveness—fighting crime and gathering information, intelligence, and evidence

**Category C:** Protecting the public—traffic, custody, and crime prevention

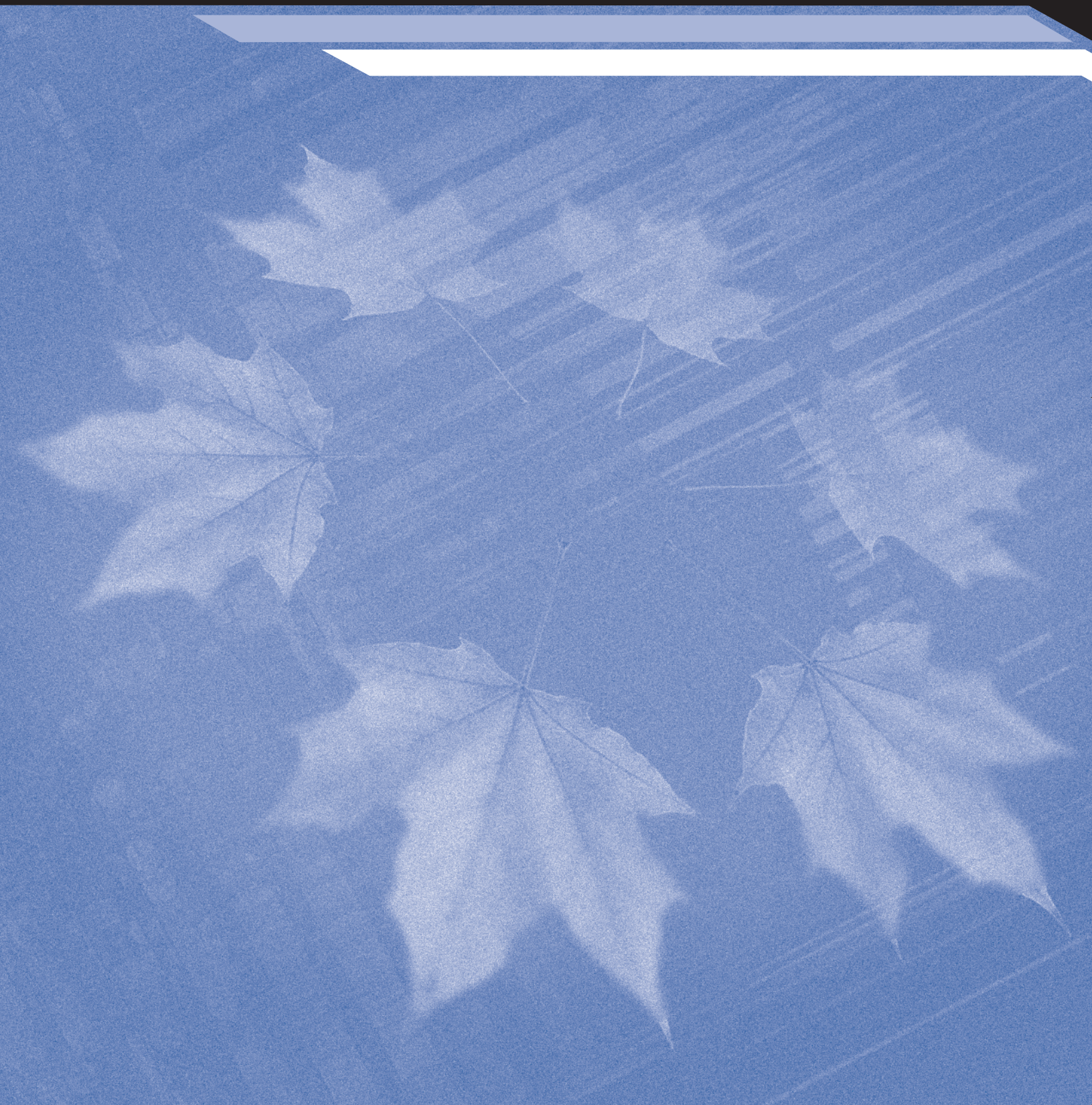
Please submit completed project proposals to

Canadian Police Research Centre  
National Research Council Canada  
Building M-55, 1200 Montreal Road  
Ottawa, ON K1A 0R6  
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# L I N K S   A N D   L E V E R A G E S



## INTERACTION WITH OTHERS

The CPRC mandate of developing equipment for the Canadian police community naturally involves interaction with others. Some of the many agencies that the CPRC has worked with over the past year are listed below.

### **Association paritaire pour la santé et la sécurité au travail (APSAM) Secteur Affaires municipales**

[www.apsam.com](http://www.apsam.com)

This association aims to facilitate injury prevention in the workplace and to ensure that the health, safety, and physical integrity of municipal workers (including police officers, firefighters, and others) across the province of Quebec is adequately protected. APSAM's role is to provide both employers and employees with customized and accessible state-of-the-art tools in the areas of training, information dissemination, advice, technical assistance, and R&D. The CPRC regularly works with APSAM to share and communicate priorities and research.

### **Canadian Advanced Technology Alliance (CATA)**

[www.cata.ca](http://www.cata.ca)

One of Canada's most influential and entrepreneurial technology alliances, CATA has the mission of stimulating global business growth through Canadian innovation and strategic partnership. It focuses on various elements of advanced security, including physical, procedural, and technological security. The CPRC and CATA work together to form closer links between the police community and related industries.

### **Canadian Journal of Police and Security Services**

[www.uregina.ca/policejournal](http://www.uregina.ca/policejournal)

Published by the University of Regina, the *Canadian Journal of Police and Security Services* offers its readers current research, theories, and commentary on policing and security issues in Canada and abroad. The Journal emphasizes reports of original empirical research, theoretical contributions, the development and testing of innovative programs and practices, and critical reviews of literature or theory. The CPRC is a regular contributor to the Journal.

## WORKING TOGETHER

### **École nationale de police du Québec (ENPQ)**

The École nationale de police du Québec was established on September 1, 2000, replacing the Institut de police du Québec.

The school is a combination think tank and integrated police training centre; it forms part of a training continuum and enjoys the participation of a large network of partners. Its collaboration with other institutes, its competency-based approach to programs, its virtual learning strategy, and the involvement of multidisciplinary teams, as well as the content and format of the training provided, have gained for ENPQ the reputation of being one of the best basic police training schools in the world.

### **École nationale de police**

Québec 

In March 2006, the CPRC signed an agreement with ENPQ to work together on cooperative activities. Early projects have included establishing a network with all 36 police organizations in Quebec to assist in identifying new technologies and establishing performance requirements.

## WORKING TOGETHER

### Mock Disaster Exercise

On April 7, 2005, Toronto's Heavy Urban Search and Rescue (HUSAR) team invited CPRC to observe their "response" to a mock disaster at the Firefighters' Training Site on Bermondsey Road. The premise of the exercise was that a part of the building had collapsed during a photo shoot and a number of people were trapped. Nearby Centennial College served as a mock hospital.

This event provided an important opportunity for testing various wireless technologies for enhancing first responders' situational awareness and improving their safety conditions. During a rescue, emergency team members normally communicate with each other using two-way radios and cell phones. However, these communications systems often fail as the frequencies are overwhelmed by local traffic.

At the mock disaster exercise, the Anvil RECoN network provided a secondary communication layer: live video and data communications using standard PDAs, laptops, and tablets, both locally and, via the Internet, to the outside world. For example, real-time video feeds from the Bermondsey Road "disaster site" and from the "hospital" were broadcast locally and webcast to communicate what was happening at the various critical points.



Dave Scott, CPRC

*First responders participate in a mock disaster exercise in Toronto*

Team members also tested these other technologies:

- Wi-fi ID tags tracked major assets (such as power generators and diagnostic equipment) on the incident website.
- As each "casualty" was moved, an admittance officer recorded basic data about the patient onto a wireless tablet. The data was immediately transmitted both to an RFID wristband worn by the casualty and to a patient management system. This application made it easier for responders to process casualties quickly, while allowing additional data to be added to the system later and ensuring that all the information stayed with the correct patient.
- Ambulance vehicles were tracked using a global positioning system (GPS) while in transit from the incident site to the mock hospital.



Dave Scott, CPRC

*Exercises offer first responders important opportunities to test new technologies, such as this real-time video feed*

Team members concluded that the technology tested played a critical part in managing the emergency. Its benefits included a higher survival rate among casualties, faster decision making, enormous time savings, and a reduction in the impact of the disaster on property and infrastructure.

## **Federal Partners in Technology Transfer (FPTT)**

[www.fptt-pftt.gc.ca](http://www.fptt-pftt.gc.ca)

This initiative brings together the various federal science-based departments and agencies involved in technology transfer. In addition to providing a forum for discussions on best practices, this organization provides excellent networking and learning opportunities. The CPRC participates in this organization through association with the Industrial Research Assistance Program (IRAP) of the National Research Council Canada (NRC).

## **Home Office Scientific Development Branch (HOSDB), United Kingdom**

[www.homeoffice.gov.uk](http://www.homeoffice.gov.uk)

The CPRC has a long association with HOSDB in the United Kingdom. The two organizations regularly share research and information on the development, evaluation, and operational use of law enforcement technologies.

## **Justice Institute of British Columbia (JIBC)**

[www.jibc.bc.ca](http://www.jibc.bc.ca)

JIBC provides continuing education for people working in the areas of justice, public safety, and human services. A formal partnership with JIBC allows the CPRC to better serve both law enforcement and industry in British Columbia.

## **National Institute of Standards and Technology (NIST)**

[www.nist.gov](http://www.nist.gov)

A non-regulatory agency of the U.S. Department of Commerce, NIST seeks to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and enhance quality of life. The CPRC maintains contact with the NIST Office of Law Enforcement Standards in order to pursue topics of mutual interest.

## **National Law Enforcement and Corrections Technology Center (NLECTC)—National Institute of Justice, U.S. Department of Justice**

[www.opk.usdoj.gov/nij](http://www.opk.usdoj.gov/nij)

The CPRC enjoys a close working relationship with NLECTC, a National Institute of Justice agency. The two agencies share information and collaborate on various projects concerning the research, development, evaluation, and operational use of law enforcement technologies.

The CPRC also forwards a weekly news summary from NLECTC to all CPRC Board members, Technology Partner Associates, and other interested law enforcement colleagues.

## **Northern Alberta Police Technology Innovation Council (NAPTIC)**

The purpose of NAPTIC is to bridge communication, understanding, and partnership gaps among police, industry, academia, and government agencies at a regional level. Greater interaction and knowledge sharing has helped to address challenges faced by the police community, including accelerating the development of practical applications of technical innovations.

## **Ontario Association of Law Enforcement Planners (OALEP)**

[www.opconline.ca/conf/OALEP](http://www.opconline.ca/conf/OALEP)

An associate member of OALEP, the CPRC contributes experience and expertise on the application of technology in law enforcement. This organization is also an excellent forum for the discussion of new ideas of current interest in the police community.

## **The Society for the Policing of Cyberspace (POLCYB)**

[www.polcyb.org](http://www.polcyb.org)

POLCYB is dedicated to preventing and combating crime in cyberspace. Its international network includes executives, administrators, and front-line professionals who work at all levels in the areas of law enforcement,

## WORKING TOGETHER

### International Activities

The mission of the CPRC is to provide leadership and focus for science and technology in policing and public safety across Canada. The key to achieving this so far has been to form strategic partnerships with the business sector in order to commercialize ideas. The small size of the Canadian market, however, puts limits on innovation. For this reason, CPRC maintains an active international network and participates in international workshops and committees.

For example, during the last year, CPRC

- participated in the National Institute of Justice Police Executive Research Forum and in workshops on Less Lethal Technology with the International Association of Chiefs of Police and the Ohio Police Associations **(United States)**
- presented to the Janes Defence Conference on Less Lethal Technology **(United Kingdom)**
- provided the keynote speaker for the Department of International Trade's Canadian Security Technology Mission to seven countries, which featured the technologies of Canadian Companies **(Europe)**
- participated in the Society for the Policing of Cyberspace (POLCYB) annual conference, and co-hosted technology



*The CPRC and Canadian business representatives participated in the European Security Technology Mission*

missions with Canadian firms and the Industrial Research Assistance Program of the National Research Council **(China)**

In addition, several international collaborators came to Canada and met with CPRC representatives.

criminal justice, corporate security, and academic institutions around the world. The CPRC is an active member of POLCYB, especially in the areas of cyber-crime prevention, information protection, and Internet safety for children and youth.

### U.S. Technical Support Working Group (TSWG)

[www.tswg.gov](http://www.tswg.gov)

This national forum in the United States identifies, prioritizes, and coordinates inter-agency and international research and development requirements for combatting terrorism. CPRC personnel take part in TSWG meetings and encourage Canadian participation in international projects.

### University of Alberta

[www.ualberta.ca](http://www.ualberta.ca)

The University of Alberta is widely recognized as a leader in research and development. Of particular note are the Computer Science department's world-class programs in data mining and machine learning, and the newly established and highly promising National Institute of Nanotechnology. CPRC and the University's Industrial Liaison Office see a natural fit between the two institutions and are working together to establish joint projects and other channels for cooperation.

## PARTNERSHIP CASE STUDY

### Gold Medal Policing: Mental Readiness and Performance Excellence

The Police Mental Readiness and Performance Excellence project, designed to study the performance characteristics of the best patrol-based first response police officers, began in earnest in 2002 after some tentative earlier steps, and concluded with the launch of the report on June 26, 2006.

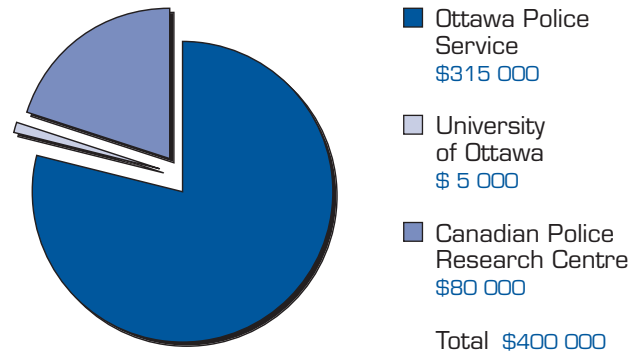
The Police Mental Readiness Project was a three-and-a-half-year formal research study funded jointly by the Ottawa Police Service, the University of Ottawa, and CPRC. This unique consortium leveraged significant in-kind support to ensure that the costs associated with the project were well below standard expenses for a study of this scope.

For example, the University of Ottawa did not impose the normal 65 percent overhead fees in relation to the research because of how highly it values the community-based collaboration with the City of Ottawa and the Ottawa Police Service. The resulting savings, combined with grant access, resulted in significantly lower research costs (\$400 000) than standard levels of funding for similar studies (\$1 million to \$2 million).

When the University of Ottawa published the final report, it received rave reviews from across the law enforcement and first responder communities. For more details, please see the project description on page 19 and the Success Story opposite.

## PROJECT PARTNER CONTRIBUTIONS

September 2002—December 2005



*A project of this size is often out of the range of a single organization. By bringing together several organizations to share resources, the CPRC is able to give life to innovative research that might not otherwise be possible.*

SUCCESS STORY

**Gold Medal Policing: Launch of Mental Readiness and Performance Excellence Study**

The CPRC is proud to have collaborated on this groundbreaking study, which identifies and confirms the importance of mental readiness and related elements for performance excellence in front-line policing.

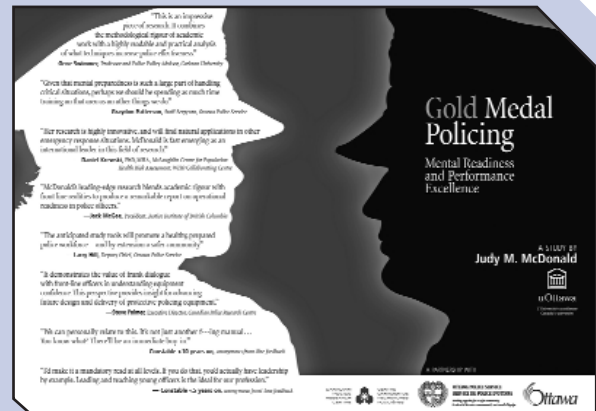
The three-year study, conducted by University of Ottawa Faculty of Health Sciences professor Judy MacDonald, identifies how exceptional front-line police officers, like most emergency responders who are accountable for public safety, perform in challenging situations, achieve consistency in their actions, are ready on demand, manage distractions, remain focused, and are able to develop effective coping strategies. It was launched on June 26, 2006, to considerable acclaim from the police community.

Modeled on similar research involving world-class athletes and other high-performance professionals such as medical surgeons, this study was based on candid, in-depth interviews conducted with front-line police officers.

The study identified 69 police-specific skills that contribute to an individual officer's success. These skills were grouped into three categories: core, enhanced, and elective performance skills.

The study also identified 48 major blocks that interfere with optimal police performance, and their potential sources. These blocks were categorized as immediate needs, serious blocks, and individual blocks, and further classified as to their sources, which could be inherent, organizational, or externally based.

Identifying specific characteristics and skills that experienced police officers develop over time is an important step



*The CPRC's Mental Readiness and Performance Excellence Study investigated what makes a top police officer*

towards providing less-experienced officers with valuable tools that they can use to enhance their own performance.

Study author Judy McDonald, who has been a part-time professor at the University of Ottawa for 15 years, commented, "I am privileged that these front-line officers shared candid, intimate details and allowed me to investigate this human side of policing, which will influence future mentoring and decision making".

This first-of-a-kind police research also served to raise the profile of first response police officers, both within the Ottawa Police Service and elsewhere.

The research was made possible through the partnership and commitment of the University of Ottawa, the Ottawa Police Service, and the City of Ottawa, as well as of substantive project contributors including the CPRC and the University of Ottawa's Institute of Population Health.

Ottawa University

## TECHNOLOGY PARTNER ASSOCIATE PROGRAM

Technologies encouraged and supported by the CPRC help to reduce injuries and fatalities among front-line officers, play a crucial role in criminal investigations, promote public safety, and assist in crime prevention.

The CPRC Technology Partner Associate (TPA) Program provides a virtual cross-country network that supports the CPRC in the development and diffusion of law enforcement technologies.

Each year the CPRC receives many proposals for new products, technologies, and ideas that might benefit the law enforcement community. Many proposals received by the CPRC are initially forwarded to an appropriate member of the TPA network, who is asked to comment on its potential value to police operations.

The TPA program also helps to disseminate technical information, to provide updates on new products, procedures, and research developments, and to facilitate information sharing among member agencies.

Currently, there are approximately 75 members in the TPA Program. The CPRC plans to strengthen the TPA network in the coming year by recruiting more members from the first responder community.

To learn more about the program, or about becoming a CPRC Technology Partner Associate, please contact the CPRC at [cprc@cprc.org](mailto:cprc@cprc.org) or (613) 949-4173.

### Technology Partner Associates

Police Service or Agency	TPA Contact	Telephone	Extension
Abbotsford	Insp. Rod. Gehl	604-864-4816	
Atlantic Police College	Insp. John Harris	902-888-6714	
Barrie	Ms. Barb Howse	705-725-7025	X 2214
Belleville	S/Sgt. Tony MacKinnon	613-966-0882	X 2223
Brandon	Chief F. Richard Bruce	204-729-2305	
Brantford	Deputy Chief Derek McElveny	519-756-7050	
Brockville	Chief Barry King	613-342-0127	X 4222
Calgary	Ms. Lana Hohn-Martens	403-206-8427	
Camrose	Insp. Darrel Kambeitz	780-672-5940	
Canada Border Services Agency (CBSA)	Mr. Pierre Pilon	613-954-4112	
Canadian Pacific Railway (CPR)	Supt. Rod Manson	403-319-7005	
Central Saanich	Deputy Chief Clayton Pecknold	250-652-4441	
Combined Forces Special Enforcement Unit	S/Sgt Brian Pellegrin	604-777-7899	
Defence Research and Development Canada	Mr. Phil Twardawa	418-844-4000	X 4292
Delta	Mrs. Pat Hart	604-940-5002	
Department of National Defence (DND)	Major Denis Egglefield	613-945-7279	
Durham Region	Supt. Greg Mills	905-579-1520	X 4302
École nationale de police du Québec	M. Pierre Brassard	819-293-8631	X 6298
École nationale de police du Québec	M. Ghislain Raymond	819-293-8631	X 6384
Edmonton	S/Sgt. Tony Harder	780-421-2375	
Fredericton	Mrs. Michele Cronin	506-460-2412	
Gatineau	Mr. Dany Montmigny	819-243-2345	X 6090
Halifax	Sgt. Gary Smith	902-490-4508	
Halton Regional	Mr. Keith Moore	905-825-4830	
Hamilton	Sgt. Alison Hood	905-546-3870	



Kingston	Deputy Chief Robert Napier	613-549-4660	X 6098
Lévis	M. Deny Blouin	418-835-8256	
London	Sgt. Scott Blandford	519-661-2583	
Medicine Hat	Insp. Gord Earl	403-529-8413	
Miramichi	Sgt. Robert Bruce	506-623-2124	
Montréal	M. Alain Tonthat	514-280-6922	
New Westminster	Chief Constable Lorne Zapotichny	604-529-2401	
Niagara Regional	Detective Constable Craig Moore	905-688-4111	X 4222
Ontario Provincial Police (OPP)	Deputy Commissioner John Carson	705-329-7624	
Ottawa	Sgt. Gerry Doucette	613-236-1222	X 5556
Peel Regional	Insp. Michael Grodzinski	905-453-3311	X 4740
Port Moody	Insp. Chris Rattenbury	604-461-3456	
Public Safety and Security - Ontario	Ms. Noreen Alleyne	416-314-3015	
RCMP "D" Division	S/Sgt. Bruce Prange	204-983-0790	
RCMP "E" Division – Burnaby	Insp. Hilton Smee	604-294-7666	
RCMP "E" Division – Coquitlam	Cpl. Victor Steinhammer	604-945-1550	
RCMP "E" Division – North Vancouver	Cpl. Sue Tupper	604-985-1311	
RCMP "F" Division	S/Sgt. Ian Currie	306-446-1625	
RCMP "G" and "HQ" Divisions	Insp. Paul Richards	613-993-8359	
RCMP "H" Division	S/Sgt. Tony McCulloch	902-426-0927	
RCMP "HQ" and "A" Divisions	Sgt. Carl McDiarmid	613-993-1193	
RCMP "J" Division	Sgt. Michel Fournier	506-452-3474	
RCMP "K" Division	S/Sgt. Peter Haring	780-495-3118	
RCMP "M" Division	Sgt. Randy Fraser	867-633-8629	
RCMP "O" Division	Cst. Dan Aubin	416-743-7922	X 221
RCMP Technical Operations	Supt. Tom Pownall	613-998-6066	
Regina	Mr. Ron Davis	306-777-6615	
Royal Newfoundland Constabulary	Chief Richard Deering	709-729-8151	
Saanich	Cst. Marc Chateau	250-475-4324	
Sannich	Insp. Sherry Dwyer	250-475-4364	
Saint John	Mr. Brian Malone	506-648-3208	
Sarnia	Sgt. Frank Rodin	519-344-6001	
Saskatoon	A/Deputy Chief Bernie Pannell	306-975-8250	
Sault Ste. Marie	Insp. Art Pluss	705-949-6300	
Solicitor General of Canada	Mr. J. P. Labonte	613-842-1849	
Greater Sudbury	Ms. Liz Mazza	705-675-9171	X 2630
Summerside	Chief Ian Drummond	902-432-1201	
Sûreté du Québec (SQ)	D/DG Normand Proulx	514-598-4411	
Taber	Chief Terry Dreddy	403-223-8991	
Thunder Bay	Mr. Peter Worrell	807-625-1307	
Toronto	Ms. Kristina Kijewski	416-808-7771	
Vancouver	Insp. Kevin McQuiggin	604-717-2618	
Victoria	Cst. Mike Yeager	250-995-7306	
Waterloo Regional	Supt. Matt Torigian	519-650-8544	
Windsor	Mr. Barry Horrobin	519-255-6700	X 4471
Winnipeg	Mr. Grant Martin	204-986-4565	
York Regional	Supt. Rick Finn	905-830-0303	X 7900