

WildFireSat

La mission GardeFeu

GOFC GOLD Fire IT

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Canadä



WildFireSat Update – Background







- WildFireSat must provide high quality data on a routine basis that can be relied on for fire management in Canada.
- WildFireSat will likely consist of several satellites.
- Along with other sources (e.g., VIIRS), will form a virtual constellation.
- WildFireSat will provide an unprecedented portrait of all active wildfires at least twice daily, in near real time

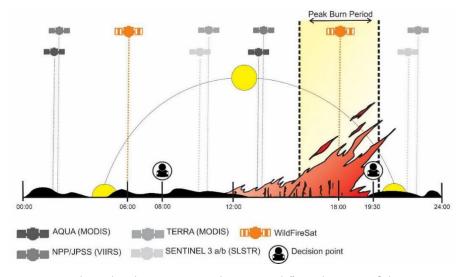


Image adapted with permission: Johnston et al. "Development of the user requirements for the Canadian WildFireSat Satellite Mission." Sensors 20, no. 18 (2020): 5081.

WildFireSat Update – Canadian **Operational Mission**







- Stage 2 of the RFP is complete
- Recommendation for a winner provided
- Award and Announcement expected end of 2024 / early 2025
- Happy to give a full update of the system virtually to all members in early 2025



WildFireSat Update – Global Mission 💢 🎊







- Pursuing global mission
- Soft engagement with international partners (this mtg in particular)
- Anyone opposed to making this a global, free mission?
- Near real-time may be different from Canadian access



WildFireSat Update – Science



- Science Plan is now expected 2024Q4 / 2025Q1
- Peer review: ~18 reviewers (thanks!), substantially improved
- Final draft, needs translation / accessibility checks before publication





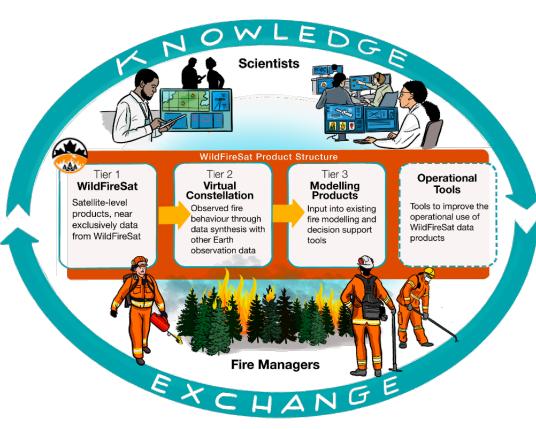


WildFireSat Product development









Tier 1 fire detection and characterisation **Tier 2** leverage other Earth observation
data to create products from a virtual
constellation (e.g. VIIRS, SLSTR
Landsat).

Tier 3 insights to fire managers about fire characteristics and behaviour at event level

Operational tools non-WFS based complementary products adding value to WFS data e.g. easily accessible visibility / cloud forecasts

WildFireSat Update - Tier 1



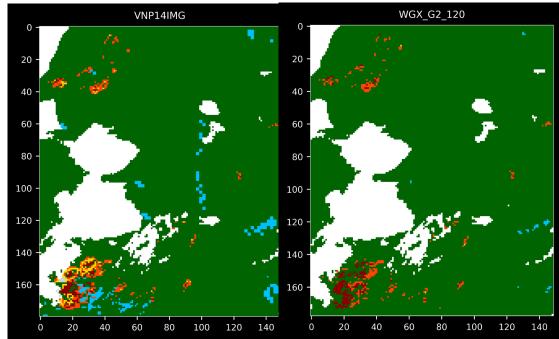








- Prototype FDC algorithm running on 'simulated WFS data' (modified VIIRS I-band)
- Working on refinements to detection algorithm
- scaling up from case study fires -> all Canada -> global regions



WildFireSat Update – Tier 2



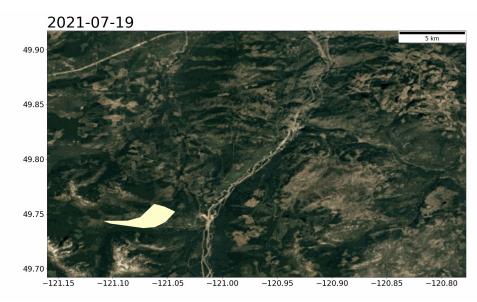








- Developed algorithm for generating 'Multi Source Fire Events' and calculating 'Observed Fire Arrival Time'
- Expanding a fire event dataset of spatiotemporally clustered hotspots
 Canada wide
- Starting work on algorithms for observed rate and direction of spread, and observed fire line intensity



Observed fire arrival time product prototype, July Mountain, BC

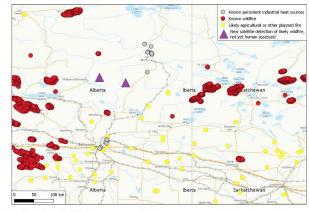
WildFireSat Update – Tier 3

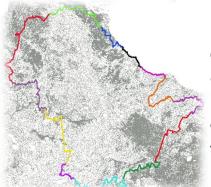






- Fire event classification model
 - E.g. wildfire, PB, agricultural; flag fires unknown to agencies
- Fire perimeter segmentation and characterisation
 - Sensible perimeter delineation based on environment, report segment behaviour/weather – good for growth modelling
- Fire detection probability forecasting
 - Cloud/clear sky likelihood at WFS overpass for next 3 days
- Next steps: adding fire weather fields to hotspots, fire growth assessment





Top: fire event type classification (mock up)

Left: perimeter segmentation

WildfireSat Update - Architecture



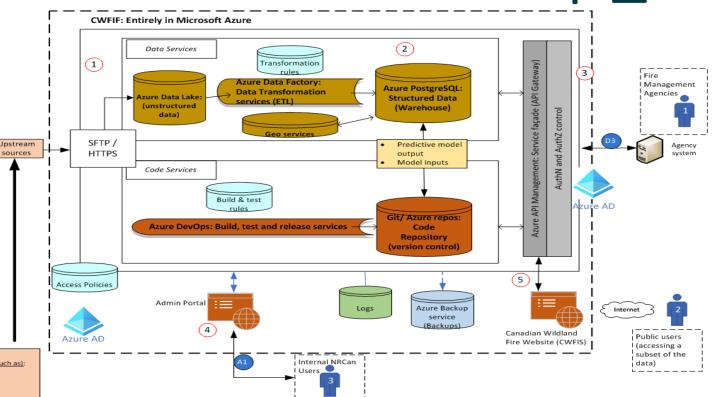




- 2 Zero trust between services
- Maintained in accordance with data management plans
 No PII PBMM
- 3 Data & Code shared with known parties
 Via programmatic interface
- Data and code directly managed by a set of known individuals with elevated privileges
 Data Science capabilities (analysis/edit)
 Leverage Azure Portal + API Gateway
- 5 Pre-stipulated data feeds
- Non-GC service to cloud-based GC service for laa5/Paa5 (no interconnection) secure API access, encrypted channel
- GC User access to cloud based GC service from GC network to approved Hyper-Scale laaS/PaaS
- Wildland Fire Management users (i.e. FPT Fire agencies) logged into external agency system with access to Prot B data.
- General public users (no login) with access to publicly available prepared data products via website.
- Named internal NRCan Users (log in) with admin privileges

IN-BOUND DATA

- Data pulled from known and trusted sources (such as):
- National burned area,
- Current active fires,
- Satellite detected hotspots
 Fire perimeter estimates,
- Data management plans exist for each identified feed



Summary



- Technical mission details can be disclosed in the new year
- Working on making WFS mission global in scope
- Product development and technical architecture are going well, MVPs and sandbox expected in 2025

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