

**Submission Number: NND.001.01028**

**Submission Of: Andrew Boniface**

**Your Details**

Email address:

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Preferred means of contact: Phone

What is your submission based on? I am making this submission based on my professional knowledge, qualifications or experience or on behalf of a group or organisation

What is your area of professional expertise? Technology and its use to enhance safety during aerial fire-fighting operations

If you are lodging your submission on behalf of a group or organisation, what is the name of the group or organisation? OzRunways Pty Ltd

**Your Submission**

In your experience, what areas of the bushfire emergency response worked well?

Please see attached document.

In your experience, what areas of the bushfire emergency response didn't work well?

Please see attached document.

In your experience, what needs to change to improve arrangements for preparation, mitigation, response and recovery coordination for national natural disaster arrangements in Australia?

Greater use of technology such as Electronic Flight Bag in the cockpit during aerial fire-fighting operations.

Please see the attached document, or the text is also copied below.

This submission is written with the intent to provide ideas and proposed solutions which would allow Electronic Flight Bag (EFB) technology to enhance the safety of Aerial Fire-Fighting operations. Content is from the viewpoint of a pilot with Helicopter fire-fighting experience, as well as extensive EFB training and consulting experience while employed by OzRunways.

This submission has been compiled after talking with representatives from each of the state Fire & Emergency Air-Desks, as well as many aviation operators who contributed during the 2019/20 fire season. During these discussions, key points unearthed were:

1. Powerline data availability
2. Fire-Fighting CTAF boundaries
3. Traffic Information availability/enhancement
4. Additional Charts/Maps (Georeferenced and custom)
5. Flight Tracking (For safety and Billing purposes)
6. Training

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EFB greatly enhances the Situational Awareness (SA) of the entire crew if used correctly. Further enhancements in SA are gained with added functionality to assist low-level aircraft within busy airspace under a high workload. The importance of reliable, up-to-date data cannot be understated. OzRunways can be configured to ingest, convert and display geospatial data from most sources (with end-user interaction where appropriate). This is very much a collaborative approach and it would be important for the relevant State and Federal agencies to make appropriate data available should the functionality be required.

Organisations are responsible for ensuring their aircrew and EFB Administrator are trained sufficiently in the use of their chosen EFB applications. Training is the first line of defence to ensure negative habits like fixation, distraction, over dependence on automation, complacency, and lack of awareness do not diminish safety. Adequate training provides aircrew with a greater knowledge of the application which improves safety by reducing the time spent with eyes inside the cockpit looking at the EFB screen.

Discussion

1. Powerline Data

Aircraft involved in aerial fire-fighting operations are frequently exposed to obstacles such as wires and telecommunication towers. Helicopter operations such as "powerline survey" experience fewer wire-strike incidents due to constant sighting of the wires in question, whereas fire-fighting operations cover a far broader area, often in close proximity to unexpected wires in the area of operation. Single-Wire Earth Return (SWER) lines are particularly hard to sight and deemed by many to be the most hazardous. There is no requirement for the majority of these towers and wires to be depicted on aeronautical charts (below 360ft Above Ground Level).

Wire-Strike accidents occur every season, however there is currently no Australia-Wide single-source of powerline data, despite recommendations from the Australian Transport Safety Bureau (ATSB) and others in the past. EFB applications are able to display different data

overlays, which if powerline data were made available, would greatly enhance the Situational Awareness of aircrew prior to arriving at a fire-ground. Applications like OzRunways access the GPS in the EFB device. The “own-ship position” of the aircraft is displayed on the moving map, and hence can be cross-referenced to other data on the map display.

In addition, it is widely recognised in the aviation community that equipment such as wire-cutters offers only mitigation and in very controlled circumstances relating to approach angle and speed. For a wire cutter to be effective, an incident/accident still occurs. A technical solution for wire detection has been sought by the aviation industry for many years now but things like Light Detection and Ranging (LiDAR) are usually expensive and difficult to fit. Unlike military operators, who may want a solution that works in an environment where they do not have access to wire data, the civilian firefighting community has the advantage of an environment where planning laws apply, and the location of wires can be mapped. The issue is more one of distraction and workload management to be able to detect a wire that is known to be there in a geospatial sense but still needs to be seen from the pilot’s perspective.

If power transmission/distribution & telecommunications companies were compelled to provide their digitised location data to EFB providers, it could easily be displayed in-app. Furthermore, for a feature to be most beneficial, a wire proximity audio visual alert may be appropriate. With the required collaboration and funding, OzRunways can provide this functionality, to be used in addition to wire map data. With time and simulator trials, this could provide a strong control to the risks inherent from the task-focus that comes in aerial firefighting to alert a pilot when they are in the vicinity of a wire.

Mapping and Geographic Information Service (GIS) work would require an investment of more resources into this area to add useful data. Most GIS work requires prolonged manual development time prior to being added to maps. Most of the effort will be with powerline / fire authorities making and compiling the data, and OzRunways can read most formats received.

Options include:

1. Load Powerline Data into the App as an overlay to existing aeronautical maps. Output from power companies would need to be in common end-user structured file formats/recognised geospatial data formats such as KML, GeoJSON, CSV, SQLITE database for processing by OzRunways. Any structured data file format that is easily readable and consistent will work, as a script can be written to read/convert it. This requires development effort by OzRunways to integrate this data.

2. Power companies/ Fire Authorities and similar organisations to create their own powerline raster maps. The Geosciences 250k topographic has been discontinued since 2008. There may be some higher resolution (maybe 1:50k or 1:100k) maps produced by fire authorities which EFB companies don't have access to. If fire authorities were to release these publicly, EFB companies could put them in-app. Funding this via a subscription model for end-users is not necessarily the best solution. It may be a better funding model for the state to pay for custom integration work which is then made freely available for all aerial fire-fighting pilots to use on operations, including other civil use such as Emergency Medical Support (EMS). It is important to note that regular updated version-controlled data would be critical for ongoing safe-operations. Power Companies could release updates on a quarterly basis for example.

#### 2. Aerial Fire-Fighting CTAF Boundaries

There was confusion at times throughout the 2019/20 fire season as to which Common Traffic Advisory Frequencies (CTAF) were applicable at some fire grounds. This was probably caused by the large volume of fires in close proximity. A potential solution here is for the State Fire & Emergency Services to provide EFB App companies like OzRunways with KML overlay files which could easily be viewed by aircrew in-app. This would at least be a good starting point with additional frequencies available should there be numerous different fires within a grid. In addition, media and EMS aircraft could safely navigate airspace while remaining on the same frequency as fire-fighting aircraft.

#### 3. Traffic Information availability/enhancement

While some aircraft across the aviation industry possess a Traffic Collision & Avoidance System (TCAS), this is fairly uncommon for Aerial Fire-Fighting. OzRunways uses 3G/4G terrestrial mobile networks to allow users to voluntarily broadcast their position to other users of the same application in real-time. This feature is designed to somewhat enhance Situational Awareness and provide search & rescue authorities rapid data to find missing aircraft.

Unfortunately, the fitment and use of EFBs with 3G/4G capability is still only a limited fraction of aircraft and use of the technology is voluntary so full situational awareness is unable to be accomplished through these systems. They are also dependent on availability of 3G/4G reception (patchy especially in large remote areas subject to fires).

Almost all aircraft are fitted with a Mode C transponder and an increasingly large percentage of aircraft are being fitted with ADS-B OUT transponders (now compulsory in all Instrument rated aircraft). CASA is making it easier and more affordable for all remaining visual rated aircraft and drones to fit ADS-B.

ADS-B is the future of air surveillance. Inexpensive ADS-B IN receiver devices (e.g. “Stratus 3”) can be fitted to aircraft to provide a full picture of surrounding aircraft fitted with ADS-B OUT and unlike EFB 3G/4G systems, does not depend on cell tower reception, fitment and use of EFB.

It is our recommendation for the best airborne situational awareness for firefighting aircraft, fitment of TCAS is considered and ADS-B OUT is highly encouraged. TCAS may present an limitation in that many units inhibit all Resolution Advisories (RA’s) below 1000ft. Focussing on ADS-B, aircrew could then use portable devices such as “Stratus 3” ADS-B IN to see a more complete air-picture on their EFB, supplemented by their EFB 3G/4G traffic if fitted and mobile data reception available.

#### 4. Charts & Maps

We are aware that Georeferenced Charts and Maps are valuable on the fire-ground for mapping of the fire and other purposes. This includes the following:

- GeoTIF (Avenza type functionality)
- GeoPDF

Custom maps and charts are easily able to be added in OzRunways EFB.

## 5. Flight Tracking & Billing

We have been made aware in NSW of inaccuracies with the Trac-Plus/Arena NAFC integration, meaning a majority of billed hours have been recorded incorrectly, and needed to be corrected manually at great expense to operators with many man-hours accrued post-season. Software integrations with EFB applications could assist here.

OzRunways may be able to assist in some way by providing logged flight data to assist with billing processes. OzRunways is not a potential billing solution, however could play a part in assisting the accurate recording of logged flight data. The gold-standard would be automated Engine & Flight-Times within OzRunways. Additional integration to Operator Flight & Duty software would be an added bonus and prevent pilots needing to spend hours in front of a computer screen after an already long day flying. OzRunways is working towards these features, but needs more of a customer requirement and state-funding to go ahead. The OzRunways engine timer works well automatically when set to "Volume Switch", and we are looking at improving our "Air-Switch" Flight timer for helicopter hover operations. There is also the option of the aircrew checking times as they go or manually pushing a button in-app for Engine Start/ Lift-off/ Land/ Engine Stop. The idea is to reduce pilot work-load while also increasing the efficiency of administrative tasks.

## 6. Training

It is important that aircrew and operators have a superior knowledge of the following areas as they relate to EFB:

- Air-Law considerations (General and AOC).
- Hardware considerations including battery.
- Importance of a well-designed, ergonomic mounting option to ensure that EFB data can be fully incorporated into a visual scan and does not cause distraction.
- Software settings & requirements.
- EFB Human Factors/Threat & Error Management principles.
- Pre-flight/Emergency procedures.
- A thorough working knowledge of the OzRunways EFB application.

With this in mind, we are suggesting that an EFB Training course be added as an aircrew recency requirement on the NAFC Arena Website (As per CAO 82.0 Appendix 9, Para 6). This will enhance aviation safety on the fire-ground.

## Conclusion

Enhancing the functionality of applications like OzRunways will provide added Situational Awareness to fire-fighting aircrew. Greater amounts of data available in key-areas will assist crews to make safer decisions and manage tasks more effectively. This data includes powerline subsets, traffic, fire CTAF boundaries, and more specific geo-referenced maps. Pilot workload in the cockpit would be reduced with some of these additions, as well as with integrations to billing databases like NAFC Arena.

Training to optimise aircrew proficiency in all of the current/incoming functionality is necessary to optimise other Non-Technical Skills such as Lookout, Situational Awareness, and Communication by avoiding distraction/fixation in an aircrew member unfamiliar with the technology. Some of the features noted in this submission are achievable soon and with minimal cost, while others will involve government funding, or at the very least customer engagement to cover the required engineering development hours to implement. Our main hope is to be a continual contributor

Is there anything else you would like to tell the Royal Commission?

Please see attached document

Do you agree to your submission being published? Yes I agree to my submission being published in my name

Supporting material provided:

Electronic Flight Bag (EFB) Submission- Royal Commission into National Natural Disaster Arrangements.pdf

23<sup>rd</sup> April 2020

## **Royal Commission into National Natural Disaster Arrangements — The “Bushfire Royal Commission”**

*Written on behalf of OzRunways Pty Ltd*

*by Andrew Boniface*



### **Introduction**

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## **Discussion**

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23<sup>rd</sup> April 2020

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