



MARINE
Safety Forum

Robotic Inspection

Use of Drones and Robotics for Tank Inspection

By Marc Whitton

Chief Commercial Officer – Air Control Entech



Safety Case

According to the Institute of Occupational Health and Health and Safety Executive, in the UK every year around;

- 40 People are killed falling from height
- 15 People are killed in confined space

The ultimate source of risk removal is **elimination**. By eliminating the need to put people in confined spaces or to work at height we will get ever closer to the target number: **ZERO**.

ACE Mission

“Eliminate the need to put people in dangerous environments using inspection capable robotics.”

LAND



SEA



AIR



The Journey



Falcon 8 Platform – Asctec / Intel

12 min-22min (claimed) flight time

0.8kg Payload Capacity

2.3kg Takeoff Weight

The Journey



Falcon 8 Platform – Asctec / Intel
12 min-22min (claimed) flight time
0.8kg Payload Capacity
2.3kg Takeoff Weight



ACE-A-H Platform – ACE
18min-25min flight time
1.2kg Payload Capacity
2.4kg Takeoff Weight

The Journey



DJI M210 – DJI

24min - 38min flight time
2.3kg Payload Capacity
6.14kg Max Takeoff Weight



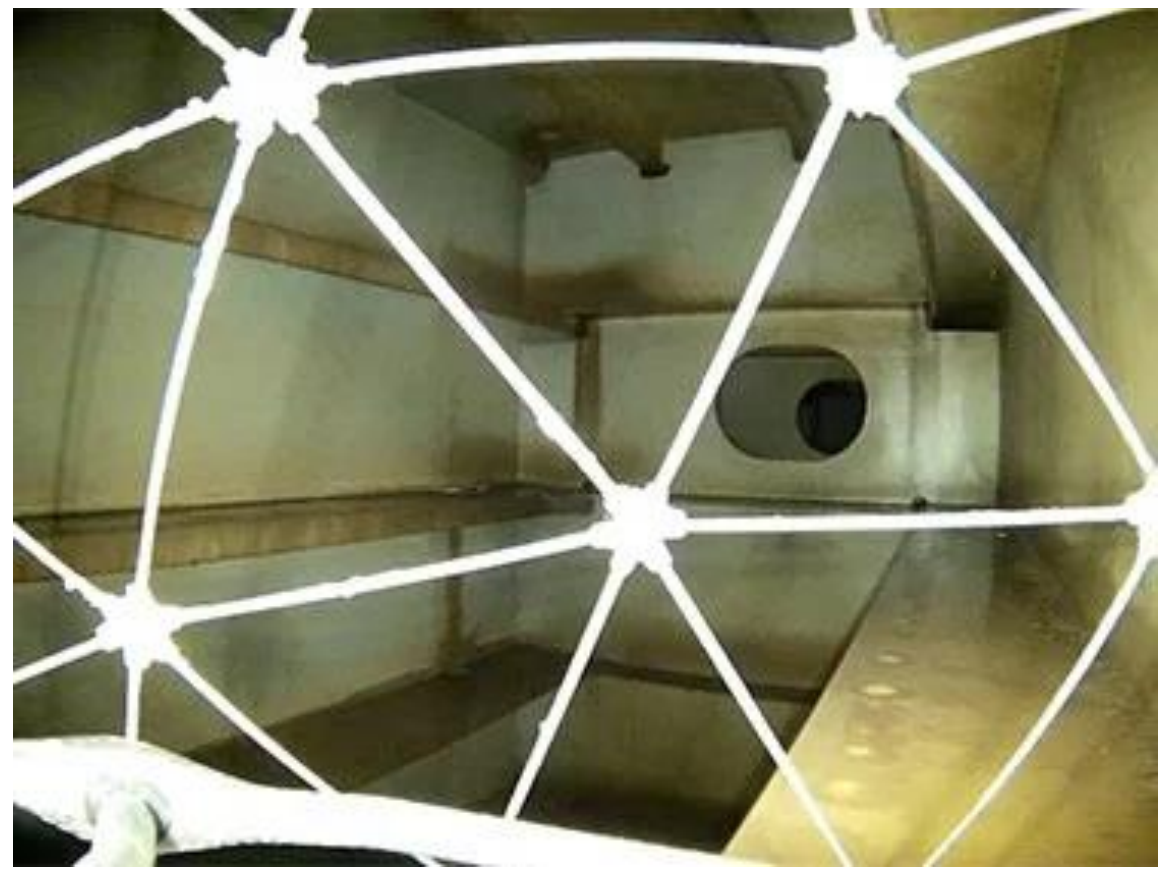
ACE-A-H Platform – ACE

18min-25min flight time
1.2kg Payload Capacity
2.4kg Takeoff Weight

The Journey



Elios – Flyability
Internal Inspection UAV
Caged for collision tolerance



The Journey

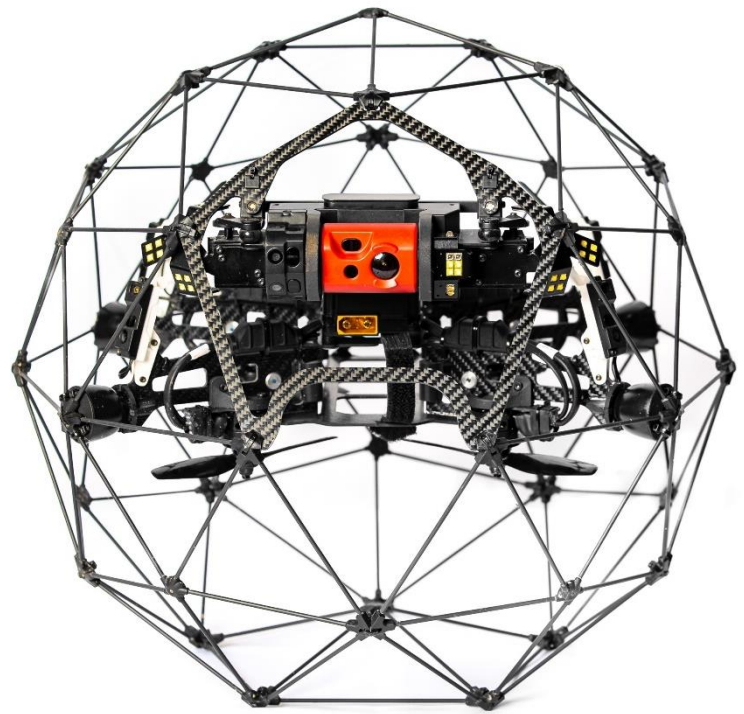


Elios – Flyability
Internal Inspection UAV
Caged for collision tolerance



ACE-A-CSI – ACE
Internal Inspection UAV
Props enclosed, no obstructions for
camera

The Journey



Elios 2 – Flyability
CAGE NOT OBSTRUCTING
CAMERA!

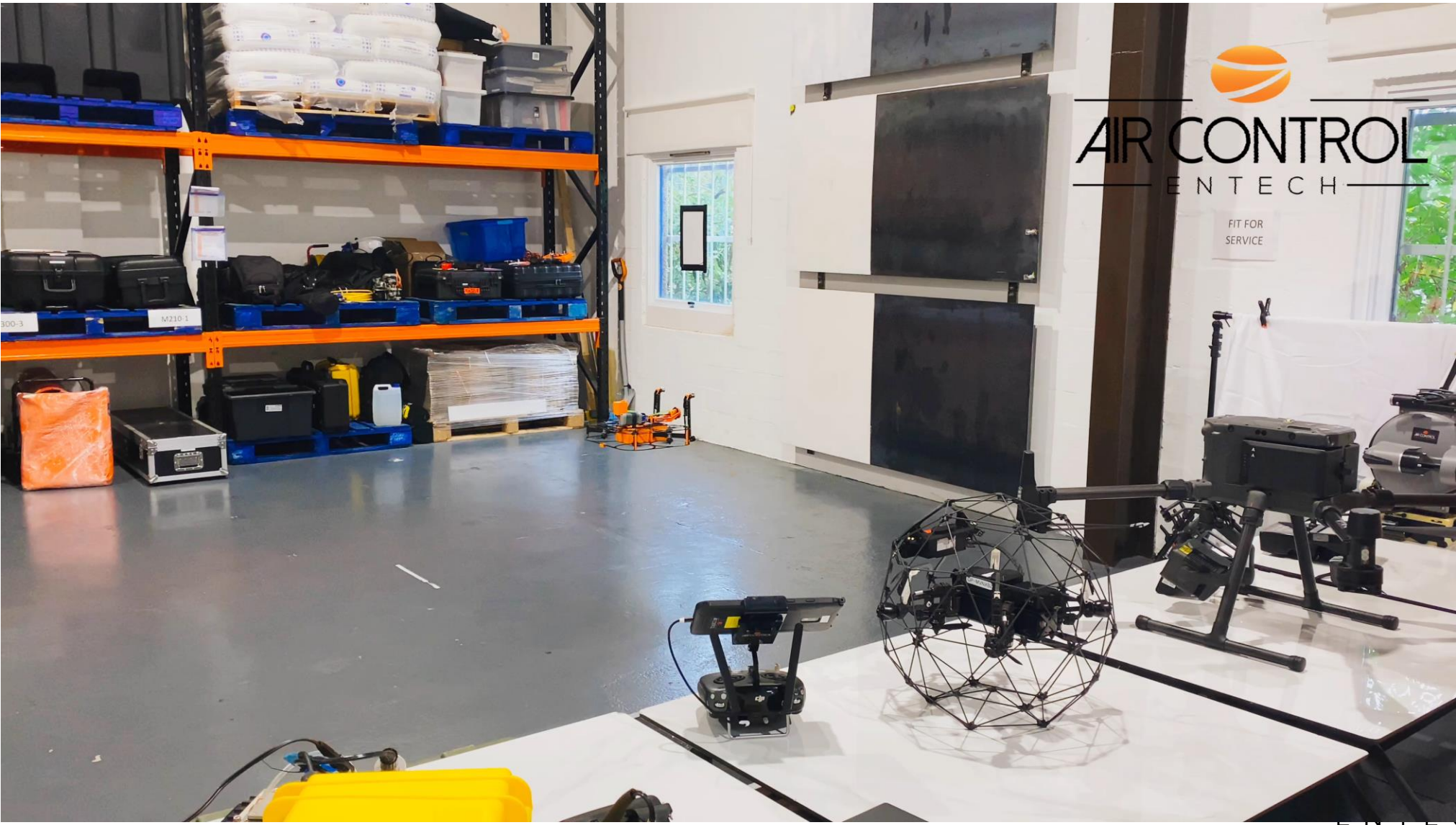


ACE-A-CSI – ACE
Internal Inspection UAV
Props enclosed, no obstructions for
camera

The Present



The Present



The Present



*LR, BV and RINA Pending

How do we deploy robotics?



▶ ACE-A-E2

- CVI
- 9 minute Flight time
- 4K Data
- Must be operated from inside the tank

▶ ACE-A-SDI

- GVI
- Unlimited flight time
- Tethered system
- Operated from out with the tank

▶ ACE-A-UTM

- UTM
- 9 min Flight Time
- Full A-Scan UTM
- 1st DNV Approved Class UTM Drone
- Operated from within the tank
- ACE Bespoke Product

Deploying Robotics - COT



CASE STUDY

FPSO Nigeria – September 2023

- 4 Cargo Oil Tanks Inspected
- 2 Days per Tank
- 8 Days Total Inspection Time
- 3 Person ACE Team
- No Working at Height
- Reduced Confined Space Working
- GVI – General Visual Inspection
- CVI – Close Visual Inspection
- DNV Approved



3 Person vs 10
Person Team



2 Days vs 4 Days
Per Tank



No Working @
Height

Deploying Robotics - WBT & PWT



▶ ACE-S-100



- 2 Hour Dive Time
- 4K Data
- Tethered System

▶ ACE-S-XRY



- Unlimited Dive Time
- 4K Data
- Tethered & Untethered system
- UTM with full A-Scan

▶ ACE-S-XRY_SPEERA



- Vacuum System
- Unlimited Dive Time
- 4K Data
- Tethered System

CASE STUDY

North Sea FSPO & FSU

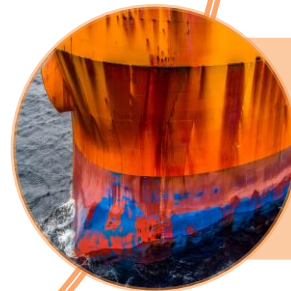
- Personnel work back to back rotation
- Embedded into offshore inspection team
- Robotics dedicated to assets
- Support of class renewal
- All inspection and reporting approved by DNV
- Significant time, safety and cost benefits



Back-to-back
personnel

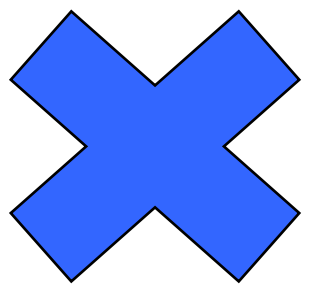


Dedicated
robotics



Lower risk exposure
for all involved

Deploying Robotics - Quayside



VS



Summary

“Eliminate the need to put people in dangerous environments using inspection capable robotics.”

LAND



SEA



AIR



“Eliminate the need to put people in dangerous environments using inspection capable robotics.”

Thanks for your attention!