Ontario’s Testing of Digital Solutions in Aircraft

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FP Innovations, 2015 Wildfire Detection Workshop
Introduction

1. Digital fire reporting
   a. Recap, progress and the software

2. Tablet assessment and testing Wi-Fi in the aircraft
Aerial Forest Fire Reporting System (AFFRS) - Background

- Started in 2009, focus on lower cost satellite communications
- Partners with Discovery Air Fire Services & Latitude Technologies
- Concept presented at 2010 FP Innovations Detection Conference
- 2010 Showcase Diamond Award for Innovation
- Integration into Operations in 2012

CRTC: Cellular Wireless providers
Aerial Fire Reporting Process

- Low data transfer (SMS style)
- Uses hardware already in every aircraft (CIFFC Standard)
- Custom AFFES application on tablet:
  - Navigation suite, moving maps, plot course, import course
  - Fire reporting data collection
- Custom AFFES application ground station
- Lower cost digital solution
Software: In the Aircraft

Replaces 9 pieces of cockpit equipment & clutter

Hardware: Trimble Yuma
Operating System: Windows 7
Development: Esri ArcEngine

Core Functions:
- Navigation and Operations
  - Moving maps
  - Dynamic zoom
  - Plot a course
  - Estimate ETA
  - Flight-watch timer
  - Import active fires and detection routes
- Fire Reporting Data Collection

A.F.F.R.S
Aerial Forest Fire Reporting System
Wildfire report collection, communication & navigation software for aerial detection patrols

Programmed & designed for MNRF by Mike Zastre & Colin McFayden
AFFRS: The Software
AFFRS: Send Fire Data
Fire Data Received

- Average 2 – 3 minutes
- Outlook dependency
- Future revisions will resolve this
- Data is pasted into translation widget (on right)
- Fire Reported created, exported to PDF and KML
- Emailed to Sector Response Officer
Location
Fire Response Sector: W03
District: DRY
Fire Management Zone: Boreal Zone
Location: 15 526538 5519905
Township: BROWN RIDGE
Municipal Agreement Area: NIL
Municipality: Unorganized
Land Ownership: CRO

Condition:
Approx Size: 0.1
Wind Direction: N
Fire Rank: 1
Wind Speed: <10
% of Open Flame: 0
Spot Fires: No
Fuel Type: C3
Values Observed by the Aircraft:
People Direction: NE Distance: 1-5 km

Values Detected by GIS within 10km: 382
Water Source Distance: 394 meters
Detection Agent: Ministry Aerial
Reporting Tool: OMNR Aerial Detection Patrol
Contact Info: D-01 GDQU

Response Notes:
District:
Fire #
Digital Fire Reporting Status
2014 Season

Successes:
• Continued support from Discovery Air & Latitude Technologies
• 12 long-term fixed wing aircraft equipped with AFFRS
• 30% of patrols used AFFRS in 2014
• 20% of fires reported with AFFRS

Challenges:
• Reluctance to relinquish person to person radio communications
• Training staff & troubleshooting glitches over a large geographic area
Wi-Fi & Tablet Assessment Project

**Purpose:** was [1] determine whether satellite internet in an aircraft would be timely, reliable and cost effective, and [2] to test a number of tablets and identify a list of “must have” criteria for use in aerial fire operations
Project Profile

- 2014 Aerial Fire Operations with Discovery Air Fire Services assessed various tablets & satellite Wi-Fi (Inmersat)
- Seven missions, 25 hours flown
- Field testing with staff from:
  - Air Attack
  - I & IT
  - Detection
  - Incident Commanders

<table>
<thead>
<tr>
<th>Tablets Tested</th>
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</thead>
<tbody>
<tr>
<td>Apple Ipad</td>
</tr>
<tr>
<td>Panasonic JT-B1</td>
</tr>
<tr>
<td>Panasonic FZ-G1</td>
</tr>
<tr>
<td>Trimble Yuma</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Testing Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
</tr>
<tr>
<td>Hardware Options</td>
</tr>
<tr>
<td>Handling &amp; Ergonomics</td>
</tr>
<tr>
<td>Connectivity</td>
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<tr>
<td>Touch Screen</td>
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<tr>
<td>Applications</td>
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<tr>
<td>Power</td>
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<tr>
<td>Environmental Considerations</td>
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<tr>
<td>Wi-Fi Performance</td>
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<tr>
<td>Video and Camera Performance</td>
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</tbody>
</table>
Results: Must-have Criteria

Must-have Criteria
1. IT compatibility (corporate)
2. Ease of viewing (screen size/glare)
3. Availability of programs (apps etc)
4. Photo/video quality
5. Wi-Fi / GPS connectivity
6. Battery life (min 8 hrs)
7. Ruggedness

Notes:
• Focus should be on criteria, hardware evolves rapidly
• Diverse Requirements across Aerial Fire Operations
• May not be a single unit that provides cockpit requirements and can also replace office use
• Costs acceptable for data expectations
Results: Wi-Fi

- Full connectivity across south and far north
- Average data transfer rate was 0.19 MB/s (190 KB/s)
- Satisfied with the data speed, seconds to receive photos
- Options for higher data rate (below)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Antennae</th>
<th>Speed</th>
<th>Example (time to send a 10s Video)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver, Decoder, and Router</td>
<td>Low Gain</td>
<td>192 kbps</td>
<td>5 min 12 sec</td>
</tr>
<tr>
<td></td>
<td>Medium Gain</td>
<td>1 mbps</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>High Gain</td>
<td>2+ mbps</td>
<td>30 sec</td>
</tr>
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</table>
Results: Demonstrated Operations

Cochrane Fire # 10

- Video sent while overhead allowing for the Sector Response Officer to direct footage, complete a Fire Assessment and call the fire OUT
- No Incident Commanders were available at the time
- Video was taken by detection Observer
Next Steps:

• 2015 Long-term Fixed Wing Contract expected to included provisions for:
  • 2 detection aircraft outfit with Wi-Fi
  • 4 Birddog aircraft outfit with Wi-Fi
• Mission profiles will be for far north recon, large fire management, area fire boss, and escalated conditions
• Aerial Fire Operations has engaged Selkirk Systems to develop an electronic clipboard for Air Attack (similar to Alberta SRD)
Questions?
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