Remote Sensing – What do we do with the data?

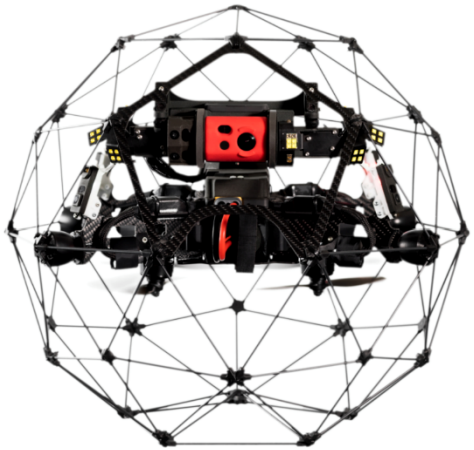
September 2024

Agenda

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

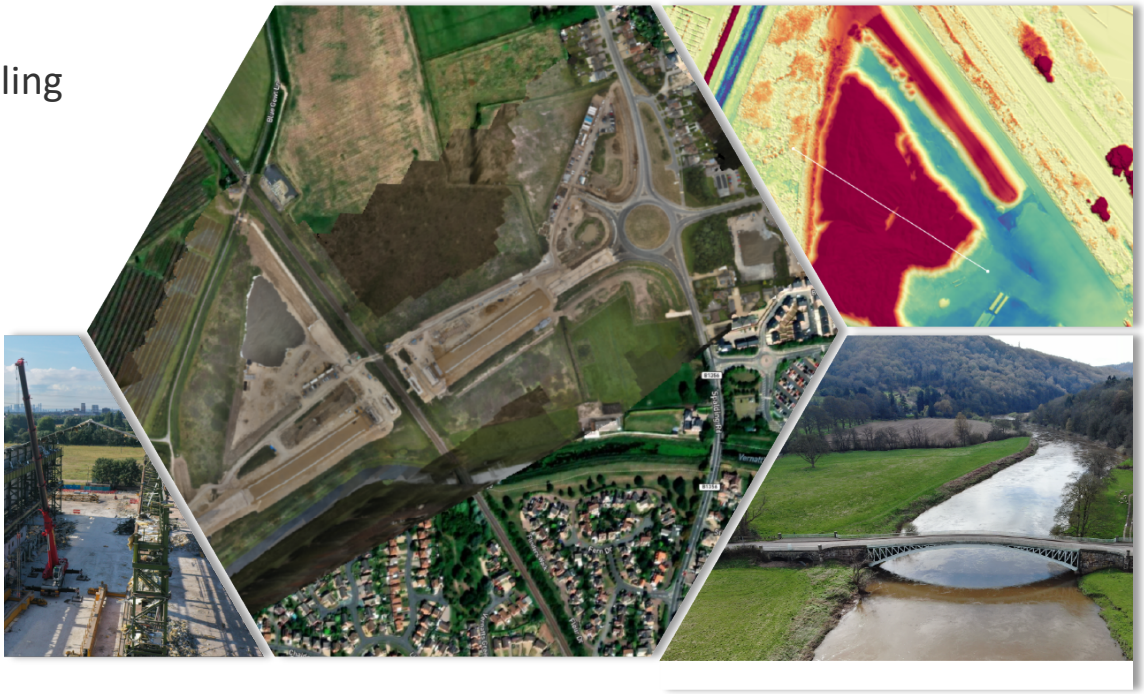
Equipment

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



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

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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

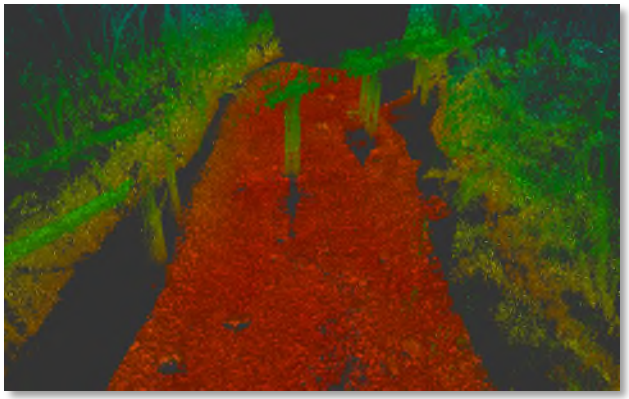
Outcomes

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

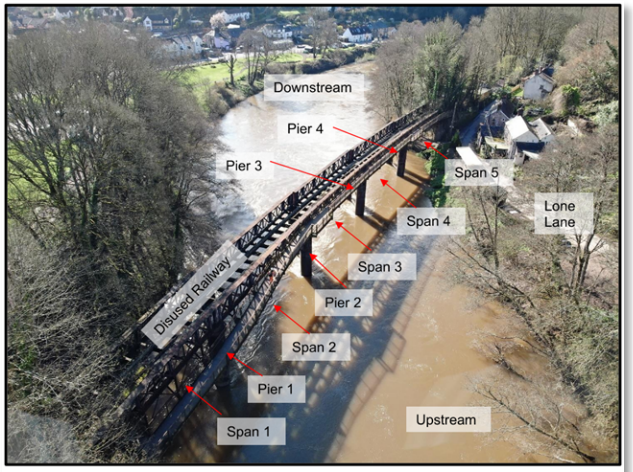


Figure 4 – General view of the bridge

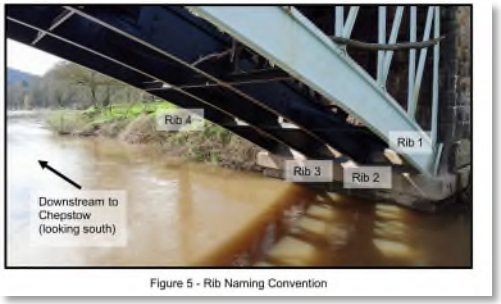
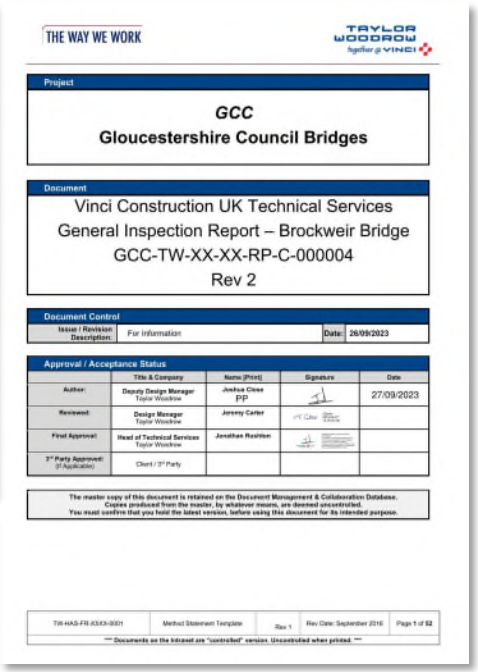


Figure 5 - Rib Naming Convention



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 hi-res imagery captured from a UAV.

Case Study Two – Validation and Verification of Cladding Brackets

Outcomes

Health & Safety
- No working at height

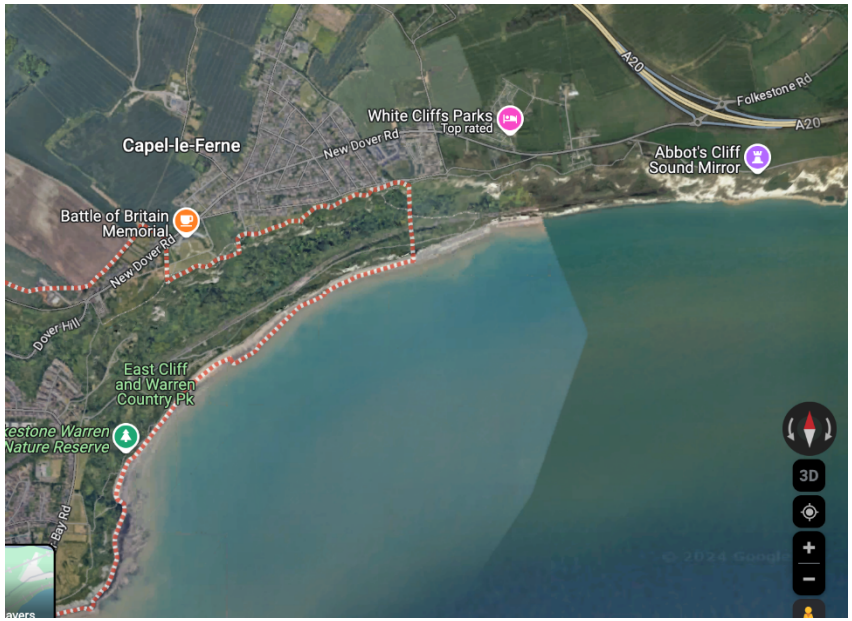
Environmental
- Less operatives to task – less travel
- Less traditionally fueled equipment.

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



Case Study Three – Incident Response - Solution

- 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

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Case Study Three – Incident Response - Outcomes

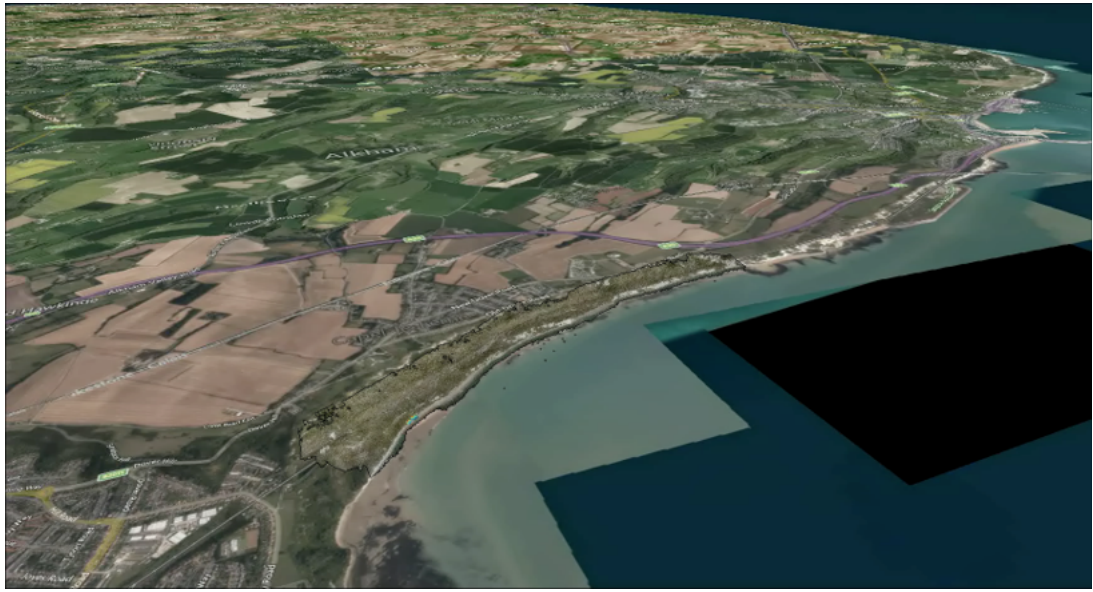
Outcomes

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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