



Drones in Bushfire Planning

WA Bushfire Conference

17th July 2024



Disclaimer



- **I am not from CASA, so any information presented here on the use of drones is based on my experience using them and is not intended to be guidance on the legalities of using a drone in Australia for commercial purposes, licensing, legal operations, airspace or any of that really important stuff. You need to check that out for yourself.**
- **Most of the images used in this presentation are my own, though some have been stolen off the internet. If you are the owner of said photographs, see me later and I'll buy you a beer.**
- No animals were harmed in the preparation of this presentation, although the Yorkshire terrier next door that won't stop barking while I'm writing this presentation is living on borrowed time, let me tell you.
- Those of you with an overwhelming fear of the unknown will be gratified to learn that there is no hidden message revealed by reading this presentation backward , so just ignore any Microsoft Alert Notices on that matter. However, by pouring a complete circle of salt around yourself can ensure that no harm befalls you or your pets.

About me.



- Formed Ecosystem Solutions in Dunsborough in 2005
- Previously 10 years with Parks and Wildlife (then CALM).
- Degree in Science, Masters degree in Ecology, Post Grad degree in Bushfire Protection
- BPAD Level 3
- Level 2 Bushfire Fighter at CALM for 10 years.
- Active member of Dunsborough Fire and Rescue since 2008
- Accredited Bushfire Investigator with DFES and Arson Squad
- Deployed to Snowy Mountains January 2020 with WA Taskforce
- CASA licensed Remote Pilot since 2015
- Ecosystem Solutions is a holder of a Remotely Piloted Aircraft Operators Certificate
- Private Pilot – Fixed wing aircraft.



Overview



- Drones - Types/Sizes
- Uses in Bushfire Planning operations.
- Integration into Firemaps (Jason FPAA)
- Future
- Limitations
- Questions



Types of Drones (Bushfire Protection Focus)



Small: >2kg <25kg



Bloody Big



Micro: 250g or less



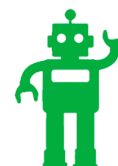
Very Small: >250g <2kg

Thanks to Elk Fish Robotics in Fremantle



How I use Drones for Bushfire Planning

- General Landscape Awareness
- Vegetation Classification Images
- Georeferenced Ortho mosaics
- Other Stuff





Landscape Awareness

- Complex landscapes
- New landscapes
- Confirm imagery and gain perspective





Vegetation Classification Images

Very Handy for Difficult to get to Veg Plots
Takes Georeferenced images from closer range



Vegetation Classification images



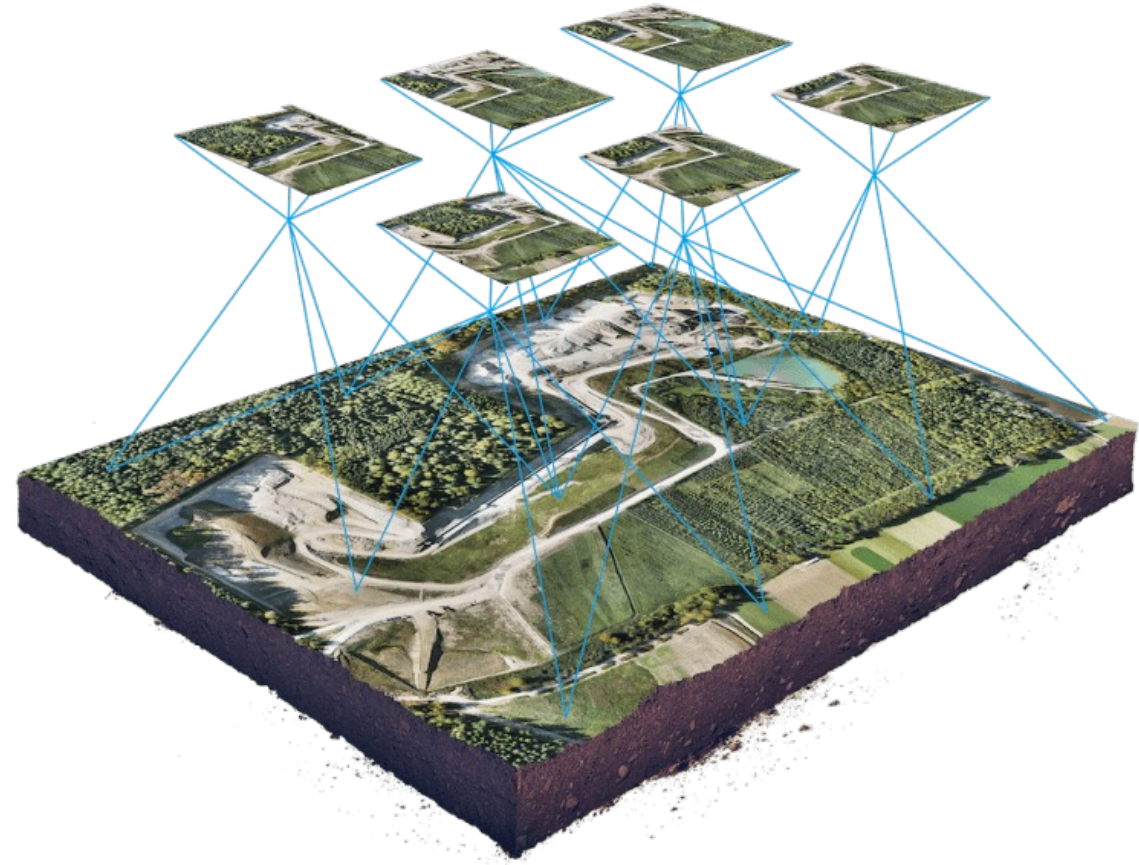
Vegetation Classification Images





Orthomosaics

- Drone flies a path and takes series of photos
- Approx 70% overlaps
- Set height
- Higher lower resolutions
- Lower higher resolution
- Preprogrammed
- Automated flight path
- Upload images when finished into software
- Processed 2 hours or so
- Stitches them together into one image.
- Georeferenced Tiff file to integrate into plans



Orthomosaics



Upcoming Changes to Sync Flight Data Fe... [Details](#)

Max Altitude: 1500m
RID (↑)

Not Logged In
Cloud Service

Flight Route

Academy

Album

DJI CARE >

Normal >



Link to Aircraft

A
Controller

Remote Controller firmware update needed

Enter Camera View



Geo Referenced Ortho Mosaics

Mitchell Falls Project October 2022





Inserting Imagery into Fire maps

Jason McFadyen

Bushfire Technical Officer

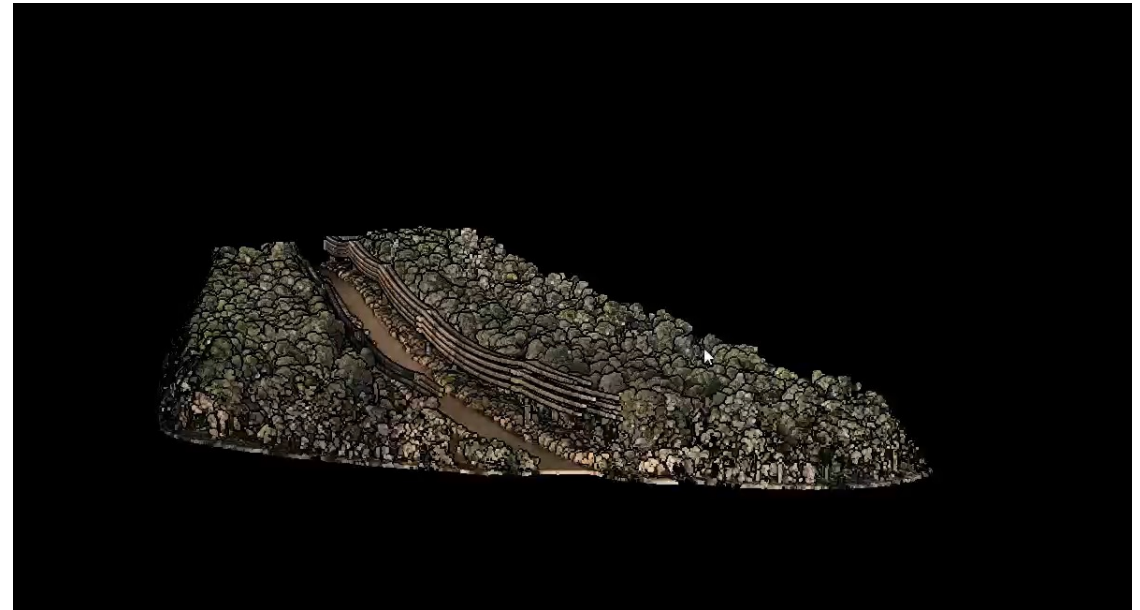




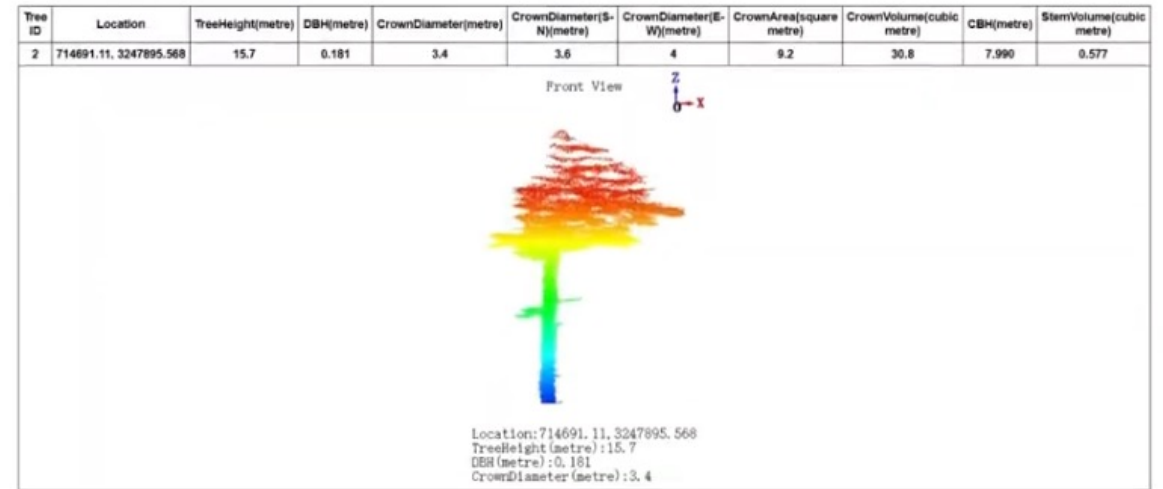
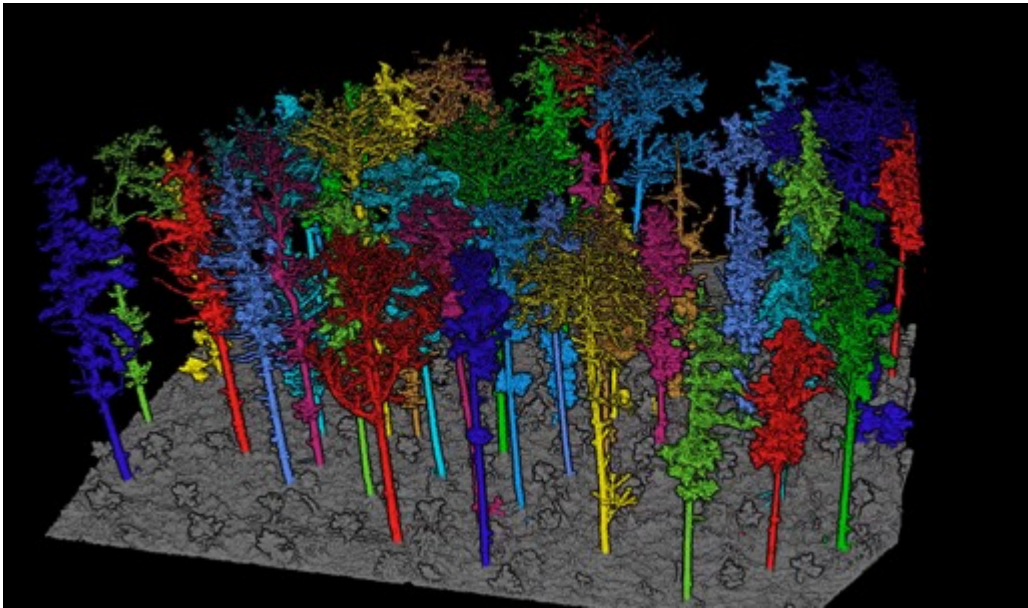
Future Options (Still Learning)

Thanks again to Kyler and the team at Elk Fish Robotics for allowing me to play with some of their technology

- LIDAR – Light Detecting and Radar (now affordable)
- uses a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses—combined with other data recorded by the airborne system — generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.
- Can penetrate vegetation
- For Bushfire
 - Vegetation Canopy cover
 - Ground layer biomass (Bushfire Fuels??)



Future Options



Lidar with lower strata removed for analysis



Constraints/Limitations

- Licensing/CASA
- Legal constraints (where can I fly)
- Permits
- Log Books/Recording flight data and missions
- Flying Commercial aircraft and batteries.
- Costs – though decreasing
- Bird Strike

Subpart 101.F—Remotely piloted aircraft

Division 101.F.1—General

101.235	Application of Subpart 101.F
101.236	Meaning of <i>approved area</i>
101.237	Meaning of <i>excluded RPA</i>
101.238	Meaning of standard RPA operating conditions

Division 101.F.2—Operation of RPA generally

101.245	Operation near people
101.250	Where very small, small and medium RPA may be operated
101.252	Certain RPA—requirement for remote pilot licence
101.255	Large RPA—requirement for certificate
101.260	Maintenance of large RPA
101.265	Large RPA—persons permitted to carry out maintenance
101.270	Certain RPA—requirement for RPA operator's certificate
101.272	Certain RPA—requirement to keep records or give information to CASA
101.275	Approval of operation of large RPA
101.280	RPA not to be operated over populous areas
101.285	Use of aeronautical radio

Division 101.F.3—Remote pilot licences

101.290	Application for remote pilot licence
101.295	Eligibility for remote pilot licence
101.300	Conditions on remote pilot licences
101.315	Notice to holder of remote pilot licence to show cause
101.320	Variation, suspension or cancellation of remote pilot licence

Division 101.F.4—Certification of RPA operators

101.330	Application for certification as RPA operator
101.335	Eligibility for certification as RPA operator
101.340	Conditions on certification
101.342	Functions and duties of chief remote pilot
101.360	Notice to certified RPA operator to show cause
101.365	Variation, suspension or cancellation of RPA operator's certification
101.370	Compliance with RPA operator's practices and procedures

Division 101.F.5—Operation of certain RPA for hire or reward

101.371	Application of Division 101.F.5
101.372	Notice of certain operations
101.373	Notification of changes in relation to operating very small RPA for hire or reward etc.



Thank you for your interest
And Thanks to Kyler and
Elk Fish Robotics

Questions?

