A Drone Platform for Autonomous Inspection and Repair of ORE Devices

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ORCA HUB
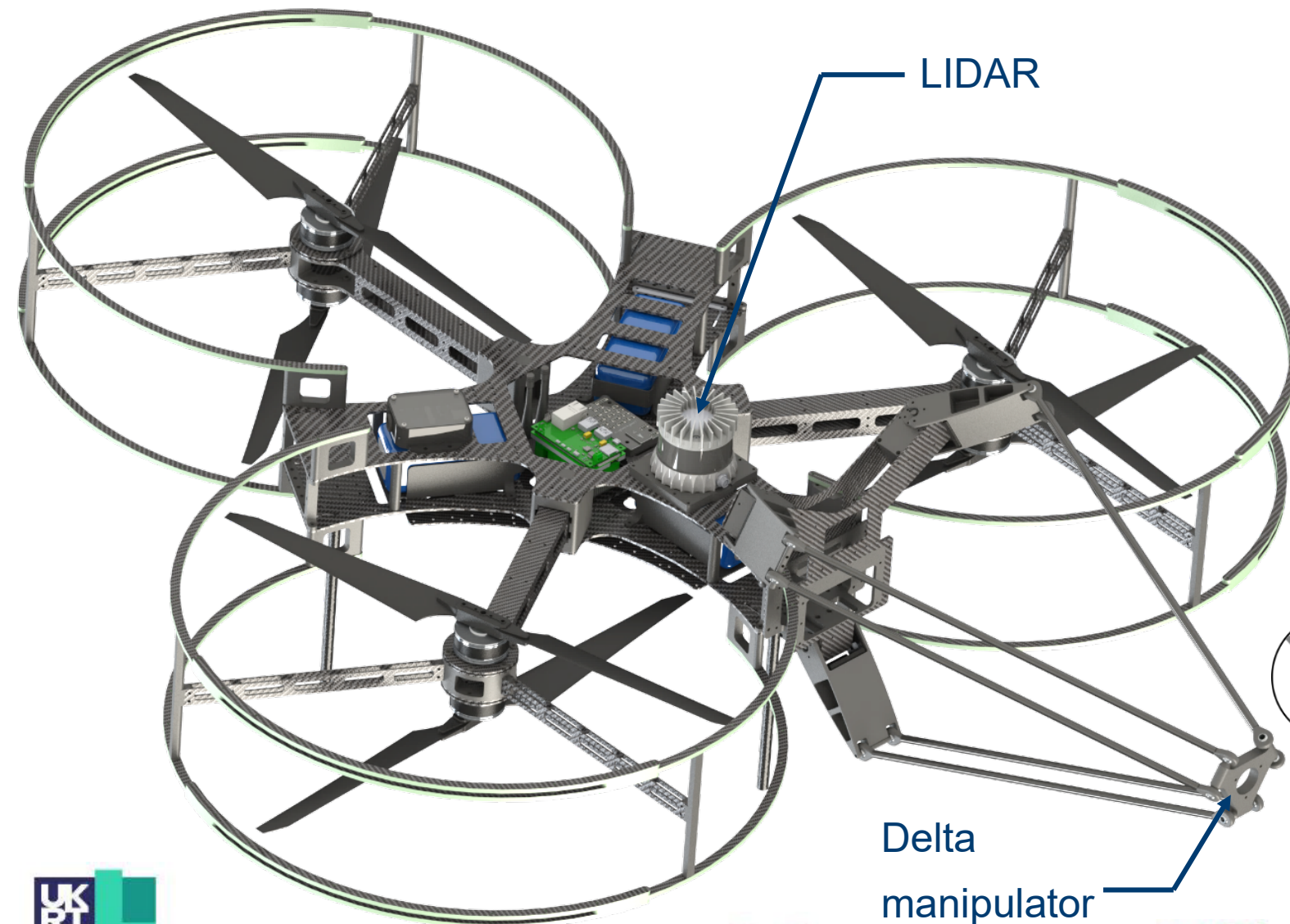Offshore Robotics for Certification of Assets
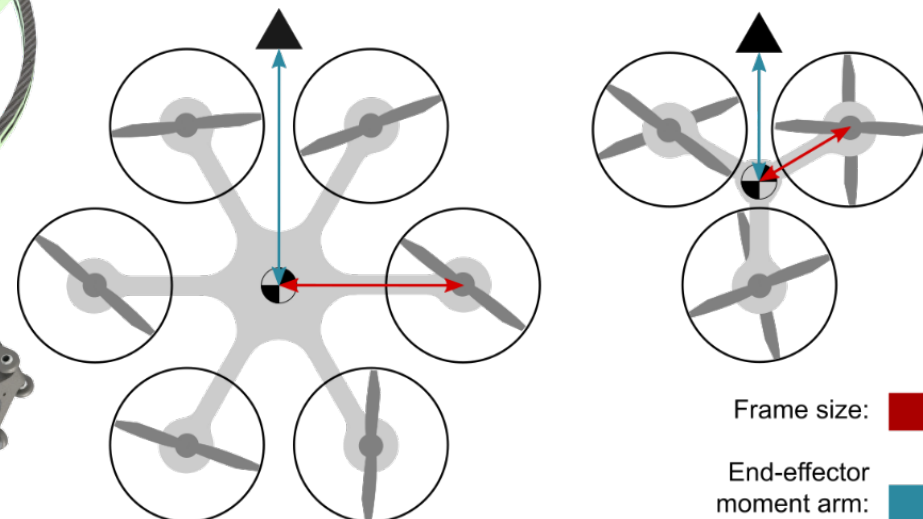Remote Safety and Integrity

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Aerial infrastructure repair and manufacturing

No scaffolding / minimal supporting infrastructure

Agnostic to terrain conditions

No restrictions on material placement – high design freedom

Disaster response

Free-form architecture
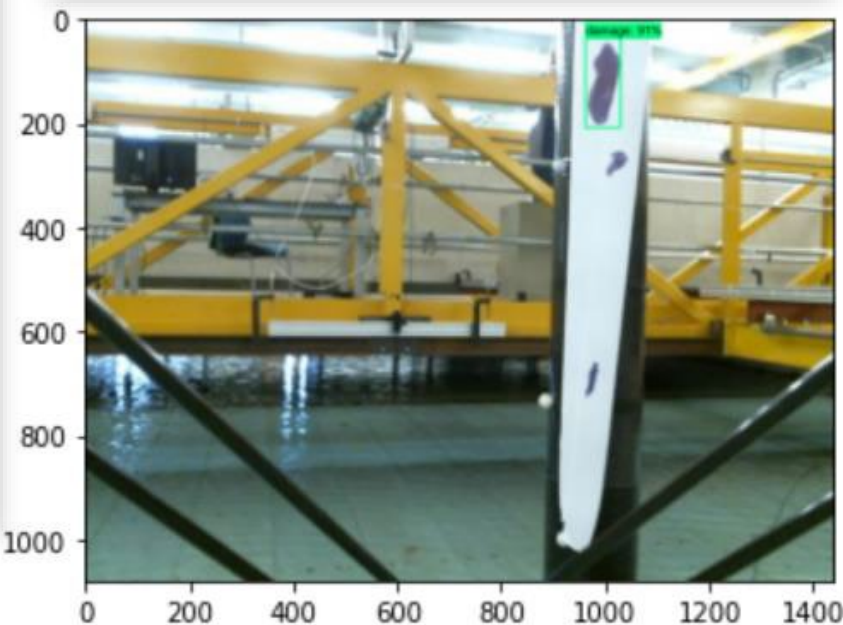
Repair at height

Large-scale in-situ repair platform

LIDAR
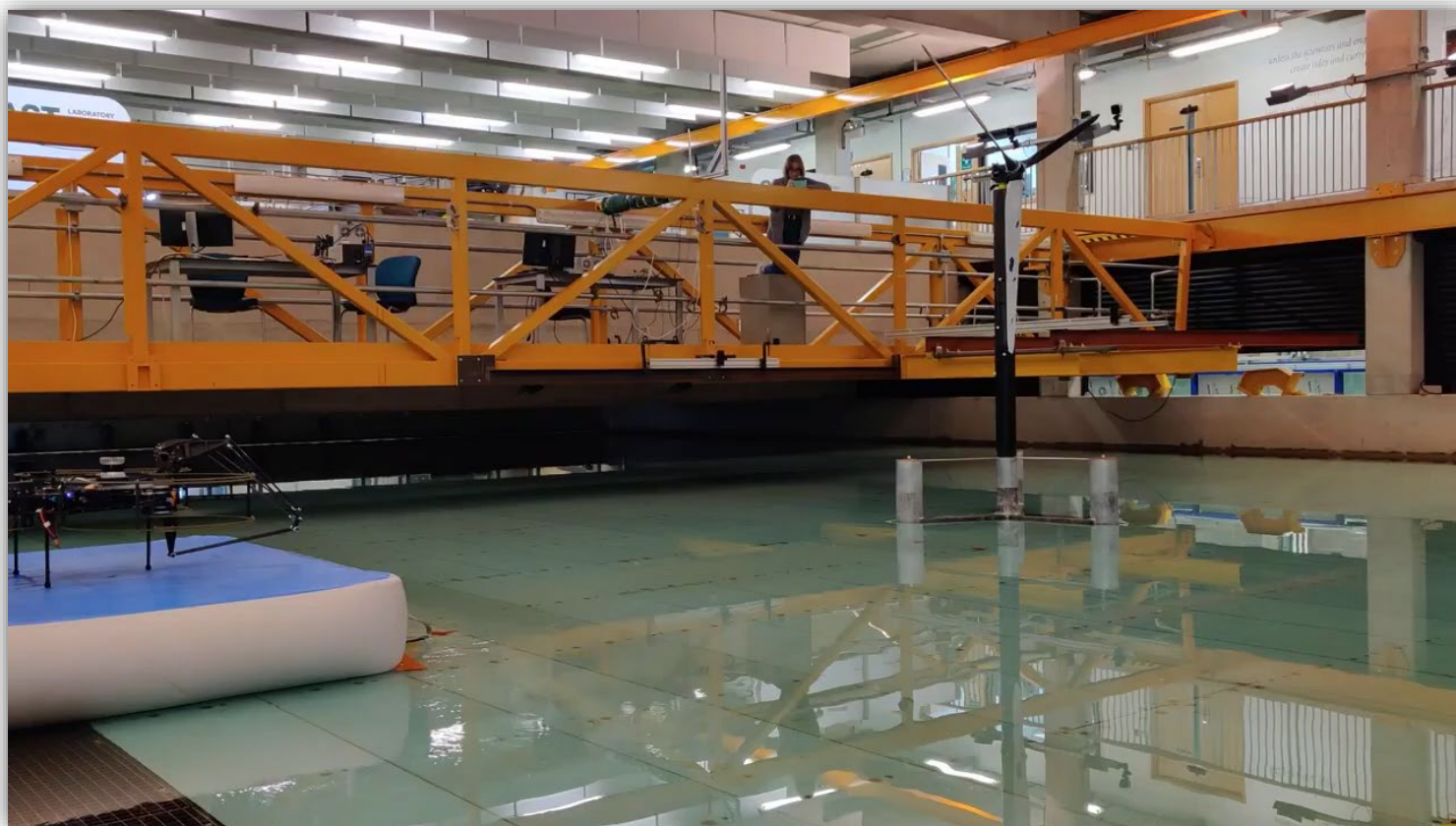
Delta manipulator

- Max. Take off Mass: 14kg (7kg payload) – 1.3m span
- Frame designed and manufactured in-house at ICL
- Compact coaxial frame layout

Frame size: ▮
End-effector moment arm: ▮

Turbine model inspection – CONTROL 2022 (April 2022)

x4 speed

Structural defect detection

- Testing ML based structural defect detection with LIDAR scans
- Scan is generated by drone in flight
- Comparison with 3D model of structure
- Concave and convex defects identified

Summary

- Motivation for aerial manufacturing

- Research challenges addressed:
  - On-board localisation
  - Flight in difficult environment
  - Structural scanning and defect detection

- Future work:
  - Fusion of additional sensors (cameras + RTK GPS)
  - Online defect detection

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