Bitou bush surveillance UAV trial
Biosecurity Queensland
Aspect UAV Imaging
Queensland University of Technology

Bitou bush is:
• Native to South Africa
• Introduced as dune stabilizer
• Very invasive
• Restricted category 2,3,4,5

History
• Located from NSW border to Bundaberg
• Control began early 1980’s
• Over 30 years into eradication project
• Isolated plants found today

Surveillance
Aerial surveillance
Ground surveillance

Project aim
• Increase the effectiveness
• Increase the efficiency
• Increase the safety
UAV trials
Four trials
• from simple aerial images
• to an investigation of the capabilities of state of the art software

Trial 1
• 3DR solo UAV with a GoPro 4+
• Viewed in “real-time” on a tablet in the field on the day
• UAV bitou identification confirmed
• More work needed

Trial 2
• Images of “betty” at heights from 10 to 40 metres
• DJI Phantom 4
• 1/2.3 CMOS, 12.4 megapixel camera

Trial 3
• Fly survey pattern to cover 100 x 200 metre area
• Height 20-30 metres above ground level
• Resolution Approximately 1 – 2 cm/pixel
• Number of images 816
Flight plan

Trial 3 results
- Output is a geo-referenced orthophoto
- Can extract coordinates of bitou
- Can zoom in on individual images to search for bitou
- BUT must still inspect 816 images in a 100 x 200 metre area

Bitou bush from 20 meters

Trial 4
- Identified the need for “automated” detection of bitou in an image
- Tested detection software
- Collaborate with Felipe Gonzalez QUT

Trial 4 image processing
- Gather images of bitou amongst native vegetation
- Mark the bitou in some of the images
- Use these marked images as training data for the software
- Establish training algorithm for the particular project
- Run the unmarked test data set

Marked image
Before processing

After processing

Where to from here?
Development of technology
  • Make software more user friendly
  • Test software in other environments
Scale up field work
  • Image gathering with light aircraft or fixed wing drone?
  • Data storage and faster processing

The future...
  Farmers are at the point of using ground based vehicles which:
  • Have a database of weeds onboard
  • Identify a target weed in real time as it moves along a row
  • Eliminate the weed in real time

Thank you