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Constellations in Collaboration: The 2025 CIFFC - WildFireSat and Fire Agency Meeting

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Constellations in collaboration: The 2025 CIFFC - WildFireSat and Fire Agency Meeting.

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3. Société de protection des forêts contre le feu
4. Saskatchewan Public Safety Agency

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SUMMARY

This proceedings document summarizes the activities of the 2025 Canadian Forest Fire Interagency Centre (CIFFC)–WildFireSat Province and Territory Workshop, held in Winnipeg, Manitoba, on October 21–22, 2025. The objective of the workshop was to continue the ongoing dialogue between the WildFireSat development team and the federal and provincial wildfire management agencies and related groups and the Canadian Association of Fire Chiefs. These discussions help ensure the development team remains focused on how these agencies will use WildFireSat products, stay up to date on user needs and expectations, and remains on track with evolving operational requirements.

Thirty-two participants attended in-person representing 18 organizations (virtual attendance was limited to select portions of the agenda). All provinces and territories with fire management agencies attended in-person except for British Columbia.

PREAMBLE

WildFireSat is being designed to provide daily monitoring of active wildfires across Canada and internationally. The mission is tailored to the needs of fire managers, and its success depends on the suitability of WildFireSat products for operational fire management. These products have the potential to be transformational for wildfire situational awareness and decision making.

To maximize this potential, the WildFireSat mission has prioritized sustained engagement with fire managers to better understand operational requirements, clarify the role of satellite data in fire management, and foster collaboration and community around WildFireSat. The document "WildFireSat Pathway for Implementation and Uptake in Provincial and Territorial Fire Management Agencies" outlines the mission's approach to increasing the likelihood of adoption. Central to this approach is the purposeful engagement and collaboration between fire managers and the WildFireSat mission team.

In support of this objective, the Canadian Forest Fire Interagency Centre (CIFFC) was engaged to facilitate a knowledge exchange meeting. CIFFC's 2024–2029 Strategic Plan includes a goal to advance knowledge exchange and mobilization by operationalizing research for the benefit of its member agencies. CIFFC is uniquely positioned within the government wildfire community to support the implementation of new operational products and is well suited to assist the WildFireSat team in delivering a focused workshop to advance fire management agency participation and knowledge sharing.

More on the WildFireSat mission's approach can be found here:

- McFayden, C. B.; Hope, E.; Johnston, J. M.; Cantin, A. S.; Crowley, M. A.; DeBoer, S.; de Jong, M.; Johnston, L.; Thompson, D. K.; Young, D. J. 2023. WildFireSat pathway for implementation and uptake in provincial and territorial fire management agencies. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre. Information Report, GLC-X-36. 45 p. https://ostrnrcan-dostrncan.canada.ca/handle/1845/270103

Figure 1. Workshop participants.

MISSION UPDATE, FALL 2025

Presented by Josh Johnston

This presentation revisited core milestones in the mission including:

- Canada's 2022 Federal Budget provided end-to-end funding for a new wildfire monitoring satellite system; an initiative of: Natural Resources Canada, Canadian Space Agency, Environment and Climate Change Canada. The main WildFireSat constellation is anticipated to be operational in time for the 2029 Canadian fire season.
- $72M was awarded for Phases B &C (design stages, designing the satellite and sensors to meet the mission requirements) in February 2025 to a consortium led by Spire Global Canada. Phase D (launch and confirming it works) & E (operations, standard repeatable data collection and product delivery) are also funded, which will be awarded later.
- At the 2025 G7 Leaders' Summit, Prime Minister Mark Carney announced that the scope of the WildFireSat mission will be substantially expanded ($68.9M over nine years).
- The WildFireSat mission is now expecting to collect data and produce fire products for all of the vegetated areas of the Earth (unvegetated areas like oceans, deserts, and those covered by ice will be excluded). This data will be made freely available to support global fire management.

The session further covered aspects of the WildFireSat constellation design and the estimated Canadian and global coverage. The WildFireSat constellation will consist of 7 microsatellites in a sun-synchronous orbit approximately 475km above the Earth. There will also be one satellite launched before the main constellation as a precursor for testing; two spare satellites in a 'hot orbit' (available to replace one of the 7 orbiting in the main constellation in case of technical issue); and, an additional spare on the ground.

For more information on the satellite specifications see the WildFireSat datasheet:

- https://www.asc-csa.gc.ca/eng/satellites/wildfiresat/data-sheet.asp

WildFireSat is intended to fill the observational gap between existing public satellite systems in the late afternoon, which is typically the driest part of the day and when wildland fires are at their most active in Canada (peak burn). The overpass times are planned to be around 16:30 to 18:00 local solar time, with a corresponding pass 12 hours later at around 04:30 to 06:00 setting fire managers up with updated information of overnight fire growth prior to the morning planning cycle. This will allow for a more complete picture of wildfire activity throughout the day, available from public satellite systems.

There will be two observations at minimum on any given day and location in Canada from the WildFireSat satellites. In some locations there could be more overpasses in a day, because adjacent orbital ground tracks converge and overlap at higher latitudes. For example, in Canada, we estimate the WildFireSat constellation will provide 3 or 4 observations for locations above 60° north on most days (2 observations at ~18:00; 2 observations at ~06:00). Locations south of 60° north will generally receive 2 observations daily, but 3 or 4 observations daily may happen occasionally.

For more information on the estimated overpass times see Issue 5 of the WildFireSat e-bulletin.

- Natural Resources Canada & Canadian Forest Service. 2025. WFS e-Bulletin (GLFC - Sault Ste. Marie), Issue 5. 6p. Natural Resources Canada. https://doi.org/10.4095/st000128

This presentation also covered details on the benefits of the relatively narrow swath of the WildFireSat satellites. This design feature should, on average, improve the geolocation accuracy and reduce systemic bias associated with fire hotspots relative to the Visible Infrared Imaging Radiometer Suite (VIIRS). This design should also avoid errors associated with observing fires at high viewing angles, as WildFireSat should have fewer false alarms from large, hot smoke plumes, and fewer omission errors in complex topography (such as hills and mountains) than existing satellite systems that provide hotspot data.

Learn more about the viewing angle for WildFireSat satellites in the Fall 2025 Canadian Wildland Fire and Smoke Newsletter by Canada Wildfire:

- https://www.canadawildfire.org/_files/ugd/90df79_a665eeef93444cae86af18138e8ab9e8.pdf

PROGRESS OF PRODUCT DEVELOPMENT

Presented by Mark de Jong, Julia Harvey, Geoff Goetz, Matthew Ansell and Alan Cantin

The progress on the WildFireSat satellite data products continues, and the core products are described in the WildFireSat Science and Applications Plan that was published in early 2025. This document was written mainly in 2023/24 and represents the WildFireSat Science Team's initial vision for products. However, any individual product is subject to change based upon the ongoing research and development process and feedback from fire managers. Over the past year, the Science Team has been working on the products shown at the 2024 workshop, to include the feedback that was received to date from fire managers.

Mark shared a personal perspective from the 2024 workshop and asked the participants if they agreed with his change in perspective. His original thought was that **fire managers are overwhelmed and don't want to be bogged down in complexities and detail**. However, after the 2024 workshop, his perspective is now that **when the situation permits, fire managers like to be able to dig down into layers of detail**. This helps to build confidence and understanding in the product for the occasions when there is limited time and the results may not be what was expected. Real-time polling during the meeting suggested that the participants generally agreed with this sentiment (**Figure 2**); there is a need for more detailed information beyond simple, high-level products such as hotspots.

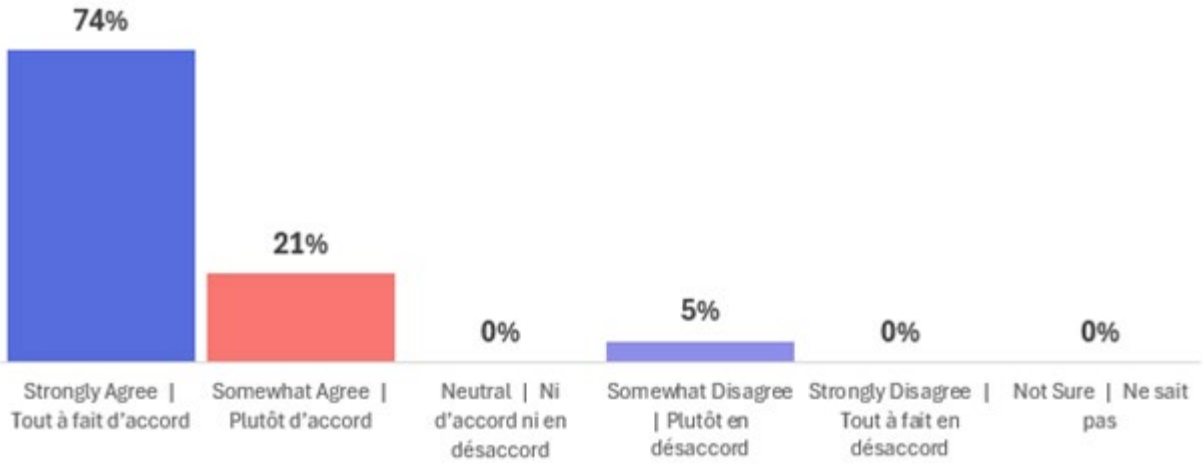

Figure 2. Participant response to the perspective that "fire managers prefer simple, high-level information during operations, but appreciate being able to explore detailed layers when time allows".

Our perspective from this survey is that the contextual information is important not only for interpreting the data, but also for understanding its limitations. For example, current hotspot products are often displayed online without accompanying swath information, making it difficult to determine whether hotspots are absent due to the lack of fire on the landscape, or due to sensor obstruction by cloud cover or large smoke plumes. Knowing where these limitations occur can help users better interpret apparent gaps in the data. For instance, under a large smoke plume showing no hotspots, there are almost certainly additional obscured hotspots not being detected. This is similar to how fire managers want to see the weather inputs, and not just the Fire Weather Indices, to better understand what is influencing the current conditions.

Progress across the three WildFireSat Tiers continues with the following highlights and integration of fire management feedback to date.

Tier 1 updates

Tier 1 products provide information on fire locations and characteristics, exclusively from WildFireSat data. Recent progress and/or updates include:

- Working on expressing hotspot confidence and flagging fires near or overlaying cloud and water.
- Developing new basemap products based on raw satellite imagery and the fire swath product to allow for better interpretation of hotspots. These products are new developments not yet reflected in the Science and Applications plan, being developed as a direct result of feedback from fire managers at the 2024 workshop.

Tier 2 updates

Tier 2 products combine data from WildFireSat, VIIRS and potentially other satellites to calculate observed rates of spread and progression, fire direction, and fire intensity. Recent progress and/or updates include:

- Working to incorporate suggestions around data visualization, where compatible with the operational data production timelines.

- Burned area product is now a lower priority, non-core product based on feedback from fire managers.

Tier 3 updates

Tier 3 products aid situational awareness and support fire growth modelling. Recent progress and/or updates include:

- Prototypes for all four products have been developed and are undergoing refinement.
- Based on feedback from the 2024 meeting, changes have been made to perimeter segmentation and visualization.

For Tier 3 products, we had a discussion on the use of national weather and fuel data vs. agency data. The perspectives in the room indicated a preference for regional integration at the agency level of fuel and weather data. Currently Tier 3 will use the best available national composite of fuel provided by the agencies, and there are no plans to default to national maps for fire growth assessments and perimeter segmentation products. Conversations will continue regarding the use and source of fuel and weather data and the appropriate implementation within agencies.

Discussion on data access

Discussions were held on data accessibility, privacy and sensitivity as it relates to situations such as new fires, fire growth and incidents involving community impacts, legal proceedings, or other sensitive circumstances. One topic centred around the timing of public data access relative to access by wildfire agencies. Although similar data is currently available from private sector and international government sources, WildFireSat data will be provided by the Government of Canada. Some participants noted there could be potential implications if the public can view data before agencies have had an opportunity to validate results, interpret them within an operational context, and develop appropriate public communications. Risks include the potential for misinterpretation, which in turn could hinder emergency management activities. One example of this is the distinction between new hotspots and new wildfires. WildFireSat will provide hotspot data, but it remains the agencies' responsibility to validate and confirm if they are new wildfires. The WildFireSat team acknowledges this is an area that requires further exploration.

Product prototype examples

The following figures (**Figures 3 - 7**) are examples of products currently in development, created primarily using VIIRS data as a substitute for WildFireSat. These are not final representations of WildFireSat products and are subject to change.

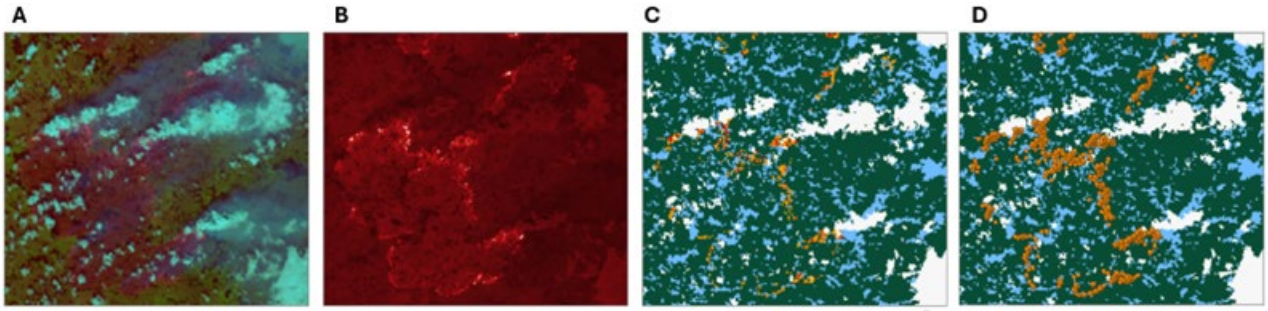

Figure 3. Example of new 'basemap' products using VIIRS data. From left to right: A) false colour composite imagery (representing something close to what the human eye can see); B) mid-wave infrared imagery (is good for highlighting hot features, like fires); C) classification of image pixels into water, forest, fire and clouds/large smoke plumes and D) hotspots overlaid on the classification image. With the context of the classification image (C) a user can visually inspect and assess if there are potential hotspots being obscured, e.g., under the dense smoke that acts like a cloud blocking satellite detection. These products can be useful for detecting un-reported fires, assessing how well hotspots represent actively burning areas of the landscape during large fire events, and any number of tasks where it is important to know where wildfire activity is occurring.

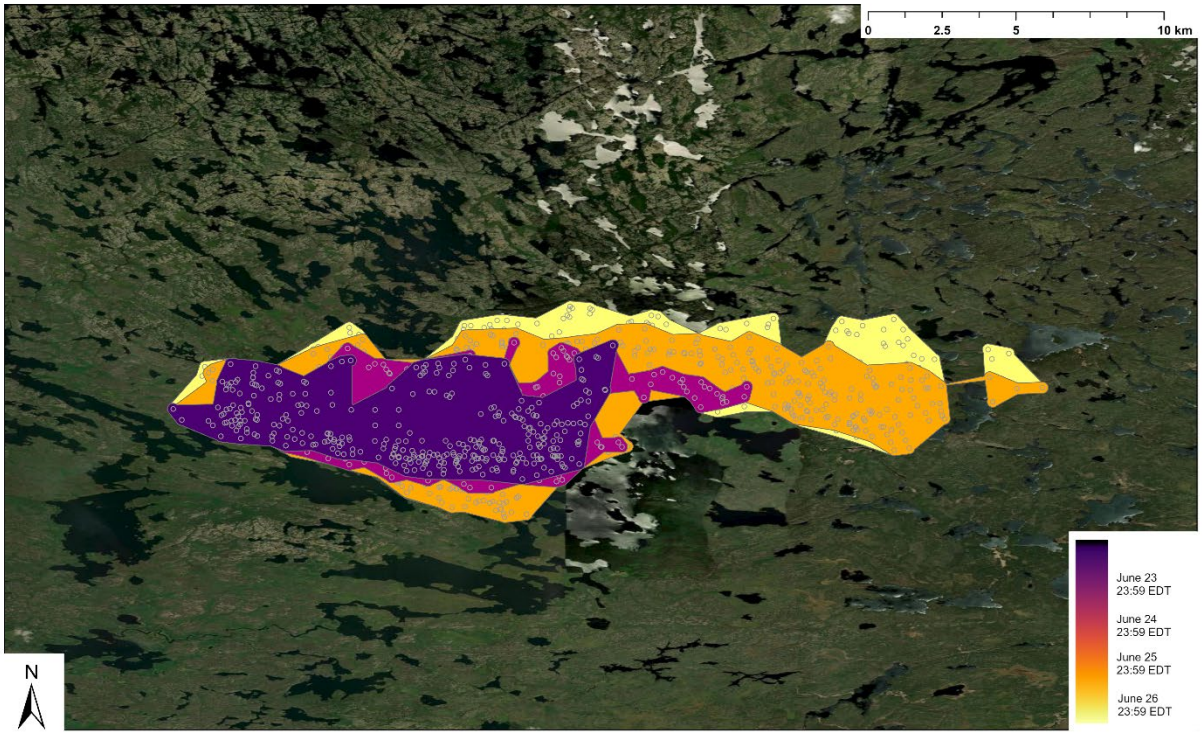

Figure 4. A 'fire progression' map illustrating the growth of a wildfire observed over time. This map is produced using hotpots and the estimated perimeters (also available as separate products). This example uses MODIS and VIIRS data. These products can be useful to track fire growth through time in an automated way. This can be a useful tool for briefings, providing insights for planning wildfire response, and also after-action review (e.g., what was expected vs. what occurred).

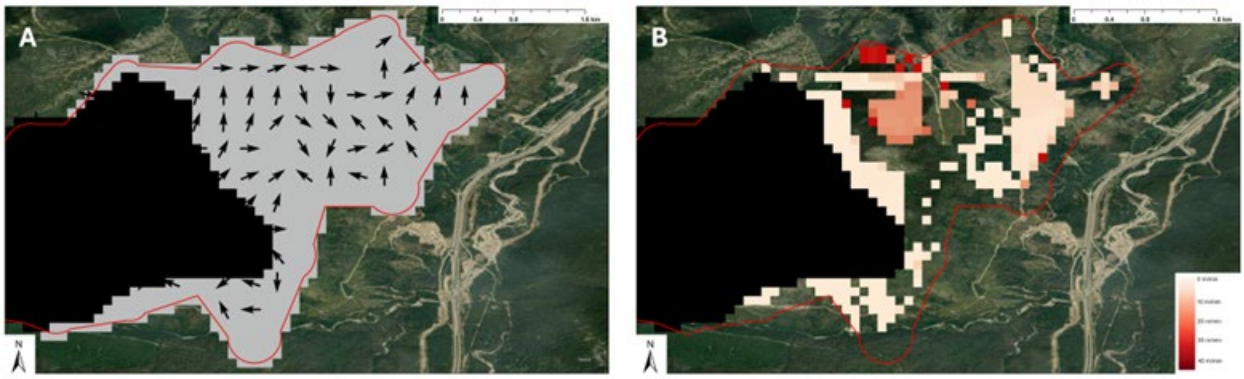

Figure 5. Examples of data illustrating aspects of observed fire behaviour. A) the direction of spread between different satellite observations; B) the rate of spread between different satellite observations.

(**Note:** visualisation of these products is not finalised; the presentation of direction arrows in A) and data 'gaps' in B) are likely to change). These examples use MODIS and VIIRS data, and that can tell us what has happened recently (not what is going to happen). This can be used to consider how a fire was expected to behave and if it did or did not behave in a certain way at a fine scale. This can help provide insights to those assessing where a fire could go and how quickly by considering how a fire was observed to behave recently. For example, if there is no change in the weather the next day and similar fuels are present, this can help inform predictions on where fires could spread in the future.

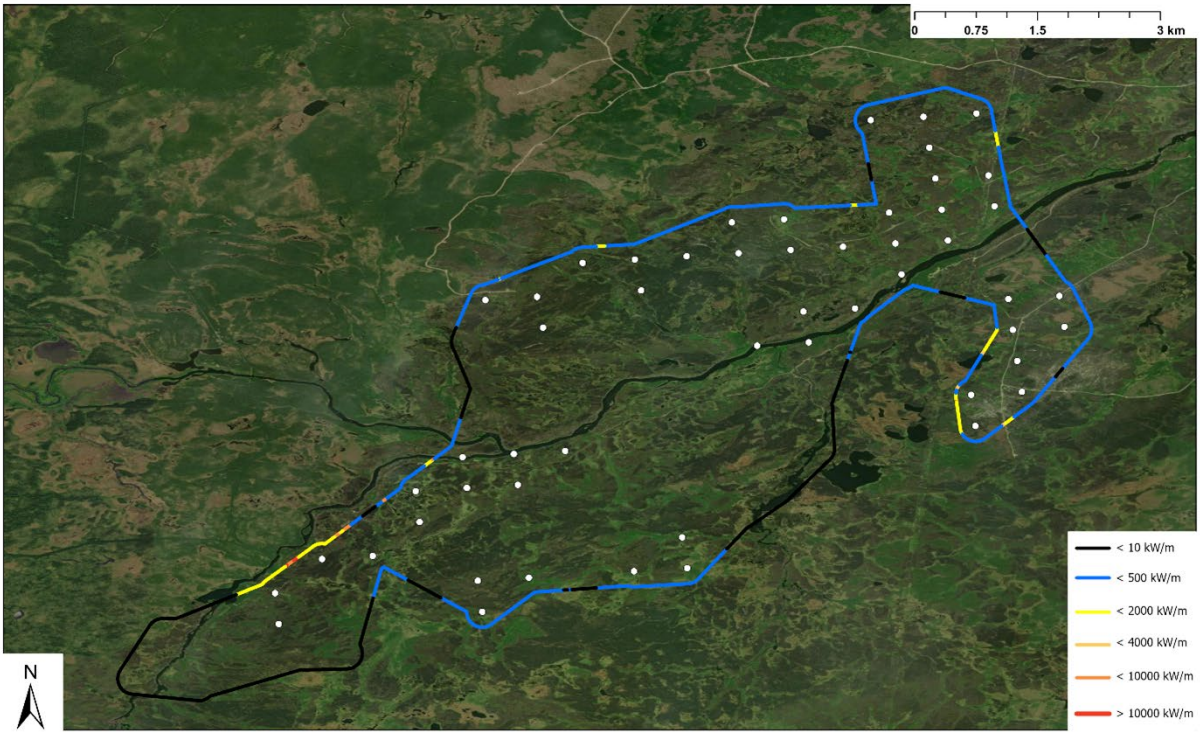

Figure 6. an example of an estimated fire perimeter using hotspot data and visualized by intensity. Estimating a fire perimeter is useful for planning resource needs; and, when coupled with intensity, can provide insights to those planning fireline tactics. For example, some suppression methods may be more or less effective based on the intensity of the fireline.

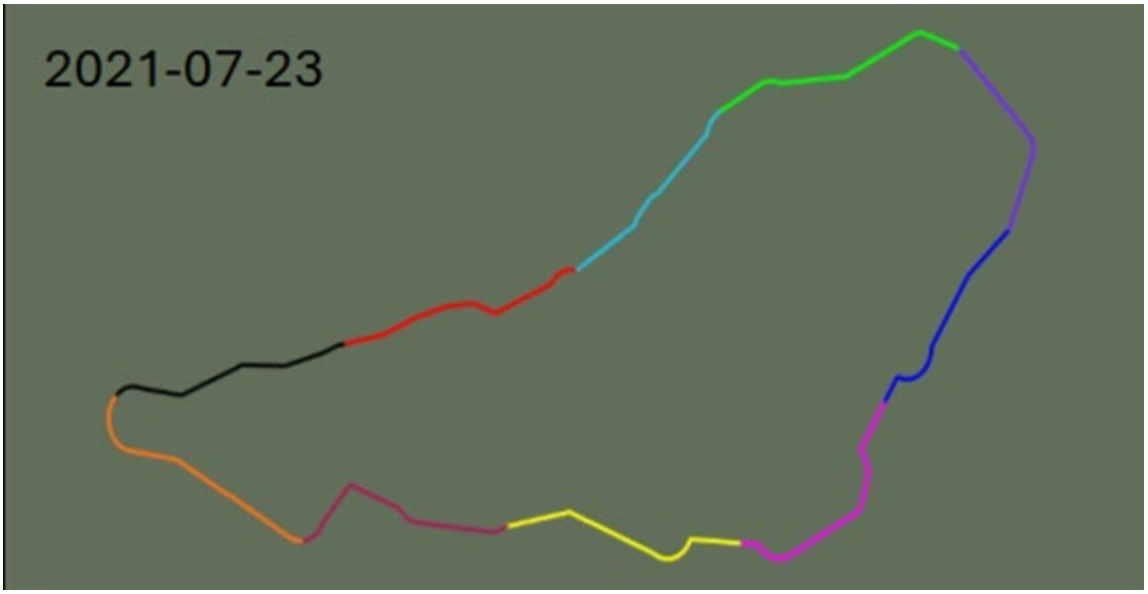

Figure 7. With very large and very long-duration fires it can be difficult to assess which portions of the perimeter are active to different degrees. Some fuel types experience little to no fire spread until critical thresholds in drought and/or initial spread indices are reached. This product breaks the perimeter up into segments based on similarity in fire intensity and fuels. Details of the most recent spread day on each segment is provided in easily read tables. This product simplifies the decision-making process around how to provide active fire perimeter information to fire growth models.

These are only some of the products currently being developed. One observation by the CFS team from this overview was a potential to interpret these products as being similar to existing operational products. For example, the product shown in **Figure 7** could be interpreted as operational segmentation, such as divisions, or interpreted through its colour scheme as indicating intensity or priority areas, for instance red being more important than blue. Similarly, products shown in **Figure 5** could be interpreted as predictions rather than observations, such as assuming the fire was predicted to spread in a particular direction at a given rate.

In the coming year, we will review products in smaller working sessions to develop an understanding of what each product represents and how it can inform different users in fire management (e.g., regional planners, dispatchers, Plans Chiefs, Fire Behaviour Analysts, and Operations Chiefs). This process will also support more purpose-driven visualization of the products and inform the design of interpretation guidance and training materials needed to enable rapid understanding and effective application of new intelligence products.

More information on the WildFireSat products can be found in the Science and Applications Plan, available here:

- Thompson, D. K.; de Jong, M. C.; Crowley, M. A.; Ansell, M.; Cantin, A. S.; Goetz, G.; Harvie, J.; MacPherson, L.; McFayden, C. B.; Oladipo, S.; Oliver, J.; Sloane, M.; & Johnston, J. M. (2025). WildFireSat Science and Applications Plan. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre. Information Report, GLC-X-38, 83p. https://doi.org/10.4095/st000016

ORGANIZATIONAL ARCHETYPES

Presented by Colin McFayden and Rob McAlpine

The purpose of this session was to obtain opinions from fire managers on the use of organizational "archetypes" to better design capacity development activities for the use and adoption of wildfire satellite data by fire management organizations. The session presented a set of archetypes describing fire management organizations in terms of their use of EO wildfire data derived from satellites.

The session used the archetypes from a study currently under review with the International Journal of Digital Earth at the time of writing:

- McFayden, C. B.; Dobbin, J. S.; de Jong, M. C.; Crowley, M. A.; Hope, E. S.; Turbelin, A.; Morton, D. C.; MacPherson, L.; Thompson, D. K.; Sloane, M.; Sponarski, C.; Nadeau, S.; Nason, S.; and Johnston, J. M. Under review. A mixed-methods approach to identify archetypes of wildfire management end-users of active fire Earth observation satellite data. International Journal of Digital Earth.

Measuring capacity

To determine where efforts should be focused to support the implementation and uptake of satellite fire data within fire management organizations, we first need to assess their capacity to do so. This includes identifying strengths and weaknesses that can be leveraged or addressed to help organizations achieve a desired level of capacity.

The term capacity can mean many things, but here we use it simply to refer to an organization's capability to do something: which, in this case, is for fire management agencies to use and adopt wildfire satellite data. This includes achieving their desired level of integration, which requires the ability to access, transform, interpret, and apply satellite data for wildfire management purposes.

This presentation continues the dialogue on a conceptual approach for assessing organizational capacity, with the goal of helping agencies prepare for WildFireSat ahead of its launch.

We first presented three different approaches and scales for understanding organizational needs and the resulting capacity. Each scale offers a distinct lens, allowing for a more refined understanding of organizations and their needs. These approaches range from individual interviews, to indicators, to archetypes, each providing different types of insight.

- **Interviews** (fine scale) are used to elicit perspectives on how an organization functions in practice and the capabilities they have to use and adopt satellite fire data. They are designed to uncover contextual factors that may not be observable through documents or quantitative measures.
- **Indicators** (moderate scale) are measurable and comparable signals used to assess organizational capacity to use and adopt satellite fire data. They use proxy measures for complex concepts that may not be directly measurable. These indicators can be tracked across time and between organizations. Indicators are not direct measures of capacity itself; instead, they represent structured evidence that capacity-related conditions are present, improving, or declining.

    - For example: the "National Readiness Index" which captures the readiness of province and territory fire management agency readiness to adopt and use WildFireSat considering measurable attributes of understanding, organizational factors and information technology within agencies.
    - Read more about the readiness indicator here: McFayden C.B.; Hope, E.S.; Boychuk, D.; Johnston L. M.; Richardson, A.; Coyle, M.; Sloane, M.; Cantin, A.S.; Johnston, J.M.; and Lynham T.J. Canadian Fire Management Agency Readiness for WildFireSat: Assessment and Strategies for Enhanced Preparedness. Fire 2023, https://ostrnrcan-dostrncan.canada.ca/handle/1845/229197
- **Archetypes** (broad scale) represent common profiles or types of fire management organizations based on the organizational traits for fire management and the use and perspectives regarding satellite data. Rather than scoring capacity like an indicator, archetypes classify organizations into meaningful 'types' based on combinations of characteristics, behaviours, and structural features.

We presented that there are trade-offs between methods for assessing organizational capacity. Interviews, for example, are time-consuming and can be costly. Many interviews may also be needed to develop a sufficient understanding of an organization, which makes this approach difficult to apply when working with many organizations.

Indicator-based approaches require a robust conceptual model, well-designed indicators, and access to relevant data. However, they are more easily replicable and, when designed well, can measure progress in a more consistent and quantified way. Data collection may still require significant time and effort, particularly when data availability and comparability vary across organizations.

Archetypes are especially useful when working across many organizations and may be the simplest approach to apply. This is particularly relevant for global fire management organizations, which vary widely across contexts and landscapes. We hypothesize that, with sufficient upfront effort to define and describe archetypes, organizations can self-identify where they fit. This can then be used to identify shared capabilities and common needs within each archetype.

Archetype models can lack the detail of other methods but may serve as a baseline concept testing framework which can provide valuable initial insights into groupings and organizational capabilities for EO satellite fire data adoption and use.

Determining archetypes

In 2023, the Committee on Earth Observation Satellites (CEOS) Working Group on Disasters, Wildfire Pilot conducted a global survey to better understand wildfire management organizations and their use of EO wildfire satellite data. The survey received 247 responses from organizations across 56 countries that self-identified as operational wildfire management organizations.

Additional details on the survey can be found in the following report:

- McFayden, C. B.; MacPherson, L.; Crowley, M. A.; de Jong, M. C.; Turbelin, A. J.; Hope, E.; Lynham, T. J.; Sponarski, C. C.; Nadeau, S.; Sloane, M.; Dufour, D.; Morton, D. C.; & Johnston, J. M. 2024. Initial observations from surveying the global fire management community and their usage of Earth observation wildfire data sources. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre. Information Report, GLC-X-37. 15p. https://ostrnrcan-dostrncan.canada.ca/handle/1845/275072

As described in detail in McFayden et al. (under review[1]), six fire management organizational archetypes were identified based on patterns of EO wildfire satellite data use which were:

- Curious: organization is aware of satellite fire data, but it is used rarely and inconsistently. Integration, trust, and capacity are low, though isolated advocacy exists.
- Nascent: Uses and trusts satellite fire data regularly, but integration remains limited. Technical capacity is present, yet training, specialization, and formal embedding are weak.
- Pragmatic: Uses satellite fire data tactically in operations with accessible data and solid technical skills. Training and specialization are limited, and adoption remains narrow despite policy support.
- Generalist: Routinely uses satellite fire data operationally with strong training and high trust. Use is widespread but not strategic, with limited policy alignment or product development.
- Specialist: Highly expert users focused on research or niche applications rather than core operations. satellite fire data use is deep but narrowly applied.
- Leader: satellite fire data is fully embedded across operations, decision-making, and research. Very high trust is supported by strong policy, training, and R&D, enabling mature and comprehensive use.

A discussion on archetypes with fire managers

To explore whether the archetype approach resonated with fire managers, we separated participants into several tables for guided conversations. A CFS person was stationed at each table to guide conversations and record responses. We asked participants whether the archetypes made sense to them, and what they felt was strong or missing. We also asked which factors they believed determine which archetype is an appropriate end goal for an organization. This included questions about where an organization needs to be; what drives or informs that determination; and which agencies feel they are not currently where they need to be, and how they might get there.

Overall, participants felt that the archetype framework was strong in its ability to simplify and organize a complex space, and it broadly resonated with their experience. No clear additional

[1]McFayden, C. B.; Dobbin, J. S.; de Jong, M. C.; Crowley, M. A.; Hope, E. S; Turbelin, A.; Morton, D. C.; MacPherson, L.; Thompson, D. K.; Sloane, M.; Sponarski, C.; Nadeau, S.; Nason, S. and Johnston, J. M. Under review. A mixed-methods approach to identify archetypes of wildfire management end-users of active fire Earth observation satellite data. International Journal of Digital Earth.

archetypes were identified as missing. At the same time, participants emphasized that the archetypes are necessarily a simplification. In practice, most organizations sit somewhere in the middle, with overlapping boundaries between archetypes rather than clear or discrete distinctions. Movement between archetypes was seen as fluid and context-dependent, rather than a linear progression.

Participants also highlighted that archetypes are rarely applicable at the level of an entire organization. Different business areas within the same organization may reasonably align with different archetypes depending on their intent of use, dependency on the information, and functional role. Operational users, policy groups, researchers, and administrative units may therefore occupy different positions, even when working within the same organizational mandate. This reinforces the idea that archetypes are best applied at the level of business functions or use contexts, rather than as a single organizational label.

When discussing appropriate end goals, participants consistently noted that not all organizations, or parts of organizations, need to aim for the same level of capability. End goals depend strongly on organizational context, accountability, scope of responsibility, and how the information is used. Rather than striving for "leadership" in a hierarchical sense, participants described the goal more in terms of mastery or fitness for purpose: having sufficient capability, integration, and confidence to use the information effectively for their specific needs.

Several factors were identified as constraining organizations from reaching the archetype they aspire to. These included a lack of clearly defined tools, limited ability to integrate information into existing workflows, resource constraints, and uncertainty about how products will ultimately be used. Trust also emerged as an important factor, particularly where organizations rely on others with higher levels of expertise or capability. In these cases, progress depends not only on internal capacity, but also on confidence in external partners and intermediaries who can support interpretation, integration, and application.

Taken together, these discussions suggest that the value of the archetype framework lies not in categorizing organizations rigidly, but in supporting reflection, dialogue, and shared understanding of needs, capabilities, and realistic pathways forward.

To further assess whether organizations are currently where they want or need to be in terms of their Earth observation (EO) user archetype, we posed three questions and collected real-time feedback online via participants' smartphones. Twenty participants took part in the survey, representing primarily provincial and territorial fire management organizations. Respondents were asked to base their answers on their broad understanding of their organization.

The three questions were:

1. Which archetype do you feel best represents your organization at present?
2. Which archetype do you feel your organization needs to be at now?
3. Which archetype do you feel your organization needs to be in the future?

In terms of the current state, most organizations reported being generalists. The next most common responses were curious, followed by similar numbers of nascent and pragmatic

organizations. Three respondents indicated that their organization currently aligns with the leader archetype (**Figure 8**).

When asked where their organization should be at present, responses shifted toward generalist, specialist, and leader archetypes (**Figure 9**). This shift suggests that many organizations perceive a gap between their current capabilities and where they feel they need to be, indicating a need for further capacity development.

Looking to the future, responses were nearly evenly distributed among generalist, specialist, and leader, with no respondents selecting archetypes associated with lower levels of integration (**Figure 10**). This likely reflects respondents' expectations of increasing fire activity and a growing need for EO-based fire intelligence in the future.

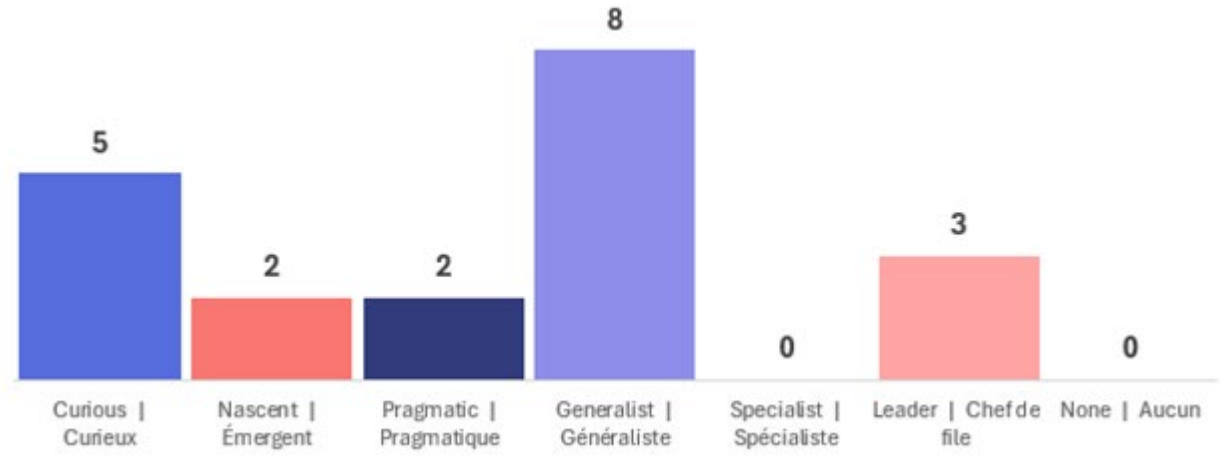

Figure 8. Responses to question 1) Which archetype do you feel best represents your organization at present?

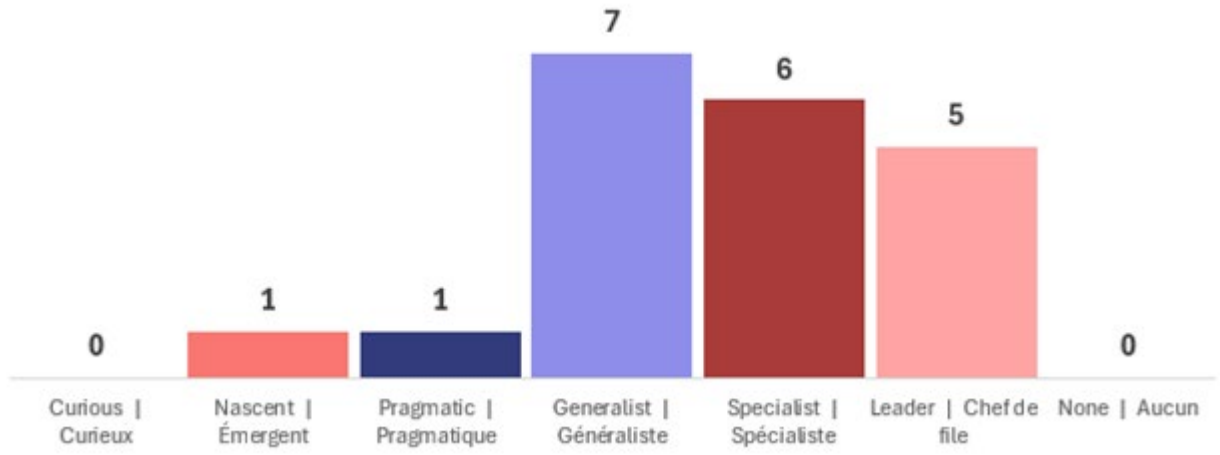

Figure 9. Responses to question 2) Which archetype do you feel your organization needs to be at now?

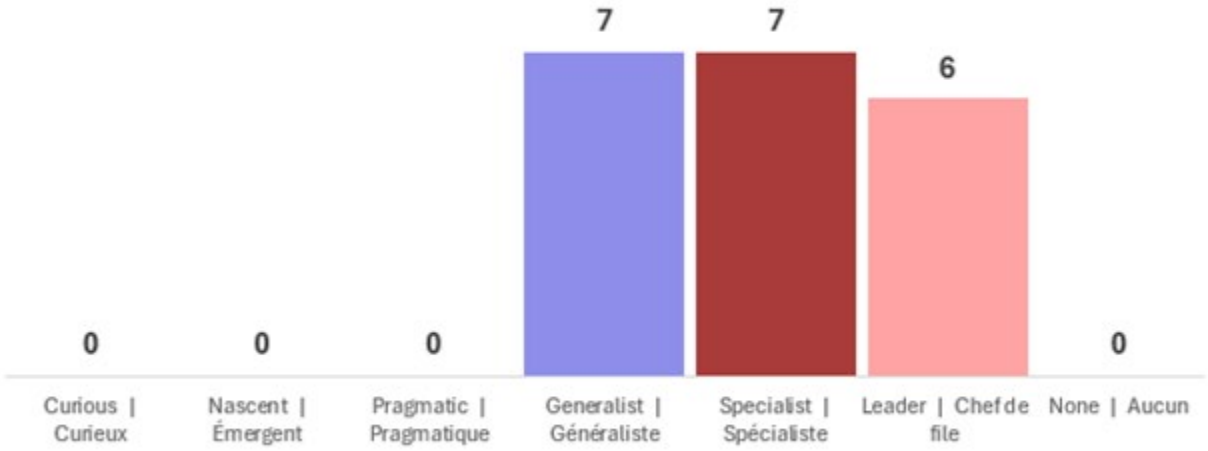

Figure 10. Responses to question 3) Which archetype do you feel your organization needs to be in the future?

Overall, the use of archetypes to guide organizational aspirations and capacity development appears to have merit. While this was a small case study involving primarily province and territory fire managers and therefore may not fully represent all fire management organizations in Canada, the results are encouraging. The dialogue reinforced confidence in the usefulness of archetypes as a tool for structuring EO capacity development conversations. Future work is needed to better define the capabilities, resources, and integration efforts required to achieve each archetype, and to support organizations in progressing toward their desired state.

CAPACITY DEVELOPMENT FUNDING FOR FIRE MANAGEMENT ORGANIZATIONS

Presented by Colin McFayden

This presentation provided a summary of the 'WildFireSat Remote Sensing Capacity for Use in Fire Management program'. Starting in fiscal year 2026/27, $6 million over three years ($2 million per year) has been allocated by the WildFireSat mission to support Canadian wildland fire agencies and emergency management organizations in enhancing their use of WildFireSat data products.

The objectives of the program were presented, which are to increase:

- Education in the use of Earth observation (EO) satellite wildland fire products.
- Expertise in the use and interpretation of EO satellite wildland fire products within wildland fire and emergency management organizations.
- Alignment and compatibility of information management technology to access and use EO satellite wildland fire products.
- Organizational capacity to use WildFireSat products.

The contribution program is open to Provincial and Territorial wildland fire management agencies, Indigenous wildland fire management, stewardship and emergency management entities, the Canadian Interagency Forest Fire Centre (CIFFC) and the Canadian Association of Fire Chiefs (CAFC). The program was open for applications as of October 1st, 2025, and will remain open for continuous intake of proposals until October 1st, 2026.

A group conversation was facilitated by CIFFC regarding fire management agency interest and ideas for project proposals with no Federal government participants present. Agencies expressed an interest in opportunities to access funding. The potential for collaboration between agencies will be discussed further, coordinated through CIFFC.

- Learn more about this funding opportunity: https://natural-resources.canada.ca/forest-forestry/forest-programs/wildfiresat-remote-sensing-capacity-fire-management-program

THE CANADIAN WILDFIRE INFORMATION FRAMEWORK

Presented by Justin Beckers

The WildFireSat products will need to be accessible to fire managers. The plan is that products will be available as interactive online maps and as downloadable web services compatible with common GIS and mapping platforms. The Canadian Wildland Fire Information Framework (CWFIF) is the next iteration of the Canadian Wildland Fire Information System (CWFIS). CWFIF is the next-generation data and service framework that will modernize and expand how wildfire information is produced and shared, building on capabilities currently delivered through CWFIS. The purpose of this session was to demonstrate key features of the CWFIF, increase awareness of the upcoming updates and encourage feedback.

The CWFIF has several data themes including:

- Weather (historical, observed and forecast) – weather station locations, precipitation, temperature, transport wind vector etc.
- Fire weather, including the Fire Weather Index System (FWI) 2025 (historical, observed and forecast) – Fire danger, daily severity rating, FWI etc.
- Fire behaviour (historical, observed and forecast) – Head fire intensity, rates of spread, fire type etc.
- Fire mapping and monitoring (interactive maps) – national burned area composite, agency wildfires, and WildFireSat products such as hotspots and estimated perimeters etc.
- Fire impacts – surface smoke (PM.25 observed and forecast), Canadian evacuation database etc.
- Forest and fuel characterization (historical and observed) – green-up, grass curing, Fire Behaviour Prediction System fuel type etc.
- Fire risk – National wildland fire urban, infrastructure and industrial interface etc.
- Fire occurrence prediction – lightning and human-caused fires etc.

WildFireSat will have products or otherwise feed information into the fire behaviour and fire mapping and monitoring sections. Importantly, the CWFIF will also link to the provincial and territory fire management agency wildfire pages. The system will also include reporting functionality such as an interactive one-page summary of the national situation. Static maps will continue to be available for viewing and exports. There will also be an extensive data catalog with advanced search and filtering options.

A walkthrough of the current prototype was provided, including a demonstration of new visualization options for the FWI system codes and indices. The visualizations follow a modified approach of Hanes et al. (2021), in which colour ranges are tied to physical interpretations. This ensures that visualizations can be interpreted consistently across Canada, with colours aligned to meaning. For example, conditions of increasing concern transition from warning yellow to danger red (e.g., **Figure 11**).

- Read more about the visualization approach: Hanes, C. C.; Wotton, B.M.; McFayden, C.B. and Jurko, N. 2021. An approach for defining physically based Fire Weather Index System classes for Ontario. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre. Information Report, GLC-X-29. 35 p. https://ostrnrcan-dostrncan.canada.ca/handle/1845/245388

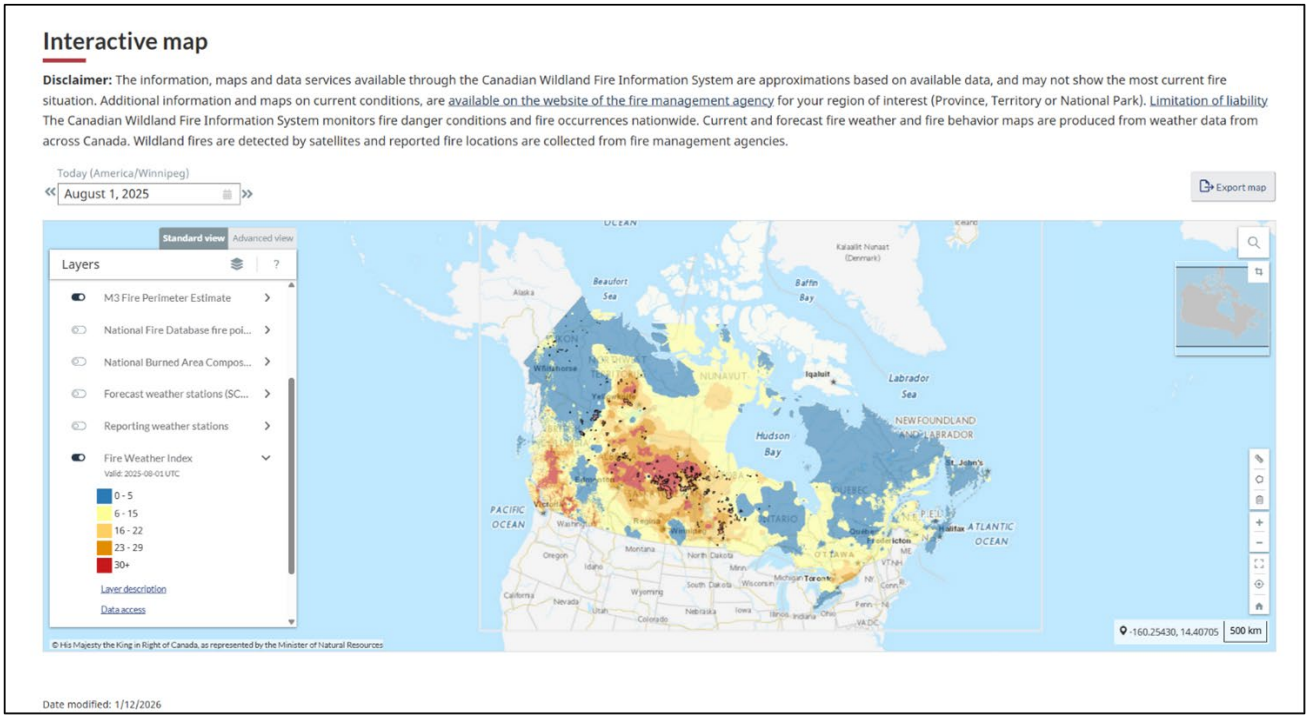

Figure 11. Example of an interactive map on the development site for the CWFIF.

SATELLITE WILDFIRE DATA EDUCATION

Presented by Maurice Lecours

This session focused on presenting the background, learning outcomes and curriculum development approach for the upcoming e-learning "Introduction to satellites in wildfire management". Developed by NRCan's Canadian Forest Service with thriveGEO and supported by Canadian fire management agencies, the curriculum will be released under an open CC BY NC 4.0 license, allowing use, sharing, and adaptation with proper credit and non-commercial use. Delivery includes downloadable instructor PowerPoint decks and e-learning modules on CIFFC's Learning Management System, available in both English and French.

The course is organized into three modules that progress from EO basics to applied operational use. Module 1 introduces what satellites measure, how they collect data, the types of orbits and sensors, and key concepts such as resolution. Learning objectives from Module 1 include explaining how satellite remote sensing supports wildfire management before, during, and after incidents; describing how satellites and sensors collect information about the Earth; comparing sensors used in Canada for active fire management; understanding how data latency and processing levels affect operational use; and recognizing how satellite data can be combined with other information to support fire management. Module 2 explores how EO information can support wildfire detection, hotspot monitoring, tracking, and situational awareness, with examples relevant to agency workflows. Module 3 reviews how satellite data can inform planning, resource deployment, and communication at regional scales.

Participants were invited to respond to several live polls to help guide future training development. When asked what kinds of learning opportunities would be most useful, the majority indicated interest in functional training tied to day-to-day operations. Technical topics such as data processing and analysis tools also ranked highly, reflecting a growing appetite for more advanced, workflow-integrated skill building (**Figure 12**). Participants identified microlearning as a preferred format, short, focused lessons that can be completed between operational tasks. There was also interest in quick guides and one-pagers to make EO concepts more tangible and easier to integrate into existing practices. When asked how EO or remote sensing training currently fits within their agency's fire management program, most participants reported relying on informal or ad-hoc learning, with relatively few having established EO or GIS training (**Figure 13**).

These insights point to a path forward to expanding practical, accessible EO training. Additional work is required to not only make training available and tailor it to the learning needs, but to also look for opportunities to formalize training moving from a largely ad-hoc or absent approach today to a more directed and purposeful approach.

In addition, there was discussion around what wildfire managers need to know in order to be able to understand and apply the different products in decision making. To do this we need to evaluate the different products and identify the associated educational components. This can then be compared against existing training, knowledge gaps and readiness to identify gaps and future training opportunities.

Also, existing national and agency training courses will need to be updated to include the availability and use of EO products.

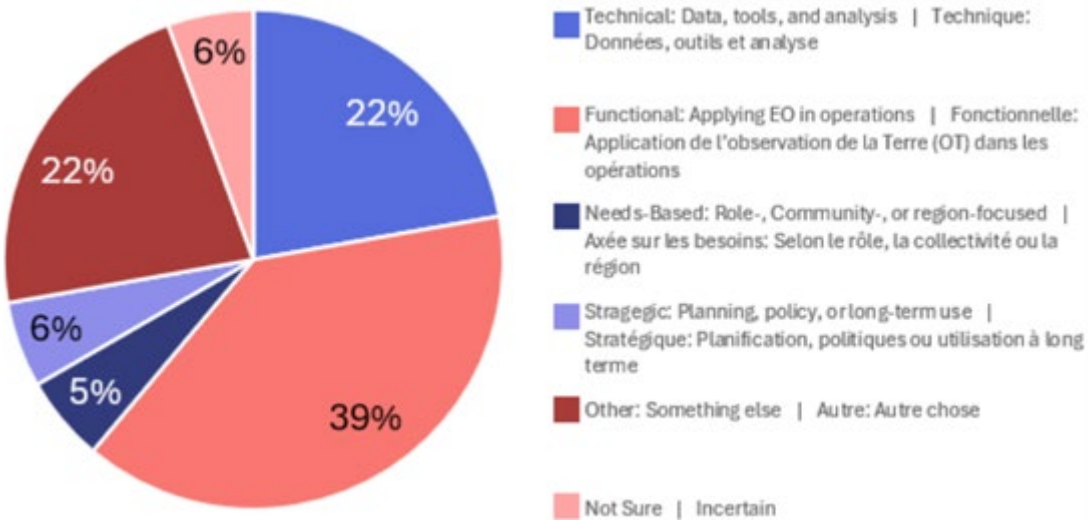

Figure 12. Participants were asked, "What other types of Earth Observation (EO) learning would be useful for your organization?" The largest share (39%) identified functional training focused on applying EO in operations as the most useful, followed by technical training on data, tools, and analysis (22%) and other learning needs (22%). Smaller proportions identified needs based (6%), strategic (6%), and not sure (5%) responses.

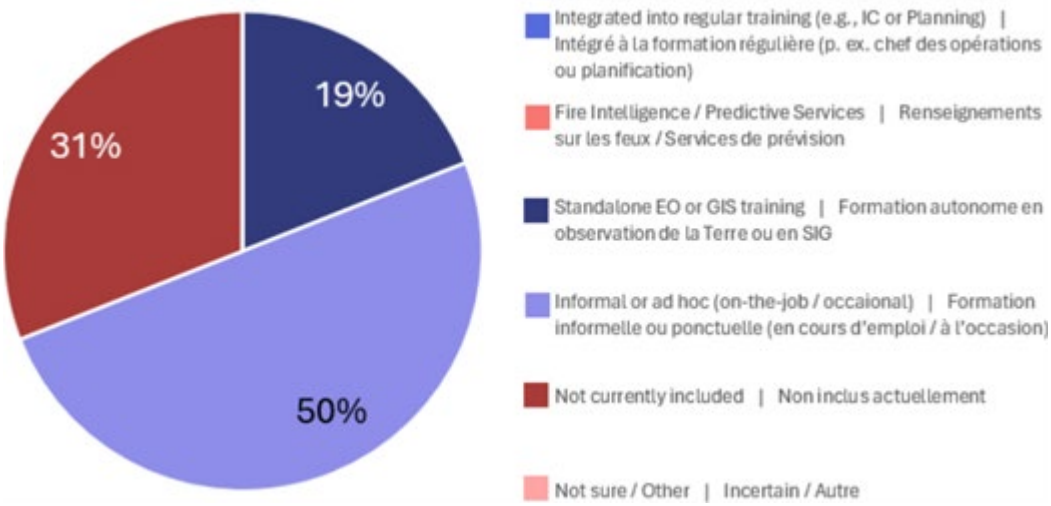

Figure 13. Participants were asked, "How does Earth Observation (EO) or remote sensing training currently fit within your agency's fire management program?" Half (50%) reported training is delivered informally or ad hoc, some (31%) said it is not currently included, and the remaining (19%) said it is offered as standalone EO or GIS training.

DISCUSSIONS ON THE WILDFIRESAT SANDBOX

Presented by Alan Cantin

The 'sandbox' is a virtual testing ground under development with CIFFC to allow fire managers to explore WildFireSat data products, provide feedback and gain experience to consider what is required for the eventual integration of those products within their workflows and information technology systems. The sandbox is aiming to be available sometime in 2026 to a limited number of testers and will only be available up until satellite launch.

The purpose of this presentation was to provide a status overview, and walk through a prototype. The WildFireSat sandbox is not a live, real-time platform but instead is designed to provide a close mock-up of WildFireSat products using alternative data sources, such as VIIRS, but formatted to reflect how the operational WildFireSat products are intended to appear. Currently, a set of wildfires has been jointly selected by provincial and territorial fire managers and the WildFireSat development team.

A prototype sandbox has been developed but additional work is required before a version will be available to be tested. This iteration of the sandbox will be hosted by CIFFC. The presentation walked through a list of high and medium priority work and sought feedback on which features and attributes are the highest priorities, and which means of access is the preferred.

Top priorities identified by the participants for the user interface features were:

- A table listing the full feature information for each product;
- Option to select by event;
- Export map option;
- two-ended date and time slider.

Top attributes identified by the participants for the user interface features were:

- Ease of use;
- Realism and accuracy of data;
- Interactive and customization;
- Performance speed.

Discussions were held on the needs for secure data and log-ins, as well as how to determine the test users. The general preference from the feedback was for the Fire Management Knowledge Exchange Team to recommend the testers within their organizations and password protected accounts. Currently the development team is focusing on consistent data standards between product development tiers. Once the sandbox is ready for deployment (spring 2026) the WildFireSat team will compile a limited list of testers, provide accounts and a means for collecting feedback.

PARTICIPANT ORGANIZATIONS

Province and territory wildfire management agencies:

- Alberta
- British Columbia (virtual)
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Northwest Territories
- Nova Scotia
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan
- Yukon
- *Canadian Forest Fire Interagency Centre

Municipal fire departments:

- Canadian Association of Fire Chiefs

Federal government fire management and related groups:

- Canadian Forest Service
- Canadian Space Agency
- Department of National Defence
- Parks Canada
- Public Safety Canada

*CIFFC is a federally incorporated not-for-profit that is owned and operated by the federal, provincial, and territorial wildland fire management agencies.

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