KNOWLEDGE EXCHANGE AND ASSESSING WILDFIRE MANAGEMENT AGENCY READINESS FOR WILDFIRESAT

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ABSTRACT

Responding to the many challenges wildland fire managers face, the Government of Canada is designing and launching a new wildfire monitoring satellite system, WildFireSat. WildFireSat is the first public satellite monitoring system designed in conjunction with frontline fire managers in Canada, responding directly to their needs (Johnston et al., 2020). Currently under development, the satellite mission has an anticipated launch targeted for 2029. The data products from WildFireSat are anticipated to be transformational for operational situational awareness and decision-making. WildFireSat will provide unprecedented, daily, near real-time strategic intelligence on all active wildfires across the country. The resulting intelligence products will be timed to provide agencies with the information needed to make critical decisions at key points during the planning process (Canadian Forest Service, 2023).

Experience tells us that having new information available does not always mean there will be uptake (McFayden et al., 2022). Preparing ahead of launch will allow fire management agencies to better position themselves to benefit from WildFireSat. In this presentation we discuss (1) knowledge exchange in fire management, (2) an assessment of the readiness of Canadian fire management agencies to integrate WildFireSat, and (3) guidance for reducing readiness gaps. This will be a joint presentation with presenters from the WildFireSat mission team and the Government of the Northwest Territories.

WildFireSat is unique in that the resulting information system will be tailored to the needs of fire management across Canada; this will require engaging in knowledge exchange (KE) with fire management agencies. We view KE as an overarching process where knowledge is collaboratively created, shared, and transformed (see McFayden et al. in-press and references therein for more detail). KE is crucial for the successful development and integration of fire science with fire management. McFayden et al. (in-press) draw attention to readiness for innovation as a potential barrier or facilitator to success. Leaving the adoption of WildFireSat products to passive efforts is a high risk to fire management agencies, jeopardizing their ability to achieve the full benefit possible. Assessing end-user readiness pre-launch creates a baseline from which we can identify what different agencies require for support with further KE efforts.

In McFayden et al. (2023), we assessed this baseline of readiness for WildFireSat generally following the steps of Knol et al. (2010). We approached readiness as a two-level hierarchy, with the first level defining three primary components of readiness: understanding, organization and information management and information technology (IMIT). Secondly, we used environmental, survey and agency data to derive indicators for these three components of readiness, which we iteratively scored and weighted. Our scoring and weighting process is subject to some uncertainty, which we addressed via a Monte Carlo simulation that allowed us to assign distributions of probability to variables within the readiness calculations. Appropriate shapes for these distributions were elicited from discussions with the fire management agencies, generating distributions of "readiness" for the three core components for each agency. We then calculated a readiness index as the minimum value of the three readiness components (understanding, organization, and IMIT). We propose that all three readiness components are needed to support overall agency readiness, with the smallest

component constraining the overall level of current readiness (analogous to having three pillars to make a raised platform; the shortest pillar determines the height). We preformed a cluster analysis on the fire management agency data to explore similarities between agency readiness attributes. We concluded by suggesting general strategies to improve readiness, such as by increasing education and training and ensuring compatibility of information management and technology within the agencies.

The results of this analysis suggest that national gaps in understanding, organizational adaptability, and IMIT agility can be addressed to enhance the potential benefits from WildFireSat. The strategies identified through the engagement can inform actions to close the readiness gaps. Data on the similarities and differences between agencies can guide collaborations, where agencies with common gaps can work together and learn from those with complementary strengths. However, we also provided agency specific assessments, working directly with the agency to identify specific needs relative to their individual readiness assessment. The Northwest Territories is one example, where current capacity in IMIT and familiarization with remote sensing products should facilitate seamless integration. The greatest effort will focus on increasing understanding leading up to the launch of WildFireSat.

Keywords— satellite, wildfire, forest fire, fire management, smoke forecasting, air quality, situational awareness, suppression, fire intelligence.

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