



# RPAS Operations in Shell - *beyond the paradigm of manned aviation*

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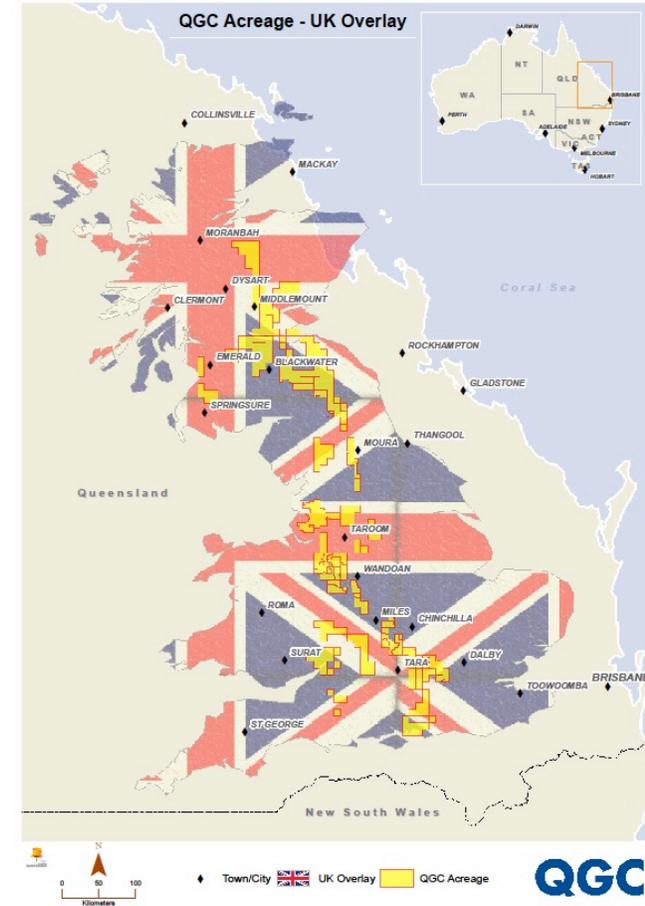
# RPAS use in Shell

- Shell has a global footprint and is operating in over 80 countries
- Majority of those assets have used RPAS in some form, mainly in VLOS
- Shell's strategy has the commercialisation of technology as one of its key elements
- RPAS is a disruptive technology, the journey in Shell is only just beginning
- Shell has the largest BVLOS RPAS program currently in QGC



# BVLOS use case – Shell QGC Coal Seam Gas Project

- Enabled by the proactive regulatory environment in Australia and low-density/complexity airspace environment
- Broad-acre development with over 4,000 points that need constant inspection over a 30,000km<sup>2</sup> area
- Traditional method of surveillance is by ground based teams in 4WD's
  - Many inspections are routine and mundane, just requiring visual checks
  - To do all these tasks QGC is collectively driving over 1.3 M km/month currently
- Also aviation risk of manned aircraft conducting low-level flight inspections of pipelines
- Finding alternative/disruptive ways to conduct mundane inspections and surveillance tasks enables QGC to:
  - Increase the situational awareness of the broad-acre development
  - Targeted driving tasks only – reduction of risk
  - More proactive well site & production management



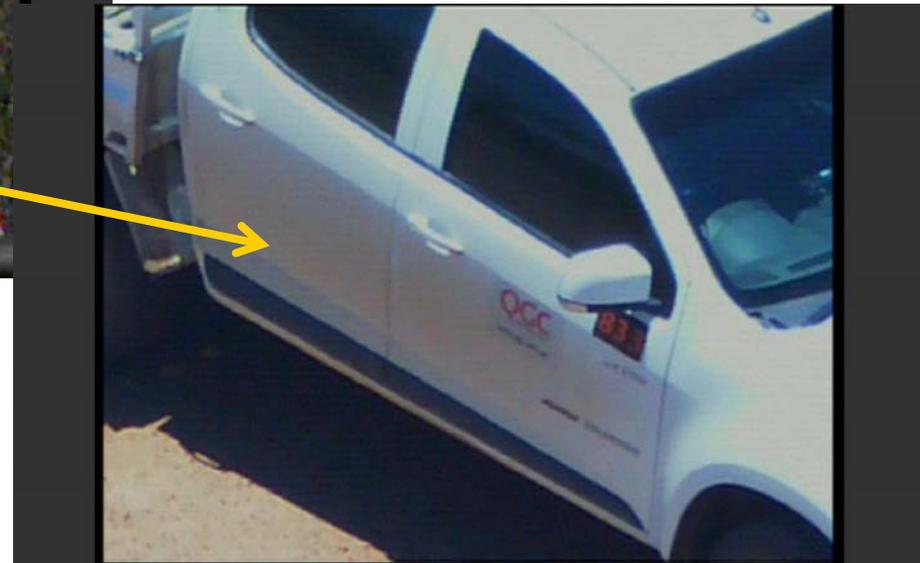
# Day Still Images

Altitude – 2500ft (Approx. 1500ft AGL)

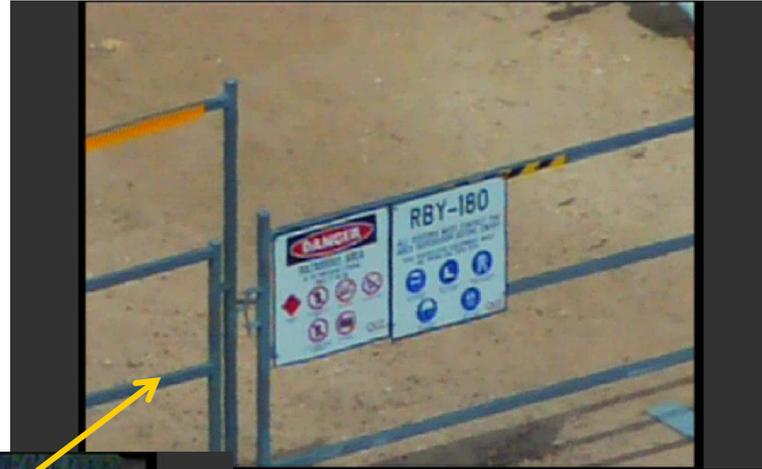
Sensor – Super Electro-Optical (EO) – 180 x zoom



Glendowner FCS with a vehicle parked out the front.



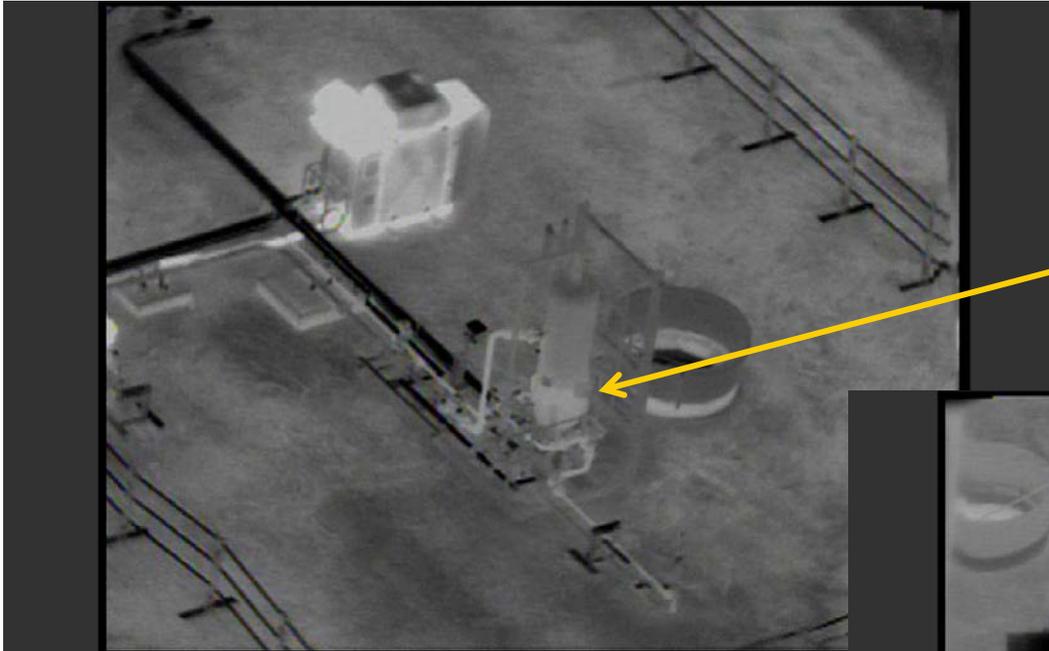
## Day images cont.



Ruby Jo well #180

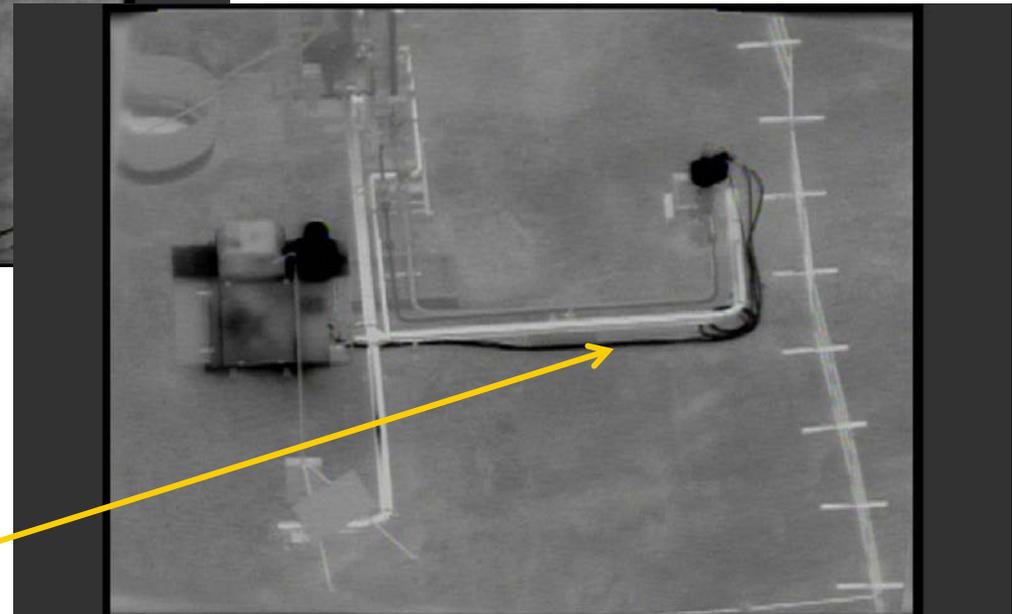


## Night images cont.



White is hot in top image

Level in the separator is at approx. 30%



Black is hot in bottom image

Hot hydraulic lines

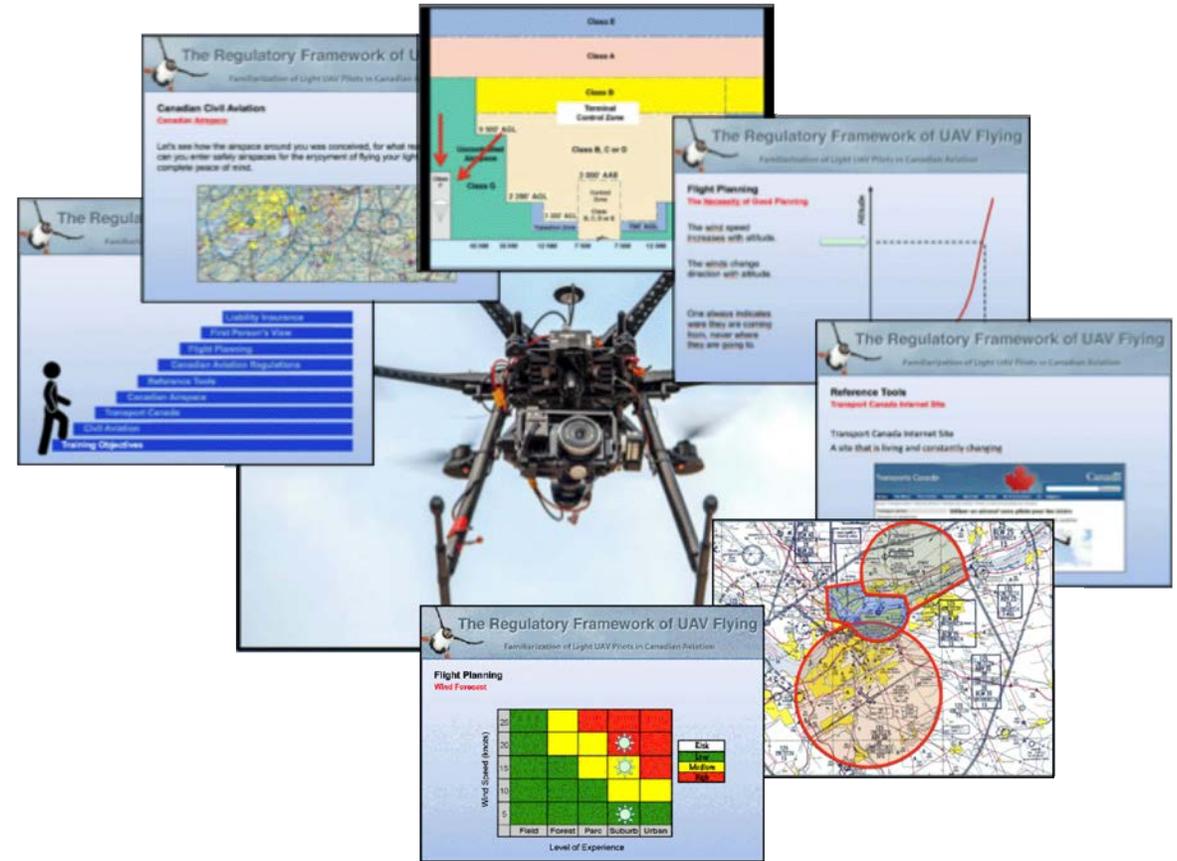
## Challenges - Privacy and Data Security

- Privacy concerns from Stakeholders
- Regulatory environment – (i.e. GDPR)
- Amount of image product created and data storage issues
- Data security of image product and methods of storage
- Use of image product internally and externally



# Challenges - Regulatory

- Consistency/Harmonization
- BVLOS Approval
- Automation Approvals
- Multi-system Approvals (BVLOS/VLOS/Multiple/Swarm) operations
- Counter RPAS use



## Challenges – OEM's

- Airspace situational awareness technology
- “Sense and Avoid” technology
- Airworthiness
- GPS degrade/RF disruption at high energy/magnetic sites (i.e. offshore platform)
- Sensor technology - Methane
- Industry involvement/collaboration
- Counter RPAS Technology



## Benefits

- RPAS is a disruptive technology that has huge potential to work more safely and effectively
- Reduce the need to conduct traditional surveillance via ground based operators
- Gives a greater situational awareness of an operation, especially broad-acre developments
- Can enable other disruptive tools to become effective (i.e. proactive maintenance programs)



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# Further information?

## Contact:

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A large, stylized graphic of the letters 'Q&A' in a bright yellow color. The 'Q' is a simple circle with a tail, the ampersand is a classic script font, and the 'A' is a bold, sans-serif letter. The graphic is positioned on the right side of the slide, partially overlapping a solid yellow horizontal bar at the bottom.





# Back-up slides



## Video

<https://www.shell.com.au/about-us/projects-and-locations/qgc/environment/environmental-operations/using-drone-technology.html>

# Airspace awareness

