



ningaloo outlook

BHP

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What can drones tell us about turtles?

Nick Mortimer, Mat Vanderklift, Richard Pillans

Ningaloo Outlook – A partnership between BHP and CSIRO

WESTERN COASTAL/OCEAN & ATMOSPHERE
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Ningaloo Outlook is a BHP-CSIRO Industry-Science Marine Research Partnership investing A$5.4 million over five years to gather new knowledge on the Ningaloo reef and its important ecological values

Received: 30 November 2016 | Accepted: 7 June 2017
DOI: 10.1111/1365-2435.12930

"Drones are increasingly being used to gather data in greater detail and across wider areas than ever before," Dr Rees said.

RESEARCH ARTICLE

Functional Ecology

Detecting elusive aspects of wildlife ecology using drones: New insights on the mating dynamics and operational sex ratios of sea turtles

Gail Schofield[1] | Kostas A. Katselidis[2] | Martin K. S. Lilley[3] | Richard D. Reina[4] | Graeme C. Hays[1]

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SCIENTIFIC REPORTS

SBS NEWS

Drones help scientists track turtles



Drones are being used to track turtles in a bid to boost conservation, scientists say. (AAP)

Turtles are being tracked with drones in a bid to

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Quantifying Nearshore Sea Turtle Densities: Applications of Unmanned Aerial Systems for Population Assessments

Seth T. Sykora-Bodie[1], Vanessa Bezy[2], David W. Johnston[1], Everette Newton[1] & Kenneth J. Lohmann[2]

Although sea turtles face significant pressure from human activities, some populations are recovering due to conservation programs, bans on the trade of turtle products, and reductions in bycatch. While these trends are encouraging, the status of many populations remains unknown and scientific monitoring is needed to inform conservation and management decisions. To address these gaps, this

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Unmanned aerial vehicles for surveying marine fauna: assessing detection probability



Ecological Applications
Volume 27, Issue 4, pages 1253-1267, 17 APR 2017 DOI: 10.1002/eap.1519
http://onlinelibrary.wiley.com/doi/10.1002/eap.1519/full#eap1519-fig-0002



Flight time
30 MINS [1]

Control range
7 KM [2]

Speed
72 KM/H

Video resolution
4K 60fps

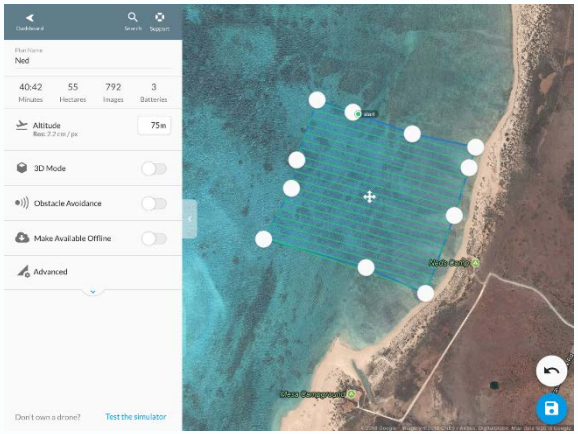
Sensor range
30 M [3]

Obstacle sensing
5 DIRECTION

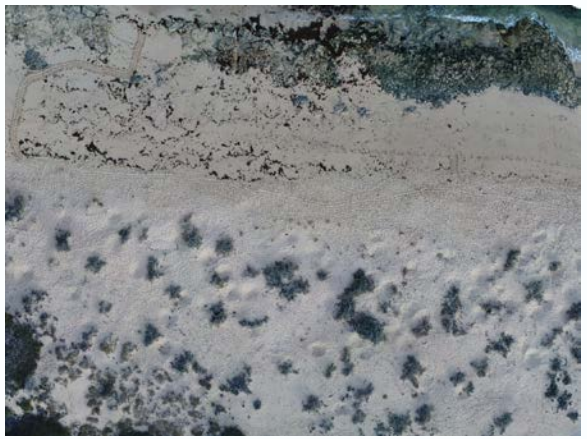
What can drones tell us about turtles?

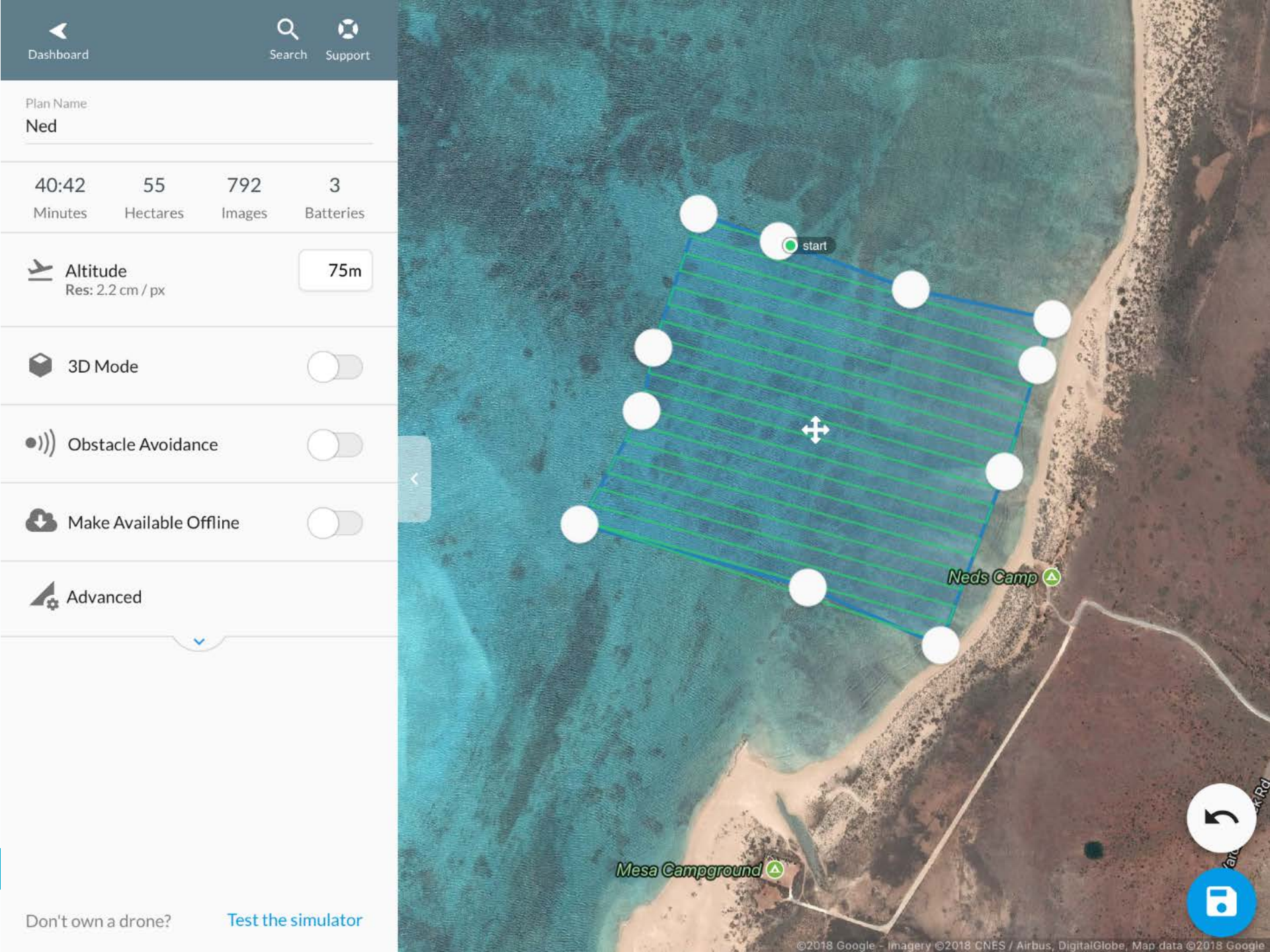
Behaviour

Population Estimates



Nest Monitoring




Dashboard
Search
Support
Plan Name
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Minutes
55
Hectares
792
Images
3
Batteries
Altitude
Res: 2.2 cm / px
75m
3D Mode
Obstacle Avoidance
Make Available Offline
Advanced
Don't own a drone?
Test the simulator
start
Neds Camp
Mesa Campground
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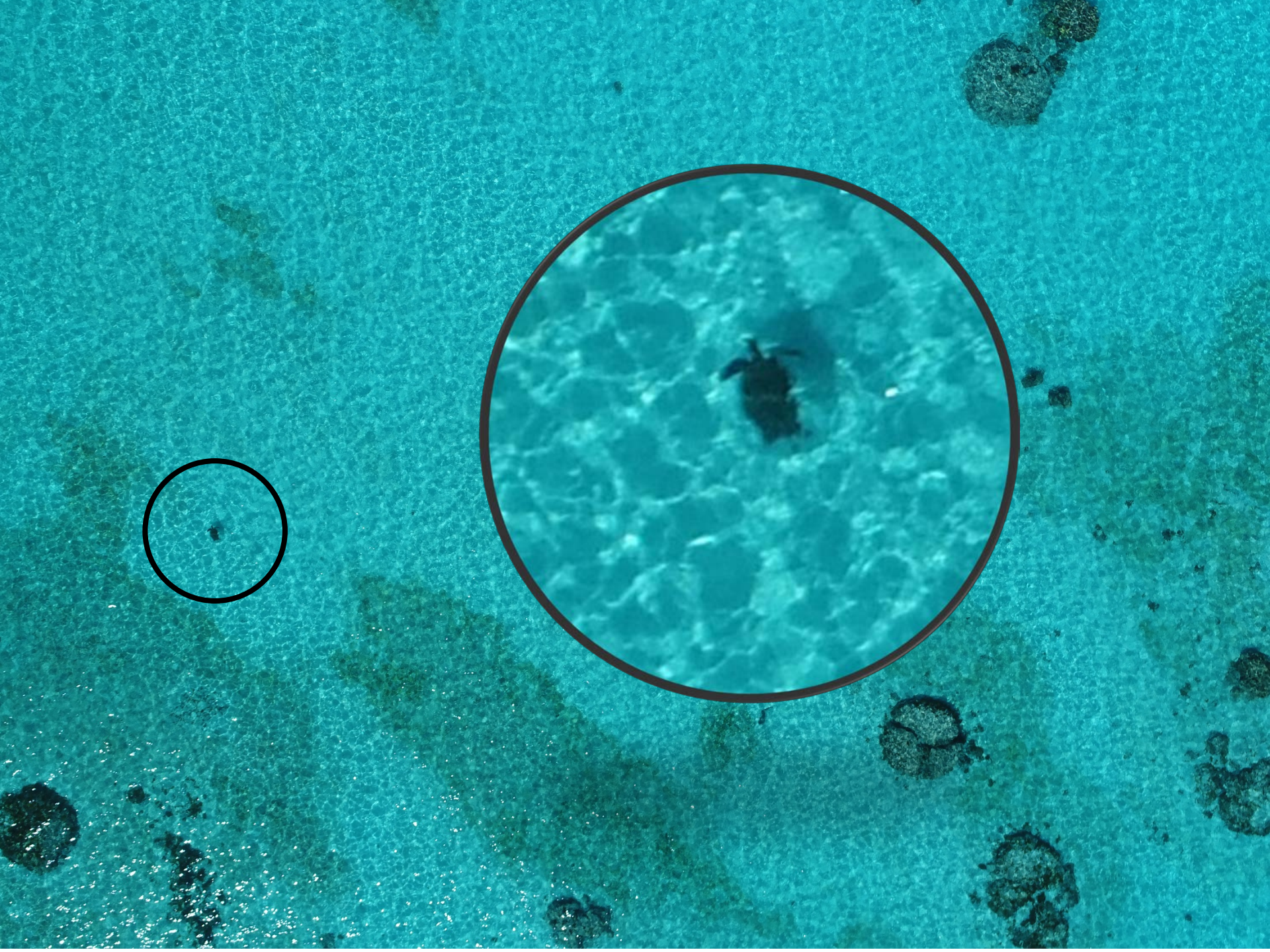
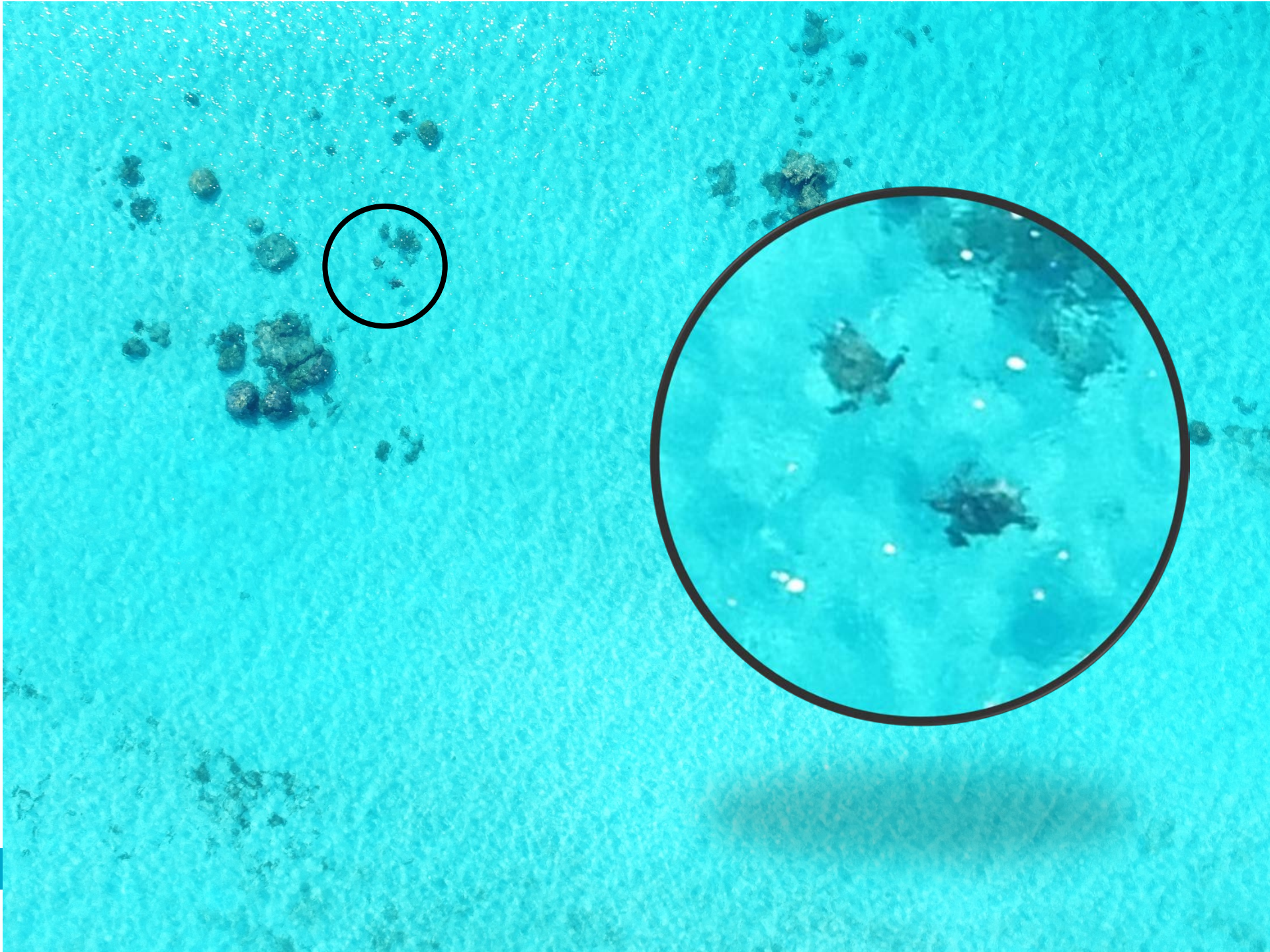






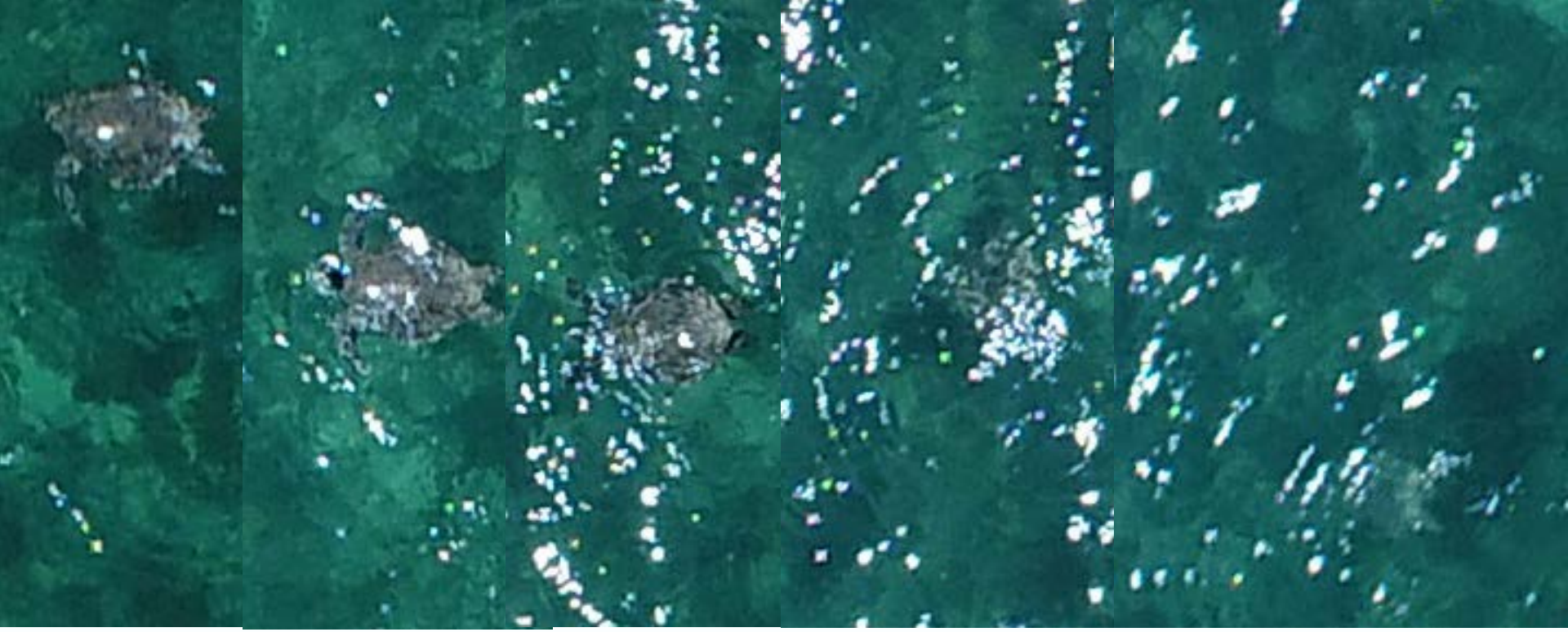
$$Av = \frac{E_s}{E_s + Ed} + \frac{w(x)}{E_s + Ed}$$

(Sykora-Bodie, Bezy et al. 2017)



$$Av = 0.175 = \frac{7.43}{7.43+35.5} + \frac{0.126}{7.43+35.5}$$

(Sykora-Bodie, Bezy et al. 2017)



$$Av = 0.175 = \frac{7.43}{7.43+35.5} + \frac{0.126}{7.43+35.5}$$

(Sykora-Bodie, Bezy et al. 2017)



6 seconds

$$Av = \frac{0.1}{0.1+???} + \frac{???}{0.1+???}$$

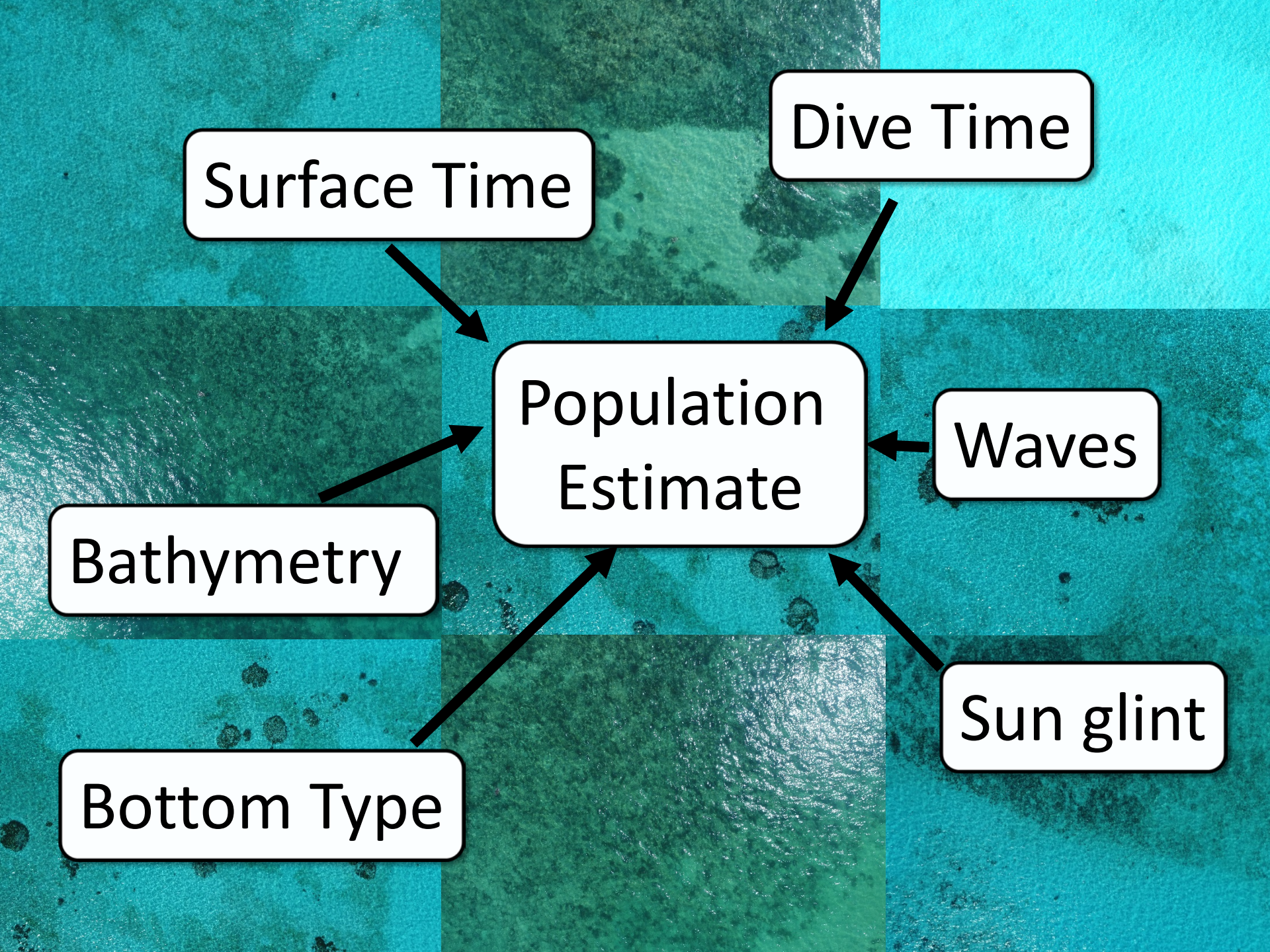
(Sykora-Bodie, Bezy et al. 2017)



12 seconds

$$Av = \frac{0.1}{0.1+???} + \frac{???}{0.1+???}$$

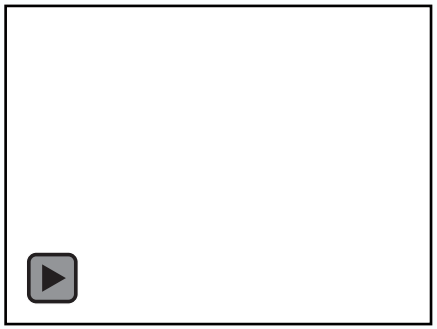
(Sykora-Bodie, Bezy et al. 2017)


Surface Time
Dive Time
Population Estimate
Waves
Bathymetry
Sun glint
Bottom Type



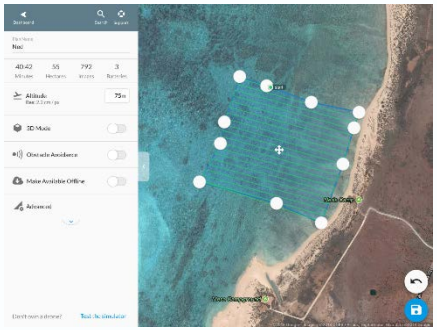


What can drones tell us about turtles?



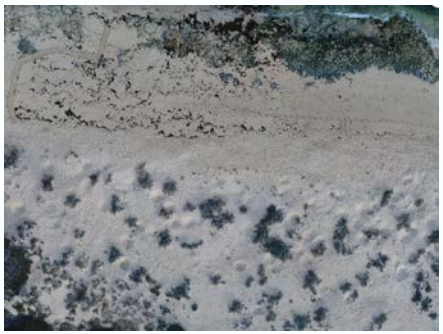
Behaviour

- Turtles can be followed and observed (Es,Ed)
- Access visibility over different bottom types
- Look at residence times on different bottom types



Population Estimates

- Multi look images increase chance of detection
- Automation of image area and availability
- Develop model for population estimation



Nest Monitoring

- Nesting tracks (best early morning)
- Differencing between days
- Tidal Information
- Night time flying with IR camera

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BHP-CSIRO Ningaloo Outlook Marine Research Partnership
Cindy Bessey (Speaker coach)