

# Remote Sensing – What do we do with the data?

September 2024

- Introductions
- Survey Equipment and Techniques
- Case studies
- Questions



### Equipment

- Drones, UAVs USVs ROVs
- Tools for application of various sensors
- Flying
- Floating
- Driving
- Diving



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### Types of work

- Structural Inspection and modelling
- Confined space inspection and modelling
- LiDAR and Photogrammetry surveys
- Thermal inspections and reporting
- Stockpile analysis
- Creation of digital twins
- Multi-spectral imaging
- Crawler/pipeline surveys
- Ecology surveys
- Underwater surveying and mapping
- Progress monitoring and marketing to clients





# Case Study One – Structural Inspections - Problem

### **Gloucester Bridges**

- Purpose: Capture data across 4 separate locations
- Goal: Timely data collection
- Requirement: No need for specialist access teams
- Activity: Conduct a general inspection
- Outcome: Generate a comprehensive condition report
  - Coverage: Above and below the waterline







# Case Study One – Structural Inspections - Solution

### **Gloucester Bridges**

- Deploy Remotely Operated Vehicles (ROV) for data capture from the air and the river.
- Aerial capture using Unmanned Aerial Vehicles/Drones (UAV) consisted of photos and videos for visual inspection of structures and photogrammetry processing.
- Waterborne ROV to capture the riverbed using multi beam sonar, processed into DSMs to accurately assess conditions and feed into overall report





## **Case Study One – Structural Inspections - Benefits**

### **Outcomes**

#### Health & Safety

- No rope access
- No water entry
- No working at height

#### Environmental

- Less operatives to task less travel
- Zero traditionally fueled equipment.

#### Cost

- Reduction in operative hours
- No plant hire
- No specialist access teams

#### Efficiencies

- Capture more data
- No need to return to site
- Capture 4 sites in 2 days







# Case Study One – Structural Inspections -Outputs

### **Gloucester Bridges**

- Comprehensive General Inspection carried out by internal structural engineers
- 3D Photogrammetry model
- 2D Orthomosaic
- Pointclouds of complete sites
- DSM of riverbeds

The outputs of this inspection model enables inspectors to efficiently interpolate the data by identifying specific elements of interest to generate reports





Figure 5 - Rib Naming Convention

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### Case Study Two – Validation and Verification of Cladding Brackets - Problem

### UWE – Bristol

'Manually verifying the installation of cladding brackets is a time consuming and costly exercise that put our operatives in harms way.'





### Case Study Two – Validation and Verification of Cladding Brackets - Solution

Create a digital twin of the site using hires imagery captured from a UAV.





### **Outcomes**

#### Health & Safety

• No working at height

#### Environmental

- Less operatives to task less travel
- Less traditionally fueled equipment.

#### Cost

- Reduction in operative hours
- No additional plant hire

#### Efficiencies

- Capture more data
- Capture data quicker
- Review data quicker





# Case Study Three – collapsing drainage adits

- Rapid deployment
- Confined space survey
- Maintain Health and Safety of individuals attending
- Share with other services





- Same day deployment to site for multi sensor capture.
- Capture the entire area in photo and video for modelling
- Laser scan the adit portals
- Scan video and photograph the adits with caged UAVs
- Create a base model for future site comparison





## Case Study Three – Incident Response - Outcomes

### **Outcomes**

### **Health & Safety**

Complete removal of persons needing to be near or on a proven failing structure.

### Environmental

Less operatives to task – less travel Less traditionally fueled equipment.

### Cost

Low cost option for all encompassing rapid data capture.

### Efficiencies

Rapid deployment to site, not requiring any specialist access equipment. Complete site dimensional data capture.





# Thank-you & Questions ?

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