DHS SCIENCE AND TECHNOLOGY

The Canada – U.S. Enhanced Resiliency Experiment (CAUSE V)

NPSTC January Meeting
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Homeland Security
Science and Technology

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Outline

- Introduction and Objectives
- CAUSE V Scenario
- Technology Demonstrations
- Next Steps
- Q&A

The CAUSE Resilience Series
Overview

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**.

Canadian Safety and Security Program

Homeland Security
Science and Technology

The CAUSE Resilience 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

Background

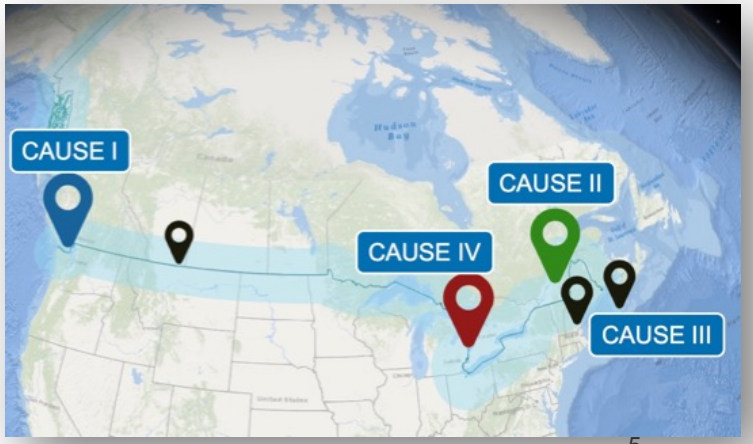
June 2011 — **CAUSE I:** British Columbia/Washington Earthquake Scenario

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

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

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

November 2017 — **CAUSE V:** Washington/British Columbia - Volcano Scenario



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

Participants

CAUSE V would be impossible without the contributions of dedicated Partners

Participants in the experiment included representatives from 24 local, state and federal agencies, as well as industry and utility partners.

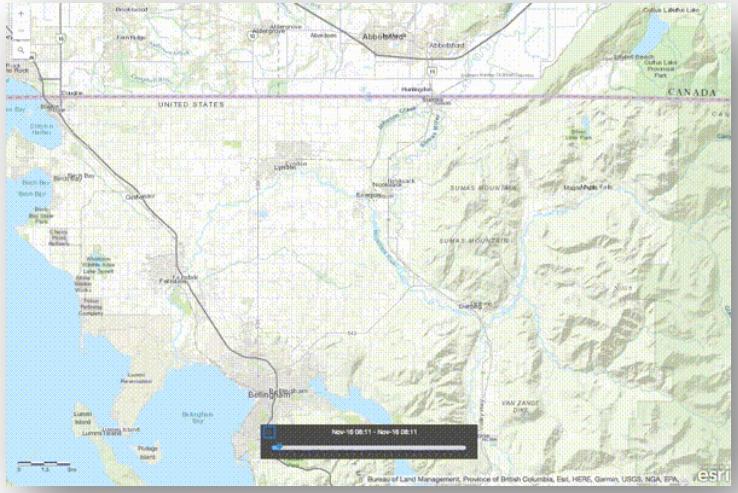
Regional Significance

- Location of 3 border crossings:
  - 3rd busiest overall along northern border (Blaine-Surrey)
  - 2nd busiest truck crossing
- Major hub for regional energy transmission:
  - 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

Experiment Scenario

- **Real-life threat** – Mt. Baker is an active volcano, last eruption ~6500 years ago
- Eruption and subsequent collapse of the Sherman Crater on Mt. Baker resulting in lahars extending through the Nooksack River watershed.
- 8-12 feet of lahar deposition across broad area

Image credit: https://volcanocafe.wordpress.com (R.Clucas)

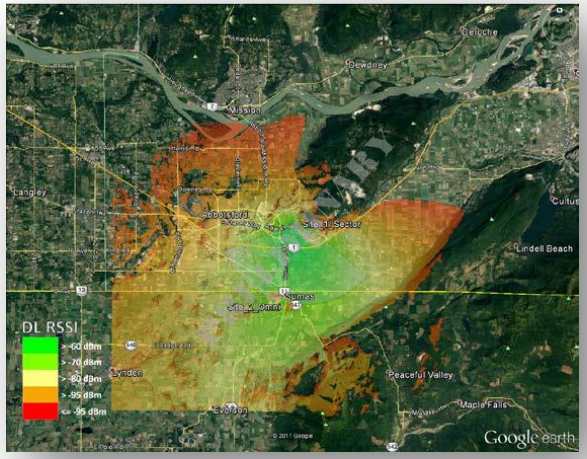


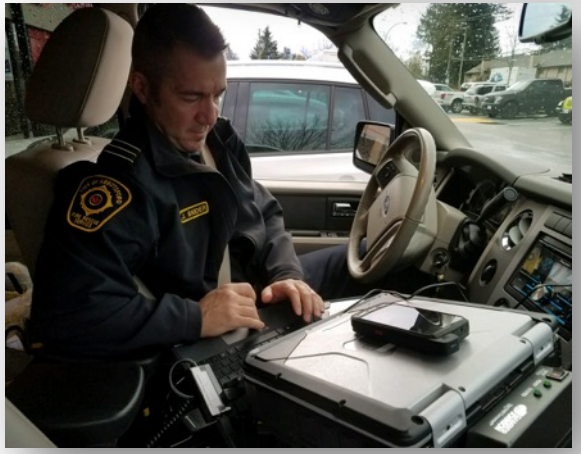
Experiment Objectives

- 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.

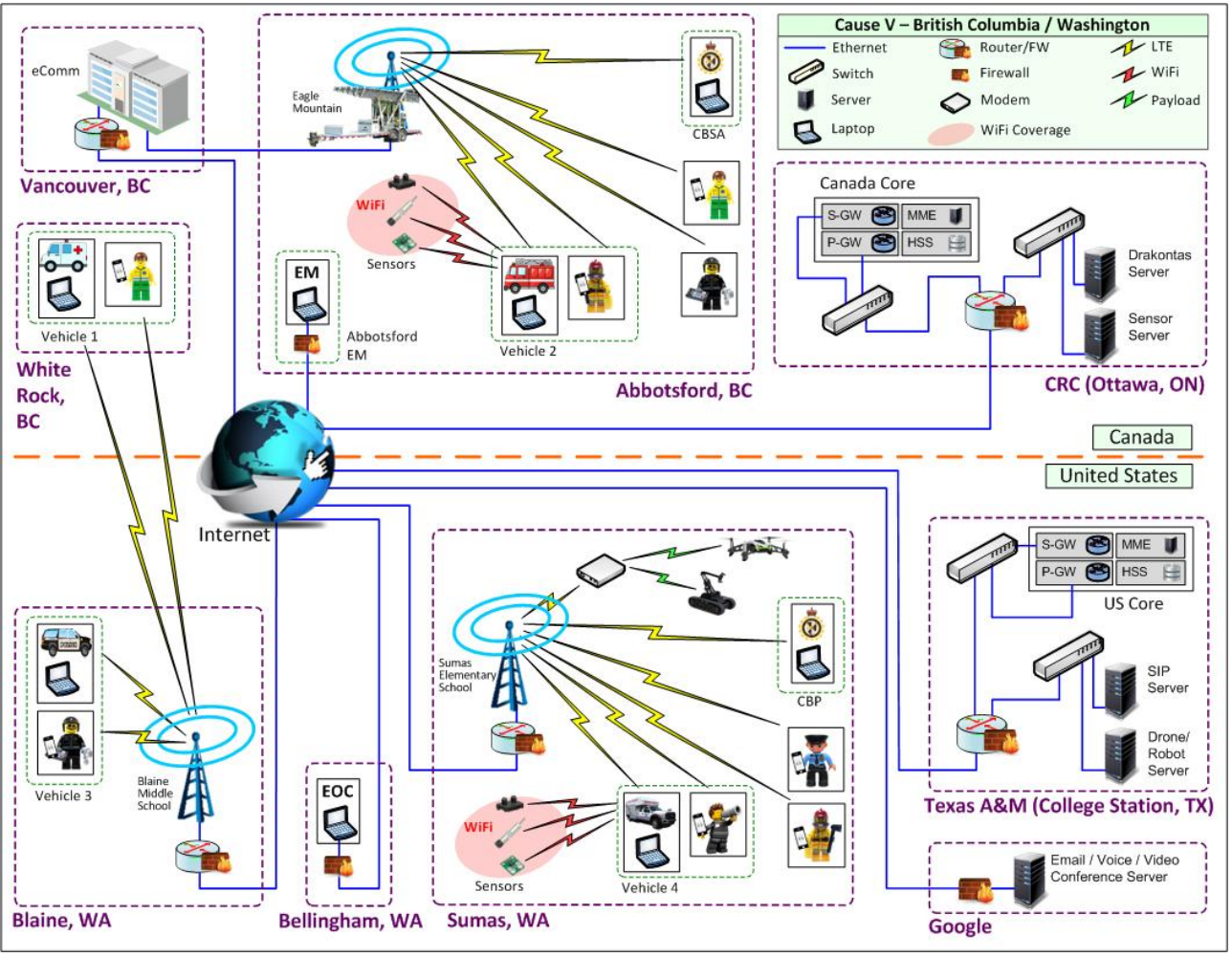
Technology - PSBN Network
Overview

- Three public safety broadband wireless (PSBN) bubbles were established at the two border crossings (Blaine and Sumas)
- Participants were provided with PSBN enabled wireless devices to support the following capabilities:
    - GIS-based situational awareness (real-time)
    - Video conferencing/voice/email
    - Information sharing
    - Internet of Things (IoT) – sensors, drones, robots





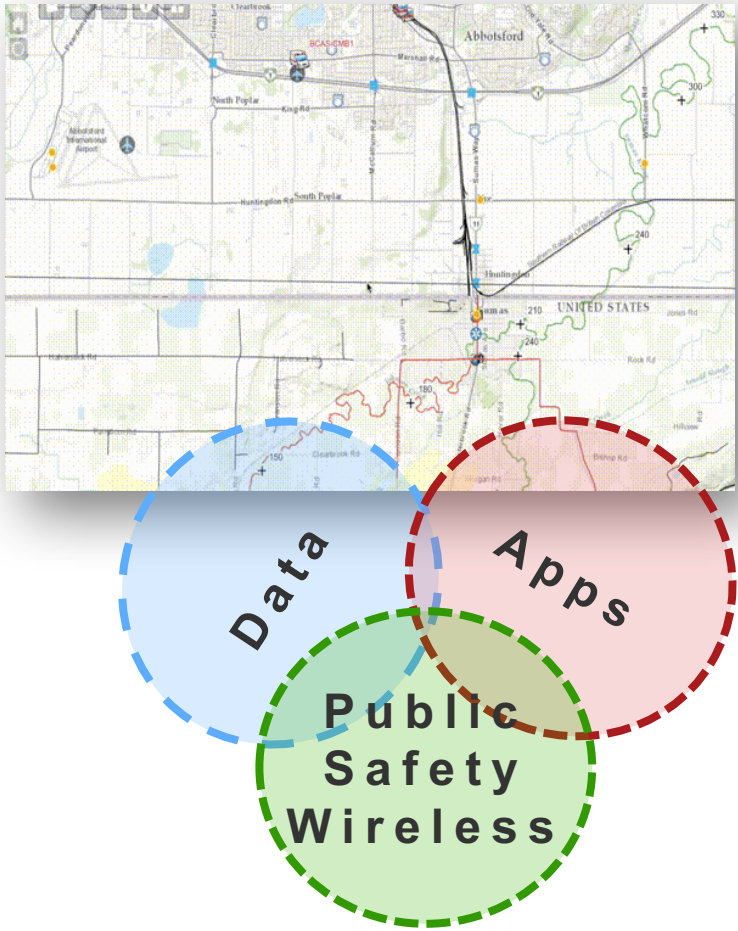
Technology - PSBN Network
System Level Diagram



The PSBN provided the backbone for participants to share voice/data from field, and supported robot and sensor integration.

Technology - PSBN Network
Highlights

- Participants successfully performed field tests to demonstrate:
  - Traffic prioritization,
  - Load balancing,
  - Pre-emption,
  - Network Access
- *Improvements are still needed in order to enable high-bandwidth applications (e.g., streaming high-resolution aerial imagery), as well as stability improvement in the handheld devices.*



Technology - Situational Awareness
Overview

1

Information collected in the field shared through common platform

Operations Dashboard

Regional-COP

2

The Essential Elements of Information (EEI's) for can be accessed through various Apps

3

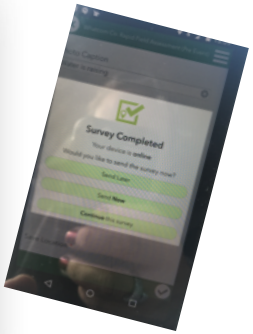
Planners, Operators and Command Staff can use the EEI products to compliment their various responsibilities

4

Situational Reports, Operations Briefings, Press Releases present the EEIs to official partners or the public

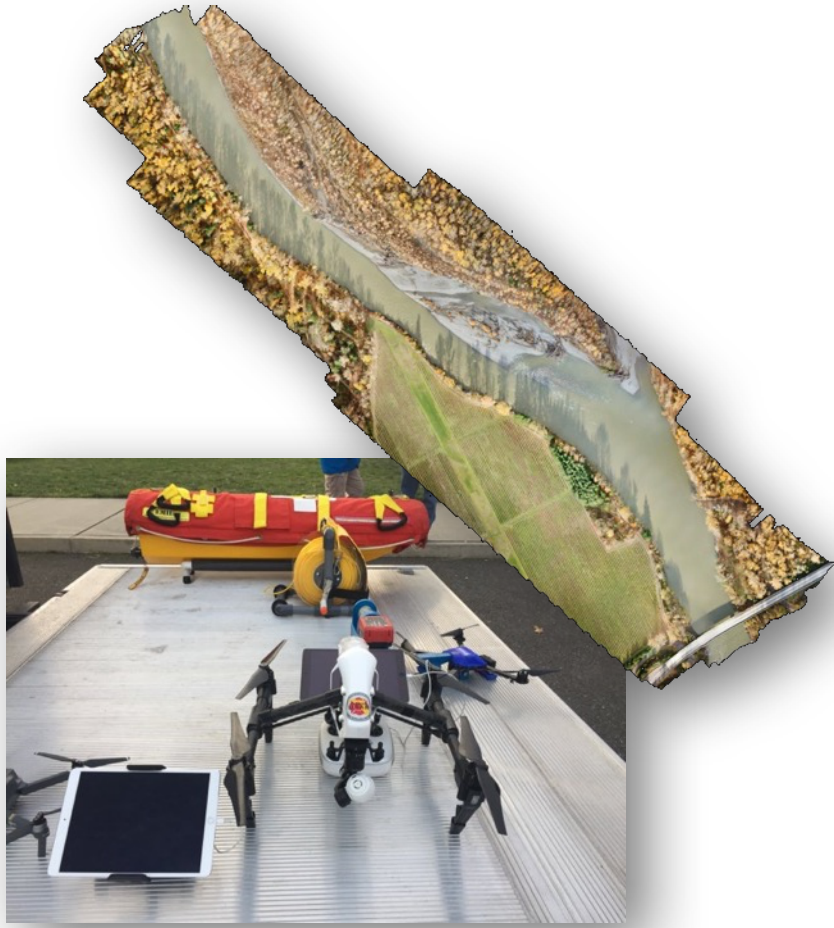
Technology - Situational Awareness
Overview

- Tracked location of personnel and vehicles 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



Technology - Situational Awareness
Robots / UAV and UAS Missions

- 12 missions conducted during the experiment
- Unmanned Aerial Vehicles (UAVs) streamed videos to EOC over test PSBN and captured imagery for ortho-mosaic maps
- Unmanned Submersible Vehicles (UAS) conducted water-based search and rescue missions



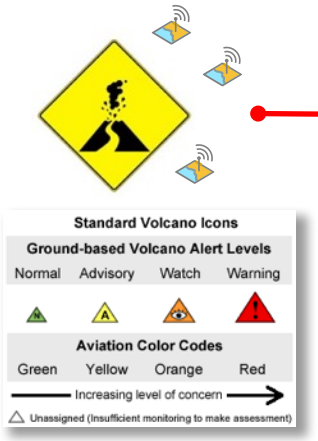
Technology - Situational Awareness Highlights

- **Information from field responders, robots and digital volunteers was successfully shared** over a common platform and visualized by all participants.
- *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.*

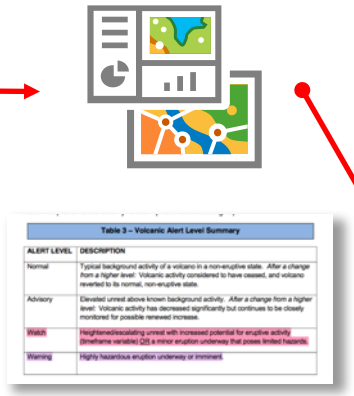
Technology - Situational Awareness
Highlights

- **Participants used the technology available during the experiment to create new** analyses and maps and shared these with other players during the experiment over the common platform and help provide valuable input to decision makers.
- *Participants indicated that additional hands-on training was important to fully leverage the technology tested during the experiment.*

Digital Volunteer Support
Workflow for Reporting Actionable Information



Volcanic activity



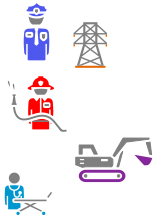
Situational Awareness from USGS

Alerting & Notification process via local alerting system + Social Media

Community

Digital Volunteers monitor and record actionable social media content.

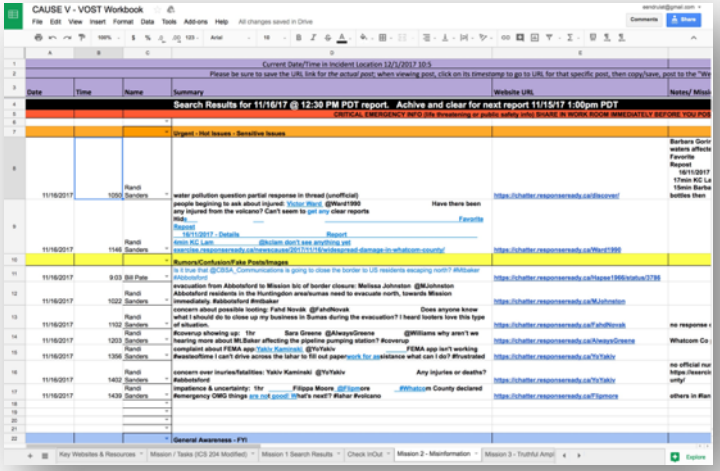
This may warrant activation of services.



Request for Government Services

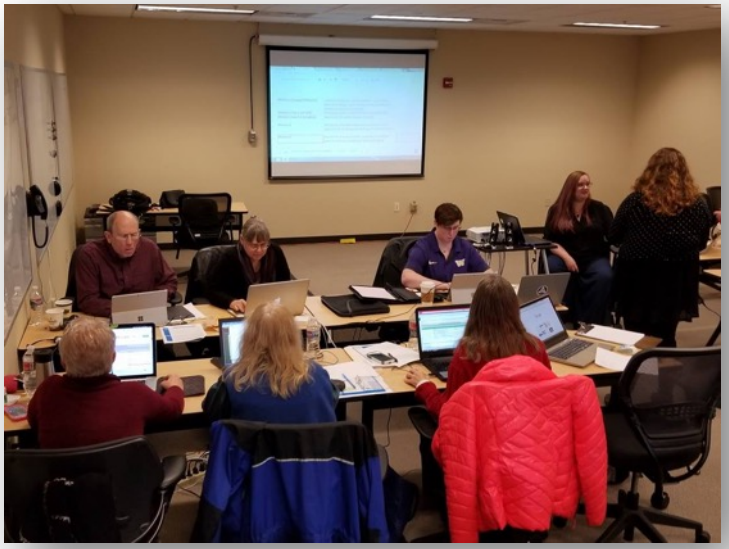
Digital Volunteer Support
Highlights

- Two trained Digital Volunteer / Virtual Operations Support Teams (VOSTs) monitored simulated social media platform to identify misinformation, and other topics
- Identified >100 messages with mission-critical information from > 700 social media posts
- Shared information to the EOC using digital forms



Digital Volunteer Support
Highlights

- Since the experiment concluded, members from these teams have activated twice to support real-life response activities.
- *For the digital volunteer teams to be fully operational, procedures need to be implemented to ensure coordination with Public Information Officers (PIO) and the Joint Information Center (JIC).*



What's Next?

- After Action Report and Video – March/April 2018
- Transition CAUSE leave-behinds to the National Information Sharing Consortium (NISC)

Questions & Answers

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