

EMGCP Meeting – Winter 2025

February 13, 2025 | 13:00 – 14:00

Emergency Management Geomatics Community of Practice (EMGCP)

Attendees DFO, DND (CJOC), DND (MCE), ECCC (NEEC), ESDC, ISED (Tourism), NRCan (EGS), NRCan (GeoDiscovery), PS GOC (Government Operations Centre), PS REID (Resilience and Economic Integration Division), PSPC (Real Property Services), RCMP, StatCan (Strategic Data Management), TC EP (Emergency Preparedness), TC TDG (Transportation of Dangerous Goods), TC TEA (Transportation & Economic Analysis)

Location Online (Microsoft Teams)

1. WELCOME AND INTRODUCTION

13:00-13:02

Presenter: Cameron Bouchard - PS (GOC)

Description

Welcome and overview of today's meeting agenda.

1.1. CALL TO ORDER

Description

The attendance is captured by attendees inputting their name, position, team and department in the chat.

2. New Data Available

13:02-13:06

Presenter: Cameron Bouchard (PS – GOC Geomatics)

National Building Footprints Dataset (Public Safety)

- This dataset was developed by Public Safety using three open, publicly available and comprehensive datasets to create a reliable national building footprint dataset.
 - o The layer extent is set to neighbourhood scale and requires zooming into the webmap to view.
 - o The data includes categories like commercial and residential buildings, with names associated (if available).
- The dataset is useful for government operations to monitor development and potential impacts during incidents.
- Presently, the data is restricted for download but can be accessed through ArcGIS Online.

Canada-US Land Ports of Entry (POEs) (CBSA)

- A recently updated border data layer is available, showing both Canadian and US land Ports of Entry (POEs), highway addresses, and CBSA site links for border wait times.
- The updated data is crucial for monitoring incidents and natural hazards affecting border crossings.

Hydrometric Gauges and Flooding Data (AAFC, ECCC, USGS)

- Hydrometric stations data, previously sourced from AAFC, has been updated to include North American set of gauges. The data includes hydrometric station gauges and water flow data from USGS.
- This data is relevant for monitoring flood risks and is available on the [GOC Flooding Webmap App](#).

3. Presentation of RCMP EM Dashboard

13:06-13:31

Presenter: Amanda Guite (Business Continuity Manager), Jeff Cable (Geomatics Tech)

- The project aims to create a dashboard to provide RCMP detachments with early warning of potential wildfires. This will help detachments activate their business continuity plans (BCP) in case of disruptions.

Development of the Dashboard

- The RCMP's sensitive data restrictions prevent direct internet communication from their enterprise server
- A workaround using personal workstations and ArcGIS Pro was implemented to automate the dashboard updates'
- The dash combines weather alerts and wildfire risk data to provide comprehensive risk assessment for RCMP detachments.

Dashboard Demo – Weather Alerts

- The dashboard identifies detachments within weather alert zones, such as tsunami alerts, tornado watches, and hurricanes.
- A script runs every three hours to update the data, ensuring timely information for RCMP detachments.
- The dashboard provides a breakdown of detachments by division and risk category, aiding in emergency planning.

Dashboard Demo – Wildfire Risk

- The wildfire risk dashboard, using data from the Canadian Wildland Fire Information System (CWFIS), categorizes detachments into high, medium, and low risk based on proximity to wildfires.
- A script identifies detachments within specific distances from active fires, providing accurate risk assessment.
- The dashboard is updated regularly to reflect current wildfire risks, helping detachments plan accordingly.

Future Enhancements and Feedback

- There are future enhancements for the dashboard, including flood risk, earthquake risks, and evacuation routes.
 - o The dashboard will also include RCMP radio towers and alternate locations for detachments.
 - o There is still a need for feedback and future data sharing to improve the dashboard's functionality.
- The presentation concludes with an invitation for questions and feedback from the audience.

3.1. Q&A

Cameron Bouchard: **How does your script get run from a personal workstation?**

A: We've created a batch file that tells it which script files to run, and then the Windows Task Scheduler to tell the batch file to run every three hours. It runs the query, spatial analysis and publishing. It is offset to run every hour and a half on two workstations (Amanda and Jeff's). In this form, it is entirely reliant on running on that desktop computer, so in case of power outage or extenuating circumstances it would impact the ability to run. In the future, we hope to get a notebook server for our GIS Enterprise but that does not address the disconnect between our off network server. The dashboard is also for information purposes only due to the frequency of updates and concerns around accuracy.

Mike Ballard: Amanda had mentioned that you were looking for data to help with flood risk analysis. Public Safety Canada has some excellent internal data and have been working with a few different federal government agencies to help with flood risk. A public product, called **Federally Identified Flood Risk Area**. It's a Raster dataset for the whole country, 30 meter pixels with low, medium, high, and extreme flood risk and it would be applicable to identifying flood risk in this use case. If this is more urgent or you have a specific use case, feel free to reach out directly at mike.ballard@ps-sp.gc.ca.

4. NRCan GeoAI

13:32-13:54

Presenter: Jean-François Bourgon – NRCan (Project Officer)

Geospatial AI Development

- Jean-François Bourgon, introduces the Geospatial AI development at NR Canada, emphasizing the importance of mapping and geospatial data.
- The presentation covers the various data sources, including commercial imagery, radar sensors, and historical air photos, and the use of high-performance computing.
- The journey of Geospatial AI started in 2019, leading to the launch of the Geo AI data series in 2023.
- The focus is on maintaining topographic information and leveraging high-resolution data for semantic segmentation from imagery.

Geospatial AI Capabilities and Applications

- There is the capacity to extract various themes from imagery, including open water, infrastructure, and forest carbon.
- Examples of data extracted from source imagery are provided, highlighting the limitations of current models.
- The presentation covers the sources of data, including satellite-based sensors and aerial imagery shared by provinces and territories.
- The development of training and benchmarking data sets is ongoing, with a focus on improving coverage, especially in the north.

Model Architecture and Performance Evaluation

- The type of architecture used for Geospatial AI is based on a stack form architecture, combining vision transformer encoder and U-Net decoder.
- Additional architectural alternatives are explored, such as mask ordering encoder and more generic models like DONA.
- A dashboard is developed to compare model performance based on different criteria, such as the period of the year and sensor type.
- An operational on-demand mapping pipeline is established, allowing for the production of standard products in a few hours.

Change Detection and Historical Imagery

- The Geospatial AI capacity is applied to change detection and mapping, using visual transformer models to compare two images and detect changes.
- Examples of change detection are provided, including cases of drought, wildfire events, and deforestation.
- The historical archive of air photos is being modernized, with models trained to detect matching points between different images.

Conclusion

- The presentation concludes with points of contact for further information and projects available on GitHub.

4.1. Q&A

Jeff Cable: **Have you trained your model to be able to interpret what may be causing those changes?**

A: Presently, there are two potential change detection use cases. So the first one is just assessing or that saying similarities between two source imagery, for example, at a raster level. The model tries to either identify the intensity of change and how this detection could affect the classification. We are trying to derive something similar to a land cover map from this imagery and determine if the classes are affected. So right now, we can highlight deforestation or loss of vegetation cover, but we can't tell the model to inform us of the *reason* such as forest fires or harvesting. The model is currently not able to provide that kind of reflection but at least we have information about which class was affected and now replaced by another type of classification.

Mike Ballard: **If you have historical archives of air photos, and get them orthorectified, can you run some GeoAI feature extraction for earthquake risk assessment? For example, I would like to know when the building was built to assess risk by building code and likelihood of collapse. Can you use air photos to determine what year the building was erected and evaluate its risk based on the year's building codes?**

A: That's a very interesting thought! We've already started some work toward that direction by being able to use specialized model and existing models to extract information from historical imagery. We did a use case around Jasper to look at urban development around Jasper and how those buildings were affected by the recent wildfire. There was good variation with new urbanization and showed which sectors were affected.

4. ADJOURNMENT

13:55-14:00

Presenter(s): Darlene Tran - PS (GOC)

The next meeting is scheduled to take place on May 15th, 2025 at 1pm at the NRCan Library in Ottawa. There will also be a virtual option for those who are not in Ottawa. Meeting details and invitations will be sent out in the next few weeks.

Feel free to reach out to Darlene Tran if you have any topics you would like to present at the next meeting.