CAUSE V – Capstone to the Five-Year Cross Border Experiment Series

January 18, 2018 1-2 pm ET
Agenda

• Introduction
• Overview of the NISC
• CAUSE V-Capstone to the Five-Year Cross Border Experiment Series
• Q&A
• Quiz for those seeking Continuing Education Units (CEUs)
Today’s Speakers

- **Sean McSpaden**, NISC Executive Director
- **Denis Gusty**, Program Manager, DHS S&T First Responders Group
- **Glen Weimer**, Portfolio Manager, Emergency Management Systems, DRDC CSS
- **Joseph Fournier**, Portfolio Manager, Wireless Technologies, DRDC CSS
- **Erik Endrulat**, Project Manager, G&H International Services, Inc.
- **Jeff Sopel**, Project Manager, G&H International Services, Inc.
Continuing Education Units (CEUs)

- CEUs will be awarded to participants that watch the webinar and complete the quiz following the webinar.
- 0.1 CEUs for this hour-long event.
Learning Objectives

• Understand the objectives of the Canada-U.S. Enhanced Resiliency Experiment (CAUSE) V.

• Understand the information sharing tools and technologies that were tested during the CAUSE V experiment.

If you have questions during the webinar, please submit using the question feature in GoToWebinar.
NISC Mission-Focused Job Aids Webinar Series

• In-depth discussion of tools, techniques, and standard operating procedures used for information sharing

• Webinar content applicable to multiple fields, including:
  • Homeland security,
  • Emergency management,
  • Public safety,
  • First responder, and
  • Healthcare preparedness.
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The NISC is a non-profit organization devoted to improving information sharing at all levels of government and for all homeland security, emergency management, first responder, healthcare, and public safety stakeholders.
NISC Members Span Multiple Domains & Disciplines

Communications
Critical Infrastructure
Emergency Management
EMS
Fire
GIS
Homeland Security
Information Technology
Law Enforcement
Military
Private Industry
Public Health
& More!

Public Sector – Private Sector – Non-profits
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CAUSE V Webinar - Agenda

• Introduction
  • CAUSE Experiment Series
  • CAUSE V Overview
  • Scenario & Tech Focus Areas
• CAUSE V Results and Lessons
  • Wireless Communications and Interoperability
  • Digital Volunteers Operations Support
  • Information Sharing and Situational Awareness
• What’s Next?
• Q&A
CAUSE is a joint effort between DHS Science & Technology (S&T) and the Defence Research and Development Canada’s Centre for Security Science (DRDC-CSS).

The focus: enhancing cross-border capabilities, including communications interoperability, shared situational awareness, mutual aid and information-sharing.
CAUSE Series
Objectives

• Connect, test and demonstrate emerging operational technologies
• Advance emergency management and responder situational awareness capabilities
• Demonstrate value of federal Science and Technology investments
• Demonstrate enhanced resilience through improved interoperable shared situational awareness and mutual aid during major events
• Enhance resilience in border region by leaving behind working operational interfaces, processes, training and exercises that will improve shared situational awareness
• Execute CAUSE V as catalyst to build trust relationships in support of the Beyond the Border Action Plan
The CAUSE Resilience Series

Previous Locations

- **CAUSE I**: British Columbia/Washington Earthquake Scenario
  - June 2011

- **CAUSE II**: New Brunswick/Maine Train Derailment/Industrial Accident Scenario
  - March 2013

- **CAUSE III**: East – Hurricane West- Wildland Fire Scenarios
  - Nov 2014

- **CAUSE IV**: Michigan/Ontario Tornado Scenario
  - April 2016

- **CAUSE V**: Washington/British Columbia Volcano Scenario
  - November 2017
CAUSE V Project Leads & Partners

Project Leads
- **U.S.:** U.S. Department of Homeland Security Science & Technology Directorate (DHS S&T)
- **Canada:** Defence Research and Development Canada Centre for Security Science (DRDC-CSS)

Partner Agencies
- **U.S.:** DHS Office of Emergency Communications (OEC), CANUS Communications Interoperability Working Group (CIWG), National Information Sharing Consortium (NISC), DHS Social Media Working Group (SMWG), Texas A&M University
- **Canada:** Public Safety Canada, Communications Research Center
CAUSE V Participants

- Abbotsford Fire Rescue Service
- Canada Border Services Agency
- E-Comm 911
- Emergency Management B.C.
- Fraser Valley Regional District
- Langley Emergency Program
- New Westminster Fire & Rescue Services
- Public Safety Canada
- Semiahmoo First Nation Emergency Preparedness Team
- Surrey RCMP
- City of Bellingham
- DHS Customs & Border Protection
- City of Lynden
- Pacific Northwest Virtual Operation Support Team
- Port of Bellingham Emergency Management & Security
- TAMU Center for Robot Assisted Search & Rescue - Roboticists Without Borders
- Seattle City Light
- State of Washington Division of Natural Resources
- USGS; Cascade Volcano Laboratory
- Washington Emergency Management
- Washington State Patrol
- Western Washington University
- Whatcom County Division of Emergency Management
- Williams
CAUSE V – Objectives

• Leverage public safety broadband networks to create a common operating picture to enhance decision making across the many agencies involved;

• Provide live, or near real time data and imagery from the field leveraging robots and human to Common Operating Picture (COP) applications in the Emergency Operation Centers (EOC’s);

• Explore the use of digital volunteers to support emergency operations;

• Test mutual aid processes, including moving specialized resources and personnel across the Canada-U.S. border and expediting the pre-vetting process.
CAUSE V – Experiment Scenario

- **Real-life threat** – Mt. Baker is an active volcano, last eruption ~6500 years ago
- **Atmospheric Flood Event** during initial volcanic unrest period
- **Eruption and subsequent collapse** of the Sherman Crater on Mt. Baker resulting in mudflows / lahars extending through the Nooksack River watershed.
- Results in 8-12 feet of lahar deposition across broad area
CAUSE V – Experiment Scenario
CAUSE V – Regional Significance

- **Border Crossings**, including:
  - 3rd busiest overall along northern border (Blaine-Surrey)
  - 2nd busiest truck crossing
- **Energy transmission** - major regional hub:
  - Natural Gas pipeline (3.8 billion cubic ft/day)
  - 3 Hydroelectric facilities feeding major metro area
- **Agriculture**: top producer of berries in U.S.
- **Natural Resources**: Salmon fishery, timber industry
- **Tourism**: Mt. Baker Ski resort
CAUSE V - Locations
CAUSE V
Demonstrating Enabling Technology

Capabilities

Communication & Information Sharing: Resilient Voice and Video Calls and information sharing, social media monitoring & identify misinformation, access real-time data

Situational Awareness: Integrate information from various sources, visualize hazards, geolocate responders/vehicles, adaptive common operating picture

Risk Assessment & Planning: Develop plans based on threat, hazard, and risk assessments

Tech

Wireless Network: Public Safety Broadband Network (PSBN)

Hardware: PSBN-enabled handhelds, laptops, modems; GPS, Vibration, and water level sensors (IoT), Unmanned Aerial and Submersible Vehicles

Apps: Email, voice/video clients, field reporting tools, Common Operating Picture viewers

Photo by Randall Bruder on Unsplash
CAUSE V – Areas of Wireless Coverage

- U.S. LTE
- Canada LTE

Vehicle Traffic: 3mi / 5km
CAUSE V – Wireless Network Coverage
System Level Diagram
Drive Test Validation
So Why Do All This?

• Support wireless users in the overall scenario

• Operational Capabilities
  • GIS-based situational awareness (real-time)
  • Video conferencing/voice/email
  • Information sharing
  • Internet of Things (IoT) – sensors, drones, robots

• Novel technological demonstrations
  • QoS/prioritization/preemption (QPP)
  • Congestion-based Session persistence
  • NG-911 on public safety broadband
  • Heterogeneous networking in support of IoT

• DRDC/CSS, Texas A&M, Communications Research Centre
Some of the Cool Applications...
Hard at Work!
CAUSE V – Key Takeaways on Wireless

• Marriage of the Canada and U.S. components of the experiment – first time!
• Participants followed the script....but went well beyond that
• High level of activity from many wireless users (over 20)
• Experiment only exposes 10% of the wireless capability...you take it from here
• Users leveraged wireless applications to communicate with each other and share valuable information
• Co-channel networks co-existing along the border without cross-border coordination
• Users continuously moved from network to network without any impact
• QoS / prioritization / pre-emption demonstrated
• Congestion-based session persistence demonstrated for the first time
• Coverage was impressive
Thanks!!

DRDC | RDDC

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SCIENCE, TECHNOLOGIE ET SAVOIR POUR LA DÉFENSE ET LA SÉCURITÉ DU CANADA

Canada
The Essential Elements of Information (EEI’s) can be accessed through various Apps.

Planners, Operators and Command Staff can use the EEI products to complement their various responsibilities.

1. Information collected in the field shared through common platform (ArcGIS Online)

2. Operations Dashboard

3. Regional-COP

4. Situational Reports, Operations Briefings, Press Releases present the EEIs to official partners or the public
ExCon Exercise Portal

Used to deliver inject material over simulated traditional and social media
CAUSE V “Home App” provided Common Operating Picture Viewers for each stage of the experiment.

Phase 1: Planning

Common Operating Picture

Phase 1 - Media and Social Media traffic begin to discuss the start of seismic activity on Mt Baker. Lahar modeling is released.

Reporting Tool
Digital Volunteer Form

La href="#" class="anchor">lahar Zone - Infrastructure Dashboard</a>
What was done?

- Tracked location of vehicles and personnel in real-time – shared information back to the EOC.
- Reports from the field submitted through digital forms and displayed in interactive dashboards.
- Time-based lahar map provided support for planning efforts.
12 missions conducted during the experiment at 7 sites

Unmanned Aerial Vehicles (UAVs) streamed videos to EOC over test PSBN and captured imagery for orthomosaic maps

Unmanned Submersible Vehicles (UAS) conducted water-based search and rescue missions
• Information from field responders, robots and digital volunteers was successfully shared over a common platform.

• Participants used the technology available during the experiment to create new analyses and maps.
Participants suggested more work is still needed to integrate **single sign-on capabilities**, **standardize symbology**, and **optimize viewers to prevent information overload** while still letting them drill down into the information to get the detail needed.

**Additional hands-on training** may be needed to fully leverage the technology tested during the experiment.
Technology - Situational Awareness

Lessons

• Wireless bubbles established for experiment didn’t match area of operations – require couriers to run data to mobile lab or EOC.

• Bandwidth over the wireless connections provided were not sufficient for streaming from multiple UAS or for uploading imagery data for post-processing for mapping.

• Edge Computing (i.e., computational heavy processes near data source) may help alleviate this problem.
Digital Volunteer Support
Workflow for Reporting Actionable Information

Volcanic activity

Situational Awareness from USGS

Alerting & Notification process via local alerting system + Social Media

Community

Digital Volunteers monitor and record actionable social media content.

This may warrant activation of services.

Government Services
Digital Volunteer Support

Highlights

• Monitored simulated social media platform (ExCon) to identify rumors/misinformation, and other topics.
• Extracted false information and notified decision-makers, echoing similar situations in real-world disasters.
• Identified >100 messages with mission-critical information from > 700 social media posts.
• Shared information to the EOC using digital forms.
• Two ‘Real-Life’ Activations following CAUSE V
Digital Volunteer Support

Lessons

- Better coordination with Public Information Officers and the Joint Information Center
- Focus on feedback loops for information requiring follow-up
CAUSE V – Participant Evaluations

Process

• Prior to Experiment: Interviews with key stakeholders

• During Experiment: Evaluators collected quantitative ratings and observations focused on people, governance, technology & implementation

• Following Experiment: After Action Review session and survey
Participant Evaluations - Initial Results
Operational gaps that can be solved by Interoperable Tech?

- Improved **inter-agency communication and information sharing** = better decision making
- **Expanded Public Safety Wireless coverage** for areas with limited radio or commercial LTE
- Important role of **crowdsource mapping & Digital volunteers** to augment traditional information sources
- Leverage **existing commercial-off-the-shelf software** where possible
Participant Evaluations - Initial Results
Gaps identified during CAUSE V Tech Demonstrations

• Persistent challenges for maintaining true shared situational awareness across multiple sites
• Observed application/hardware issues on handheld devices (e.g., GPS tracking, restarts required)
• Some wireless connectivity and audio/video quality issues present
• Coverage from drones was not as responsive as needed
• Need to build/better understand business processes before applying tech solutions
Participant Evaluations - Initial Results
Concepts to Carry Forward

• **Future opportunities** to test and provide input on emerging tech

• Using experiments/exercises to **focus on recovery phase**

• Availability of **good information** (e.g., lahar zones) for developing plans

• **Social media monitoring** to support operations

• **Cross border teamwork**!
What’s Next?

• **After Action Report and Video** – March/April 2018

• **Transition CAUSE leave-behinds** to the National Information Sharing Consortium (NISC)
10 news outlets have picked up on the CAUSE V Experiment

#CAUSEV on social media: 4,914 total impressions, 107 engagements (likes, retweets, etc.)
Thanks! Any Questions?

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