Jamaica - Canada Technical Assistance Partnership (TAP)

Advancing Drone and Artificial Intelligence Technology for Disaster Management

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Partnership Overview

- A flagship initiative under the Expert Deployment Mechanism for Trade and Development (EDM) funded by the Government of Canada.

- Technical partnership between Natural Resources Canada (NRCan) and National Spatial Data Management Branch (NSDMB), Jamaica.

- Implemented to strengthen national disaster risk management through technology transfer, GeoAI research, and data interoperability.

- Officially launched November 2024, marking the beginning of Jamaica's integration of advanced geospatial and artificial intelligence capabilities in disaster operations.

TAP Kick-off meeting (November 2024)

Objectives of TAP

Capacity Building – Build national expertise in AI, remote sensing, and UAV data analysis.

Technology Transfer – Introduce Canadian best practices in GeoAI, data integration, and field mapping.

Research & Development – Develop pilot applications that test AI-driven decision support for disasters.

Integration – Merge data from multiple agencies for situational awareness and informed response.

Collaboration – Establish sustained partnerships among local and international disaster management entities.

Achievement #1 – Capacity Building and Training

- Two intensive **national workshops** delivered to expand technical capacity:

- **GeoAI and Machine Learning Fundamentals** (Nov 2024) – Introduced foundational concepts in artificial intelligence, supervised learning, and computer vision for damage detection.

- **Drone Data Acquisition and Photogrammetry (Jun 2025)** – Hands-on sessions focused on UAV operations, mission planning, and high-resolution orthomosaic production.

- 18 officers across 9 agencies trained, including ODPEM, NSDMB, NLA, NWC, JFB, and local municipal teams.

- Participants learned to configure drones for accurate data collection, process drone imagery, develop and train deep learning models, and apply spatial and photogrammetric analytics in daily workflows.
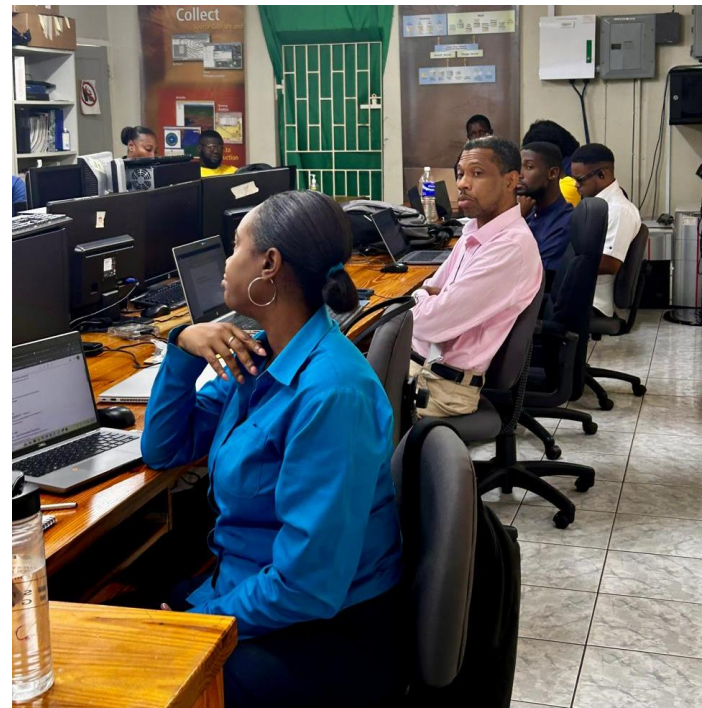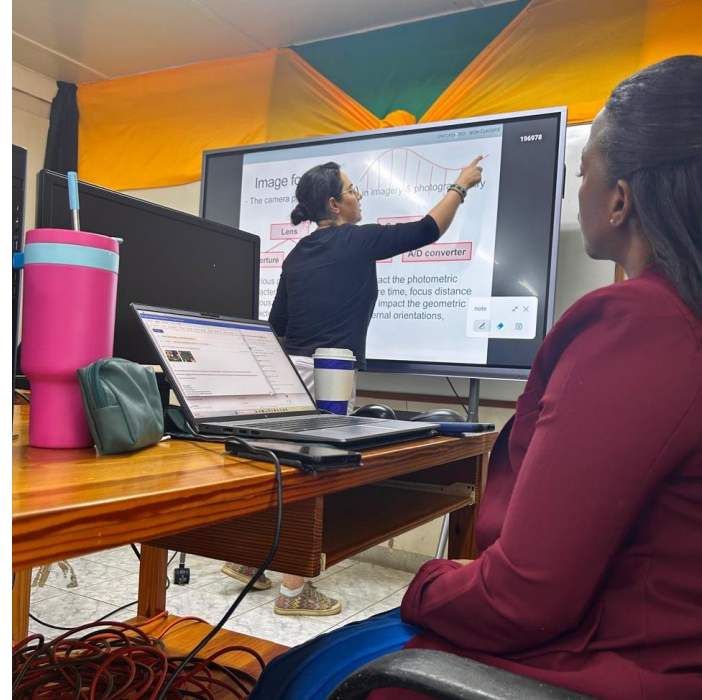
GeoAI and Machine Learning Fundamentals Workshop

November 2024

June 2025

Drone Data Acquisition and Photogrammetry Workshop

Achievement #2 – GeoAI Pilot Project Conceptualization

- Developed the concept for a GeoAI Disaster Decision-Support System (DSS) in collaboration with NRCan's Centre for Mapping and Earth Observation.

- Designed to **automate post-disaster damage classification** using **drone imagery, satellite data, and field observations**.

- Concept validated by the NRCan team and proposed as a **scalable Caribbean model**.

Achievement #2 – GeoAI Pilot Conceptualization

The pilot framework includes modules for:

- **Object detection and feature extraction** (buildings, roads, debris fields)

- **Damage severity scoring** based on spectral and thermal analysis

- Integration into ODPEM's **National Emergency Operations Centre (NEOC)** workflows

Achievement #3 – Drone Technology Handover Ceremony

Drone Technology hand-over ceremony at Canadian Embassy of Jamaica (August 2025)

Achievement #5 – Drone Technology Deployment

- Two DJI Matrice 4T drones delivered in 2025 with full accessory suite (batteries, RC Plus controllers, BS65 charging station).

Equipped with:

- 48 MP wide-angle camera for precision mapping
- 640×512 thermal infrared sensor for hotspot detection and post-event night missions
- RTK positioning and obstacle avoidance for safe, accurate flight
- 45-minute flight endurance per mission

- Now operational under NERGIST and integrated into field workflows for reconnaissance and assessment during hurricane drills and flood mapping exercises.
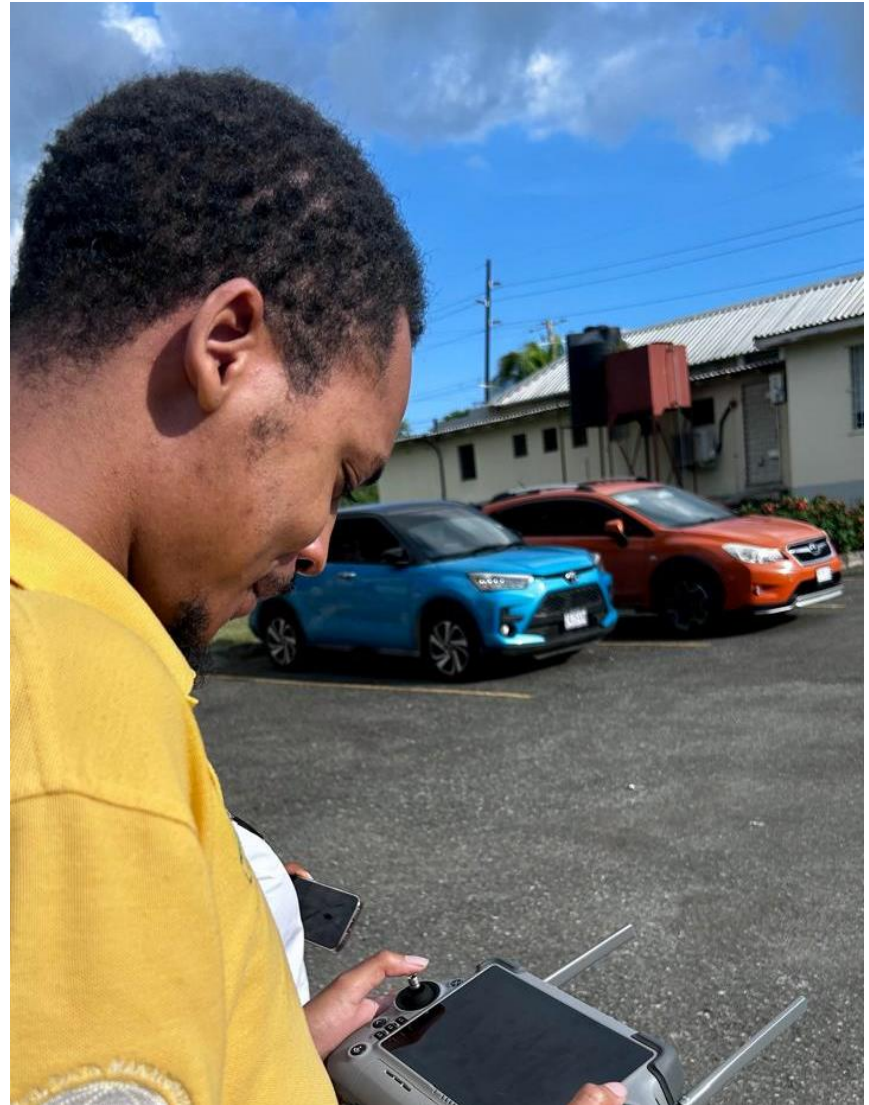
Integrating Artificial Intelligence

- GeoAI combines computer vision, machine learning, and spatial analytics.
- Initial model training performed on Essex Valley pilot dataset using labelled building footprints.

- AI model tested for accuracy in differentiating between no damage, minor damage, and severe damage categories.

- Supports real-time map generation to inform ODPEM and local authorities.
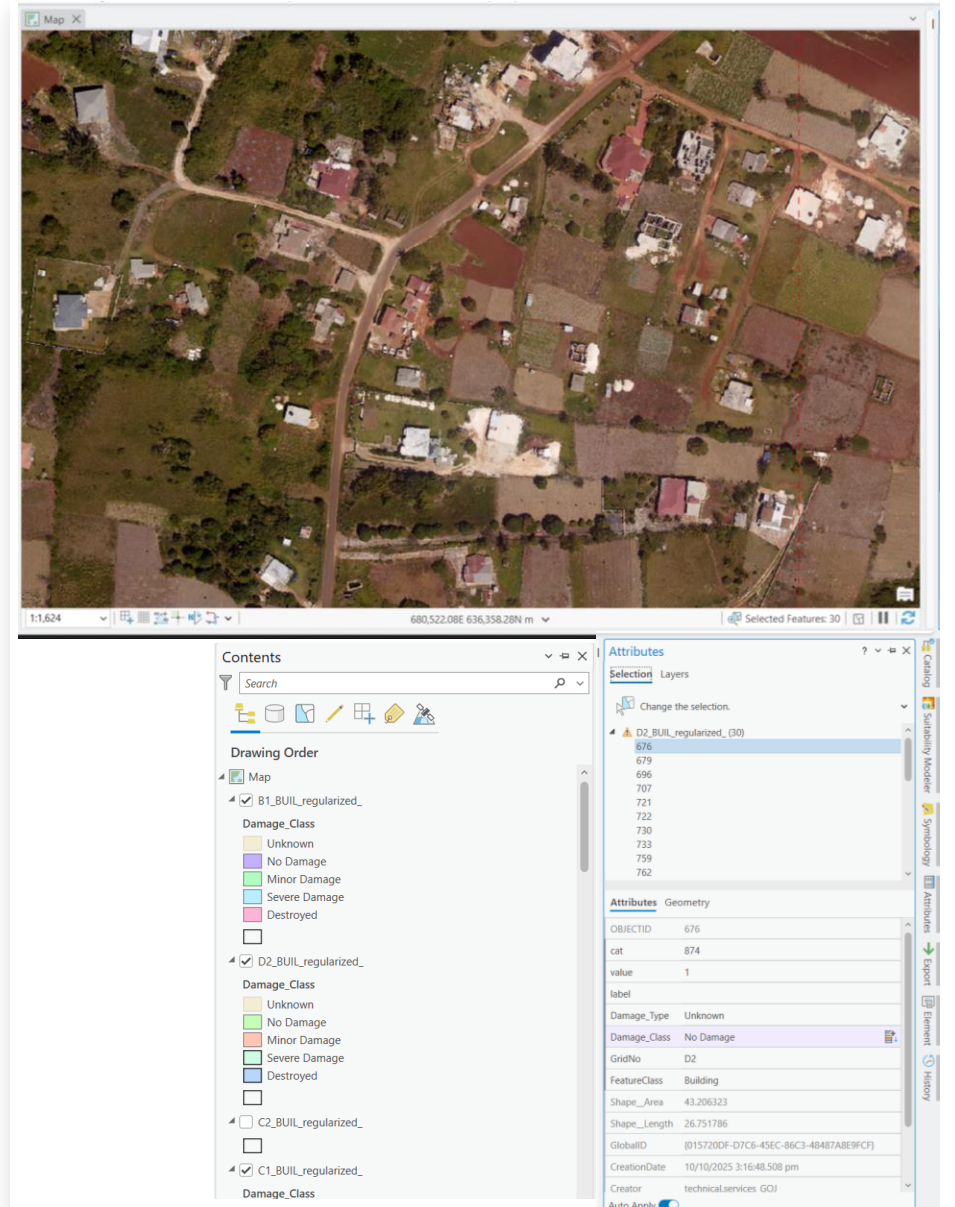
On-the-Ground Impact

"with use of the drones, now, we could have an automated response to [disasters]; instead of having a person physically go or putting themselves at risk, we could have the drone do a flyover." – Okieno Samuels, GIS Project Manager, NSDMB

Drones now serve as a first-response tool for reconnaissance and risk validation.

Enables rapid situational awareness and reduces the time between impact and assessment.

Supports safer, evidence-based decision-making for resource deployment.

"We look forward to the drones, especially since your technical team pushes authoritative… quality data that we can use to train the whole system to determine damage. Simple, impactful… far-reaching activities that can feed into the full disaster management and resilience-building cycle of our country." Alicia Edwards, Principal Director, NSDMB

Conceptual Disaster Decision-Support Platform

A conceptual prototype created by NRCan and NSDMB for future national deployment.

Key functions:

• Automated feature detection and change analysis	• AI-generated damage classification maps	• Live dashboard with disaster intelligence feeds	• Cloud-hosted data integration from drones, satellites, and ground teams	Trained deep learning model for building detection and classification will be made available for future collaborations

Outlook (2026 and Beyond)

- **Scaling drone-based mapping efforts** for flood zones and landslide-prone areas
- **Creating AI training datasets** from hazard imagery archives
- **Institutionalizing GIS workflows** within ODPEM and local governments
- **Continued technical support from NRCan** for applied research and system scaling.

The End