

**Wildfire Operations Research**  
**Advisory Committee Meeting Minutes**  
**March 8, 2016**

**LOCATION**

Northern Forestry Centre, CFS, Edmonton, AB

**ATTENDEES**

**FPINNOVATIONS**

Dominic Roser

Ray Ault

Greg Baxter

Jim Thomasson

Rex Hsieh

Steve Hvenegaard

Roy Campbell

**GOVERNMENT**

Dave Schroeder, Quentin Spila, Tanya Letcher

Alberta Agriculture and Forestry

Patrick Loewen, Cordy Tymstra,

Alberta Agriculture and Forestry

Chris Dallyn (on-line)

Saskatchewan Environment

Dan Thompson, Kerry Anderson , Rod Suddaby

Canadian Forest Service

Brian Simpson, Josh Johnston, Brian Wiens

Canadian Forest Service

Wes Steed

Government of the Northwest Territory

Dave Bokovay, Marc Mousseau (on-line)

Canadian Inter-Agency Forest Fire Centre

Andy Low, Dave Merrick (on-line)

Colin McFayden (on-line)

Vern Marshall, Colin Urquhart (on-line)

## INDUSTRY

Travis Holder

Rick Solomon

Rob Hyslop

Jeff Berry, Revie Lieskovsky

Mark Campbell

George Day

Tom Schicks (on-line)

British Columbia Wildfire Service

Ontario Ministry of Natural Resources

Wildland Fire Management, Yukon Territory

Campbell Scientific

Direct Injection Inc.

RGH Pacific EMS

Conair Aviation

ICL Performance Products

EVS Solutions

University of Toronto

Meeting begins at 0900

Ray Ault and Dan Thompson review the Safety procedures for NoFC.

Ray Ault begins introductions.

Minutes tabled and approved by Q. Spila, seconded by J. Berry.

For a review of all presentations please see:

<http://wildfire.fpinnovations.ca/AdvisoryMeeting/2016Spring/PresentationList.aspx>

The Minutes will focus on the discussion following each of the projects presented at the meeting.

## **Projects Completed Since Last Meeting**

### **1. UAV and Rotary wing Cost Comparison (Jim Thomasson)**

Q. Spila: this is assuming you use one UAV. What if you used more? A) The main factor is the short window spring scanning has to take place in. If it had to be done in 9 days it would cost a lot more as you increase the number of UAV's the number of people increase. If there was more time to complete, costs would be different.

Action Point – Jim will calculate and add more UAV's in a shorter time period and add to report.

Q) J. Berry – what is the accuracy? This project was not meant to test this, but Udaya Vepakomma of FPInnovations has performed accuracy tests. (The average distance from that point to the surveyed positions for the 4 grid points is 4.455m, with a max of 6.5837m and min of 2.274m)

Q) Josh Johnston – why scan? There are satellites that could do this. Also, this seems to be short range, can fixed wing UAV's do this? A) Only have looked at r/w UAV scanners. Regardless of type Transport Canada regulations require UAV's be in line of sight range which limits their flight distance.

## **Project Plans for the Summer of 2016**

### **2. Canopy penetration of airtanker drops in forest fuel treatments and untreated stands (R. Hsieh)**

Q) D. Schroeder – will you put cups out? A) Yes, and we may need help.

Project planned for end of April or early May, based on aircraft availability.

Q) Will there be foam or retardant? A) Just foam.

Q) Cordy T – are they separate drops into the treated and untreated plots? A) Yes.

Mark Campbell – what will be the results from this? You will need to pick up cups immediately if you are comparing to retardant (post-drip from trees will affect results).

Comment – Q. Spila – the Objective is to show Slave Lake residents that FireSmart works with visual evidence.

Comment – The proposed methods are similar to those used in the NWT with AT 802/ CL215 drop comparison. That report belongs to the GNWT.

Q) J. Johnston – where do coverage levels come from? A) Gallons/100 sq. ft. is a standard measure for airtanker drops.

### **3. Matching helicopter drop volumes to wildfire intensity (R. Ault)**

There was no powerpoint for this project so a short overview is presented:

For this modeling exercise FPI will collaborate with Mechanical Engineering at the University of Alberta. A Master's student will use this project for his thesis. Project will use the same radiant panel that was used for the gel, foam, retardant comparative testing project. Varying coverage levels on a bed of fuel will be used. Field data may be collected if allowed for by time and circumstance. The cost to FPIinnovations is \$20,000/year and will be matched by NSERC.

Comment: J. Berry – need to control the environmental factors – use a standard summer day.

R. Ault – We oven dry fuels to keep the same moisture content for each test. In the lab we are developing a relationship which we plan to validate in the field.

Comment: J. Johnston – SSM has an outdoor lab that has a bed of fuel and a tower where a drop tank could be set up. Have had fires up to 4000 kW/m. We could use cameras to document intensity and drop water to various coverage levels.

Comment : C. MacFadyen – will talk on this possibility.

Buckets will allow a known amount of water on a set area.

### **4. Determining the effectiveness of water-enhancing gel as a fire-control agent (R. Ault)**

Consult Work Plan on-line at:

<http://wildfire.fpinnovations.ca/104/EffectivenessofGelUsingHelicopterDropsonWildfire.pdf>

Comments: R. Solomon – very few dip tanks are available now.

Alberta – not considering aviation gel in the future, may move towards ground vehicle tanks.

Red Earth site has mulched areas where long term retardant can be applied and fire run towards it. This could be done through ground application to include water enhancing gel.

Q. Spila – this is a good approach.

D. Marek – drop volume calculation process should be the same used for gel. (coverage level)

R. Ault – FPIInnovation results from radiant panel tests showed foam more effective than gel.

J. Berry – controlling coverage level with ground application could be difficult. Very low coverage levels in mulch are able to stop fire spread.

R. Ault – plans are to start at highest coverage levels (8) and work down.

M. Campbell – find ‘sweet’ spot and then increase or decrease coverage levels.

Q. Spila – water will stop fire spread in mulch.

R. Ault – put retardant in front of fire and see how long it holds.

Air tankers can drop to knock down fire so ground crews are able to come in. We should look at worst case scenario. Can retardant be used for long term protection in mulch?

R. Solomon – has a product and application system. A retardant/gel is the answer. Testing this would get it more quickly through Missoula product testing system.

J. Berry – this takes one problem and solves it. It will let us know how much to drop on mulch and could result in saving dollars. Should know the DC (drought code) though as it will influence fire moving through deeper fuels and popping up on the other side of protection line.

Comment – ground access in the north for application is very different than in and around communities.

## **5. Fire behaviour and initial-attack crew capabilities in burning harvest debris (G. Baxter)**

## **6. Design and evaluation of a new wildfire sprinkler (R. Campbell)**

Q) C. Tymstra – why is there only one prototype? Could you do three and test as a full kit? A) We had considered building multiple sprinkler prototypes, but opted to test the design first. Building additional sprinkler prototypes is a future option i.e. a full kit, if the design proves workable and the committee felt it viable.

Q) J. Johnston – will you perform durability tests? A) We are just working with a prototype and proof of concept at this time. In fact, we may have to lighten the sprinkler materials in the future, it is very robust at this time. Definitely something to consider though.

R. Ault – Point made regarding prototype construction. We have developed several products and the question as to how we should hand-off to the manufacture promising products? For example, the NWT would like to buy an FPI designed ground torch. The wildfire program is not in the business of manufacturing. We are interested in advisory member thoughts on how we commercialize these prototypes for a small and limited market. If you have thoughts or ideas please let us know.

Q) How do you deal with student designs? Who owns the rights? A) Up front, we make it known to the students and University that our involvement will require the projects outcomes become Public. If not agreed to be public we do not proceed.

Comment – the market for these is very small. In the case of the sprinkler, we actually approached different companies hoping to gain their interest, but in one case they weren't interested and in another they made it very clear that they were not involved in the wildfire sprinkler business.

D. Roser – FPInnovations could be doing better in this area. We can work with I.P.'s and Canadian manufacturers.

## **7. In-line Mixing (R. Campbell)**

Comment: We want to test these latest changes, but if our mixing issue has not been resolved we will seek Advisory Committee direction this fall on the viability of further testing.

## **8. Using the environmental lapse rate to forecast wildfire blow-ups (G. Baxter)**

Where do we go from here?

G. Baxter – continue with case studies. Look at times other than when balloons are released to observe daily pattern typical of lapse rates. Compile the findings and circulate to experts in atmospheric sciences (Fire Meteorologists, Environment Canada) for their thoughts on the project and approach. Work this summer with Conair and the Kamloops Fire Center with data from an RJ85 Airtanker that is working a 42 day research contract in BC. Then summarize summer findings and present to Advisory Group at the Fall meeting.

C. Tymstra – get review from N. Nimchuk and M. Flannigan.

W. Steed – contact weather specialists.

Q. Spila – if this is viable then we could see the data being collected by birddog aircraft. Could get birddog to fly a minimum profile to collect data.

D. Schroeder – would like to see temperature profiles at different times and distances from where weather balloons are released.

J. Berry – would be worth viewing data from the RJ85 that is in Australia over our winter. Check around Dec 27/28 in the Melbourne area.

### **9. Developing a national fuels management reference database (R. Hsieh)**

Comment: W. Steed – Wes is wondering how good their data is and what is the minimum requirement for the database. Wes believes the quality of the data collected in the past may not be to the standard required for the database.

R. Hsieh – showed the group the minimum amount of data required by the database.

Comment: D. Schroeder – next year CIFFC is putting money aside to help agencies use the database.

## **Project Proposals**

### **1. Foam stick & foam fast applicator evaluation (R. Campbell)**

Campbell: Asked for feedback on testing methods; specifically asking ICL representative for their input.

Comment: M. Campbell – outline is good. Pressure is important as too much can rip the stick to bits and choke out applicator.

### **2. Develop rapid response kit for documenting challenged fuel treatments (S. Hvenegaard)**

Comment: C. Tymstra – do database collection protocols drive database OR does the database drive data collection protocol? A) It is database driven.

Comment – a literature review may provide insights into what can be collected and how.

### **3. Fire behaviour in old burn conifer regenerated stands**

R. Ault – we are looking at this as a grad student project. They could pull together all the data from the ICFME and CBCFS research fires in the NWT. They can also set up PSP's in burns from 0-20 years old. The challenge is that Students cannot rely on burning for their thesis and finish on time, so this is a database project.

Comment – C. Tymstra – Ellen from the Fire Partnership is working in a similar area, but is more ecological in terms of regen based on fire intensity.

May not have right question at this time – the literature says that 20 years is the threshold for re-burning; this may a better question and place to start.

R. Ault – these are early times, we have the site and access to all the burn data. FPIInnovations will talk with Mike Flannigan and Mike Wotton to come up with a research question and the possibility of working with a student.

#### **4. National wildfire agency interoperability workshop 2016 (Telecommunications Workshop)**

Q) NWT – Is this going to include multi-jurisidictions as a part of this? i.e., local fire departments and Territorial Fire? A) The request was to bring together wildfire-agencies for the first time in many years. Not planning to invite other juristictions.

#### **5. Literature review for unmanned aerial system usage in wildfire operations**

Companies are now approaching Wildfire Agencies to test and use UAV's on fires.

Transport Canada restricts flying in the area of a forest fire. Companies generally have little knowledge of how or what will add value to the wildfire operations and this leads to assumptions and approaches that are not practical.

FPI likely has a role to play in bringing together UAV companies and the Wildfire Agencies and this is the objective of this proposal. What approach does the advisory believe is going to benefit the fire community? Talking to Companies? A workshop? Go and listen to Agencies talk about fire?

Comments – should this be a Workshop or a 'Technology Watch'?

"Beyond Line of Sight" flying of UAV's is 10+ years away with Transport Canada.

BC has run a project with UAV's on wildfires; we can gather the data from them.

Q) Is this just 'Platform' technology? A) Yes – sensors can likely be put on anything. Can put a sensor on a Bell 206 and can fly tomorrow.

Comment: A literature review isn't needed. The issue relates more to what can practically be done under the current regulations and limitations. How can the UAV add value to fire operations with current technology and line of sight issues.

Comment: J. Johnston – in USA this is big technology, but there are more restrictions than in Canada. Maybe a 'Policy Watch' is required rather than a Technology Watch.



Q) J. Berry – When there is a Notam on a fire, can you fly a UAV there? A) Currently restricted to when NO other aircraft are up – so basically can only fly at night if appropriate paper work is provided.

Can this be a Section Theme at Wildfire Canada?

Maybe propose a wildfire theme at the Transport Canada Conference in November in Edmonton.

Comment : C. Dallyn – Saskatchewan has small versions of UAV r/w. They need to attend a school to fly them.

Comment: D. Roser – what is everything they can do? We should find this niche and then present these to industry. Maybe there are only one or two roles for them in fire.

Action – FPI explore adding a wildfire section to a UAV industry workshop or conference over the winter of 2016.

#### 6. Effectiveness of Smartphone IR to detect heat from within a burning tree

There was then a vote on the six proposals to determine if there is still interest in FPIInnovations working on them.

Project	Yes	No
Foam Stick	6	0
Quick Response Kit	6	0
Regen and fire behaviour	6	0
Telecom Workshop	7	0
UAV Workshop with Agencies	5	0*
Smartphone IR	0	6

\*Send out new proposal (C. Dallyn)

Next Meeting: October 28 in Kelowna at Wildfire Canada?

Comments: K. Anderson-the Smoke Forum Meeting is on at the same time but should be mostly different crowds.

W. Steed – Partners in Protection also meeting.

#### Fuel Treatments

FPIInnovations has worked on Fuel treatment projects since 2001 and have over 31 reports on our website. So, where to go next? First, FPIInnovations is thinking of compiling a synthesis of the work done to date as has been done in the USA by Tolmie.

Comments: re-treatment schedules and maintenance of sites are the interests.

C. Dallyn – more work is required. Saskatchewan is thinking of moving work further away from the communities. They are also still interested in fuel treatment widths based on fuel type.

Fuel treatments and Suppression plans – Saskatchewan promoting fuel treatments on changing fire behaviour, the use as anchor points, tanker drop effectiveness and increased visibility for crews to see and action spot fires.

Comment: D. Schroeder – can build a fuel treatment matrix to be used for FireTec. This will help identify knowledge gaps.

Meeting adjourned.