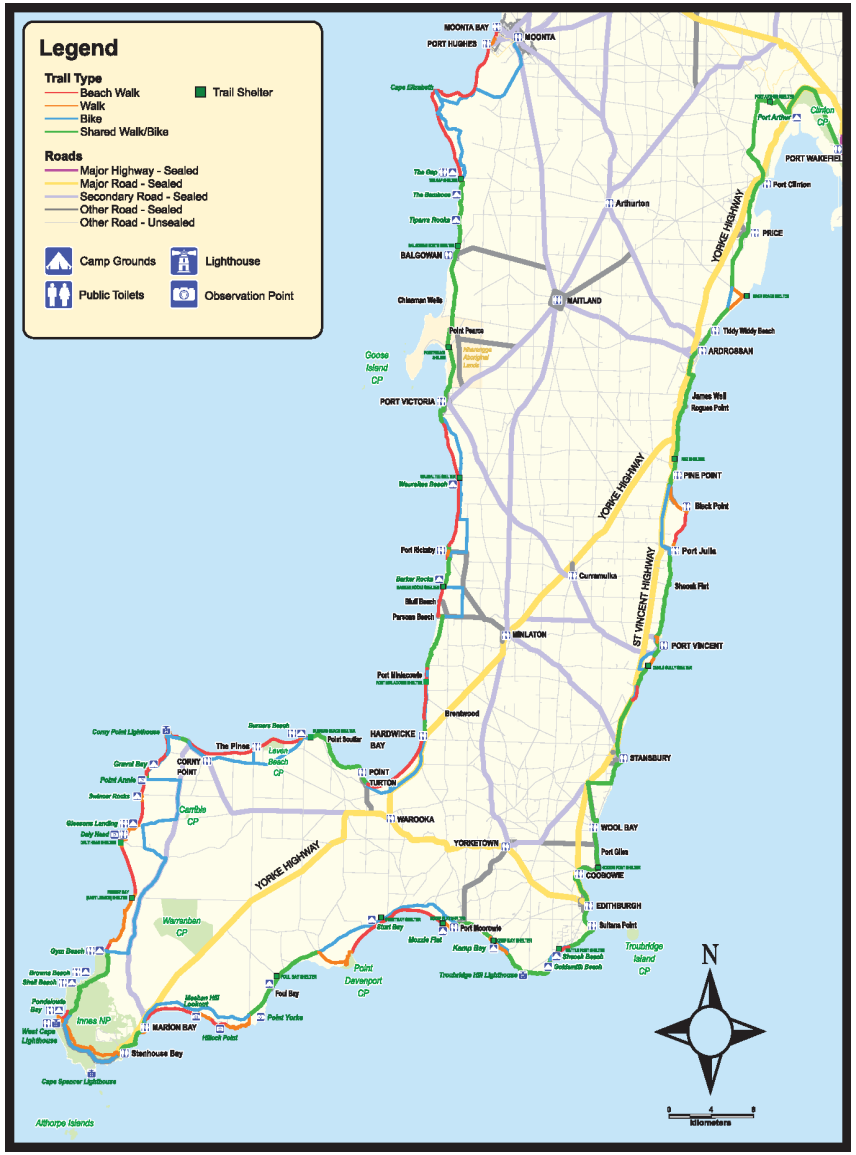
YORKE PENINSULA COUNCIL

Agriculturally rich~Naturally beautiful

Drones!

Why we acquired a drone

- We wanted to capture footage promoting our 500km of hiking trails



What the business wanted to do

- Mapping
- Event photography
- Promotional material for caravan parks
- Building inspections
- Compliance inspections
- Fire prevention inspections
- Road construction demonstration
- Road state surveying
- Roof inspections
- Jetty inspections
- Light pole inspections
- Pest control inspections
- Dangerous dog investigations
- Planning surveys

So let’s talk about CASA and the regulations.

The Civil Aviation Safety Authority

- The Civil Aviation Safety Authority was established in 1995 as an independent statutory authority.
- CASA's role is defined in the *Civil Aviation Act 1988*, which forms the basis of the *Civil Aviation Safety Regulations*.
- The operation of drones is covered in
  - Civil Aviation Safety Regulation Part 101 (AC 101)
  - CASA 96/17 – Direction – operation of certain unmanned aircraft
  - Advisory Circulars for drone operations
- CASA refers to drones as RPAs (remotely piloted aircraft)

CASA's Classification of Drones

- Generally a drone is defined by total mass of both airframe and payload (We will leave airships out of it)
- A drone will be either included in AC 101 or excluded, depending on its mass and use.
- If excluded then a non-licensed pilot may fly the drone if they meet a number of conditions that will depend on the class of drone.

Micro
(RPA < 100 grams)

- Endurance: poor- generally measured in minutes
- Payload: very limited low quality camera at most
- Avionics: poor
- Operating Environment: very limited - susceptible to environmental conditions generally used indoors

Very Small
(100g < RPA <2kg)

- Endurance: good- generally around 20-30 mins
- Payload: Small, usually a 4k camera with limited capabilities
- Avionics: good – GPS and attitude stability provide an exponential improvement in performance
- Operating Environment: Good – still susceptible to environmental conditions but a 1.7kg drone can operate in winds of up to 45km/hr
- Most drones you see in shops fall into this class

Small
(2kg < RPA <25kg)

- Endurance: very good- generally around 30 to 60 minutes.
- Payload: good – sophisticated cameras, small spray units for agriculture.
- Avionics: very good – start to get redundant systems.
- Operating Environment: very good – high mass reduces the impact of environmental conditions
- Redundant batteries, motors and props reduce risk significantly
- Start to see multiple operators, eg. Pilot plus camera operator.
- Start to see batteries replaced by internal combustion engines on some models

Medium
(25kg < RPA <150kg)

- Endurance: excellent – internal combustion starts to become dominant, some jet aircraft.
- Payload: excellent – eg. highly sophisticated weather sensors and cameras, the pictured Yamaha drone has a 28kg payload
- Avionics: excellent
- Operating Environment: excellent
- The drones start to look like real aircraft

Large
(150kg < RPA)

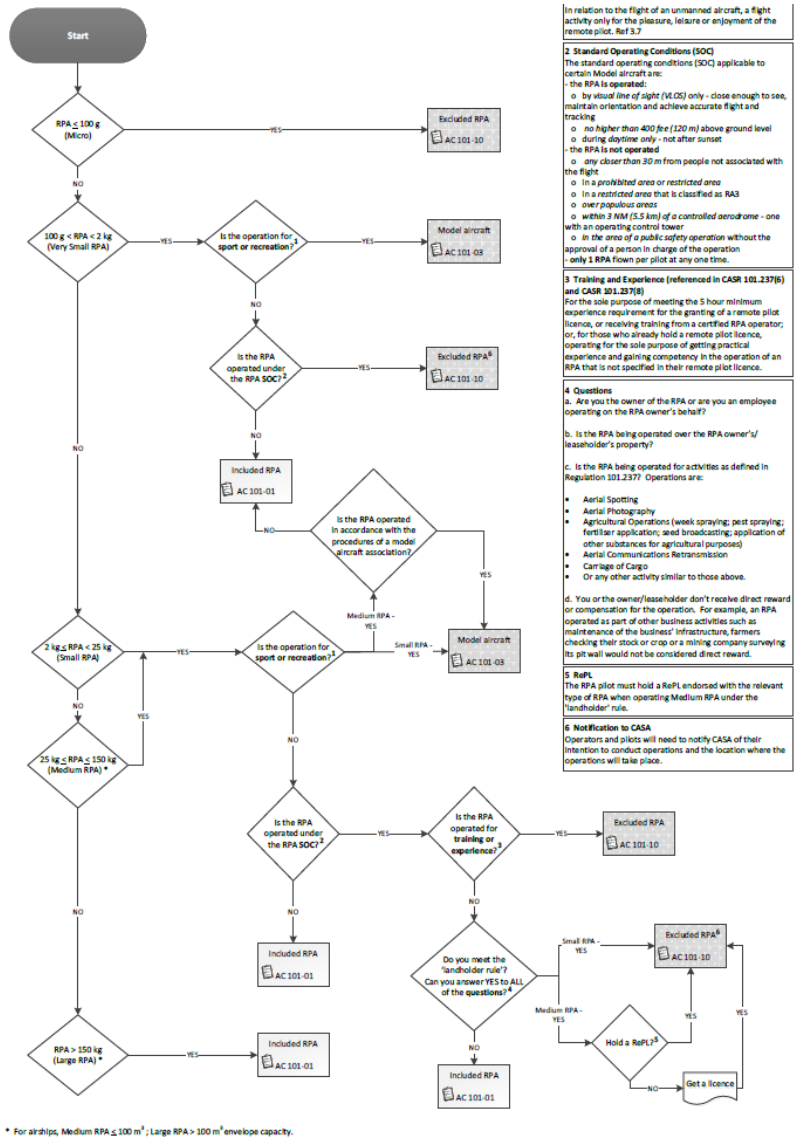
- Endurance: how far do you want to go?
- Payload: 100s of kgs
- Avionics: commercial and military grade
- Operating Environment: They might care about cumulonimbus and Cyclones

Navigating the Regulations

- Flying commercially or for economic gain is illegal, unless you have your remote pilot licence or are flying in the sub-2kg category within the Standard Operating Conditions (SOC)
- Flying for Council counts as operating commercially and this means that your organisation also needs to have a Remote Operators Certificate (ReOC) and you will need to get permission to fly within the conditions set out in AC 101
- HOWEVER as mentioned there are a number of operations and airframe classes that are exempt from AC 101

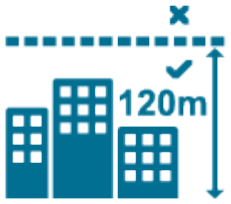
Exemptions to AC 101

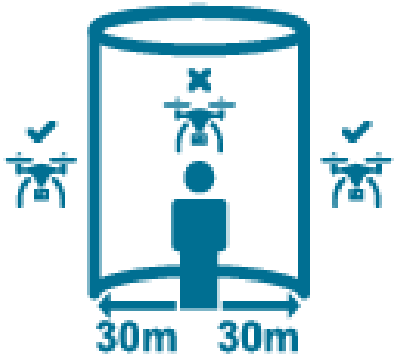
- The exemptions can be complicated to determine, fortunately CASA has created this easy to follow flowchart
- Basically if your drone is under 2kgs you may fly as long as you follow the Standard Operating Conditions (SOC)
- Drones up to 150kgs can be flown under the exemptions, but are heavily restricted



Standard Operating Conditions (Part 1)

- You must only fly during the day and keep your RPA/drone within visual line-of sight
- You must not fly your RPA/drone within 30 meters of people, unless the other person is part of controlling or navigating the drone
- You must not fly higher than 120 meters (400 ft) above the ground, in all locations
- You must keep your RPA/drone at least 5.5km away from controlled aerodromes (usually those with a control tower)
- You may fly within 5.5km of a non-controlled aerodrome or helicopter landing site (HLS) only if manned aircraft are not operating to or from the aerodrome





Standard Operating Conditions (Part 2)

- You must not fly your RPA over the top of people. Examples include festivals, sporting ovals, populated beaches, parks, busy roads and footpaths.
- You must not operate an RPA/drone in a way that creates a hazard to another aircraft, another person, or property
- You must not fly your RPA/drone over or near an area affecting public safety or where emergency operations are underway (without prior approval).
- You must only fly one RPA/drone at a time.
- You must not operate your RPA/drone in prohibited or restricted areas.

And Also.....

- It’s pretty easy to violate privacy while operating a drone
- There are certain places you cannot fly without permission:
  - Private property
  - National Parks
  - Council Land
  - Notable Landmarks (?)
- Drones must remain 300m away from Marine animals such as dolphins and whales. ($110,000 fine)
- First Person View – completely violates the SOC.

What does it all mean?

- Using Drones is kind of a thing you can do
- It carries risk
  - The vast improvement in avionics and controls over the last decade mean that it is quite easy to violate the SOC without really thinking about it
  - Technical failure can strike really suddenly, and the sub 2kg class does not have much in the way of redundant critical systems
  - Think about the risk of “Drone” and “Council” hitting the news
- Fines and jail time can be consequences of not following AC 101 and the SOC

To fly outside the SOC you will need

- Remote Pilots Licences that cost around $4000 each
- A Remote Operator Certificate
  - Costs around $2000 to submit to CASA
  - You have all your safety, maintenance and operational processes documented and submitted to CASA
  - You need a Chief Pilot who is responsible for approving all flight operations.
  - You need a Chief Maintenance Officer who is responsible for maintaining the airframes, batteries, controllers etc.
  - You can get help putting this together and it will cost around $3-6000 depending on what you want to do.
  - It takes a lot of time.

We needed a ReOC - how do we do it?

- We put a pilot through the RePL
- Studied the CASA literature
- Looked at getting and maintaining a ReOC
- Gave up
- Thought about it some more and talked to other Councils and the drone industry.

Solution – Commercial Partnership

- I approached National Drones and we formed a national first partnership for a Council – We fly under their ReOC
- In return for a setup fee we trained 5 pilots as though they were to fly with National Drones.
- We submit flight plans to National Drones and they modify and approve them, interfacing with CASA if needed.
- National Drones fly the missions we do not have the equipment or skill to fly.

What we actually use drone for

Promotional Photography and Video

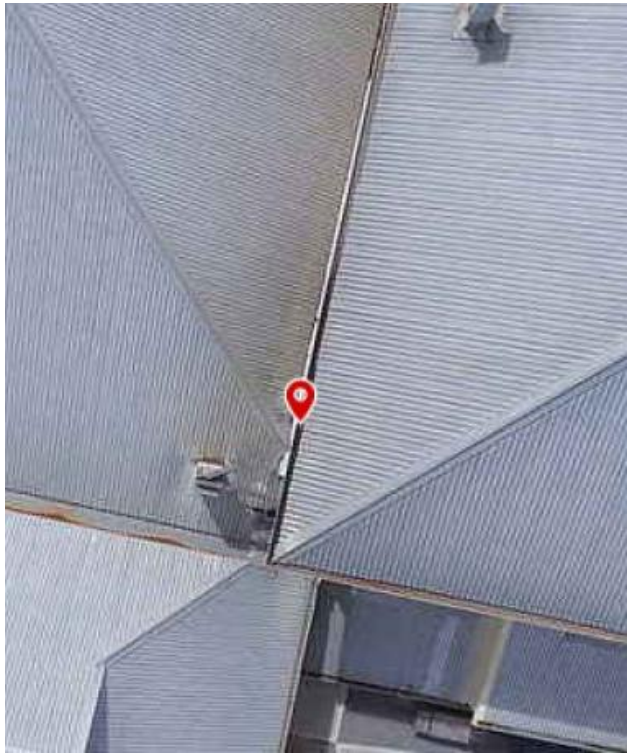
Surveying – Road Works

Demonstration – Truck Movements

Surveying – Vegetation Damage

Inspections – Pest Control

Roof Inspections



High Resolution GIS Mapping imagery
(In Progress)

Senate Committee Findings

- Immediate reform of the sub 2kg class of drones
- Mandatory registration for drones over 250g
- Mandatory user registration and training
- Increase prohibited airspace
- Build in technical limitations in distance and altitude
- Implement mandatory return to home and forced flight termination
- Enforce airworthiness standards
- Improve regulation of RPAs and the associated national enforcement regime