Drones for Asset Management – Operator Data Capture

The story of how we captured data for Plymouth community Homes (PCH) and NHS Exeter

David Holmes – Founder and Director
Chris Brown – Commercial Director

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Somerset Council

Devon County Council

UK Future Flight Innovation Zone

Session outline

1. Challenges: PCH and NHS
2. Solutions: geospatial data and evidence-based
3. Outcomes, impacts and lessons learnt
4. Reviewing the evidence – beyond PCH and NHS

InView Assets create accurate and precise virtual reality models of buildings and landscapes.

This enables stakeholders to make smarter decisions and plan developments.

Forget about the drone.

It’s all about the data and deliverables

A few questions:

1. How many of you are asset managers / involved in asset management?
2. How many of you worry about the risks of staff working at height?
3. How many of you worry about the costs of scaffolding?
4. How many of you have complete asset information?

Part 1
Challenges: PCH and NHS

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Common problems and challenges

Common asset management challenges

Incomplete records (maps, plans, asset information + condition)

Siloed / non-joined-up or disparate data

Sustainability + future resilience

Plymouth Community Homes

NHS
Royal Devon and Exeter
NHS Foundation Trust

Additional problems

Navigating a value-driven spending need

Minimising disruption and impacts for users / residents

(organisational) inertia and resistance to change

Specific data requirements

Information for refurbishment of properties and enhancements for residents

Topo / 2D CAD and BIM surveys

Information to support repair prioritisation (PMM)

Evidence for insurance and legal aspects

Plymouth Community Homes

Data to help fix leaking roof on the ICU at Exeter

Non-invasive, zero-touch remote data inspection

Understanding the urgency to replace a much bigger area of hospital roof

NHS

Royal Devon and Exeter

NHS Foundation Trust

Overcoming general social drone challenges

"You can't fly a drone at the here – its dangerous".

"Members of the public will be worried by seeing a drone operating".

"We don't trust drone data for surveys – we would rather use a 'real' surveyor".

"You are expensive – my mate has got a drone and they will take pictures for £150 ."

"What about GDPR / privacy – you are not allowed to take pictures of my house / estate?"

Part 2
Solutions: geospatial data and evidence-based

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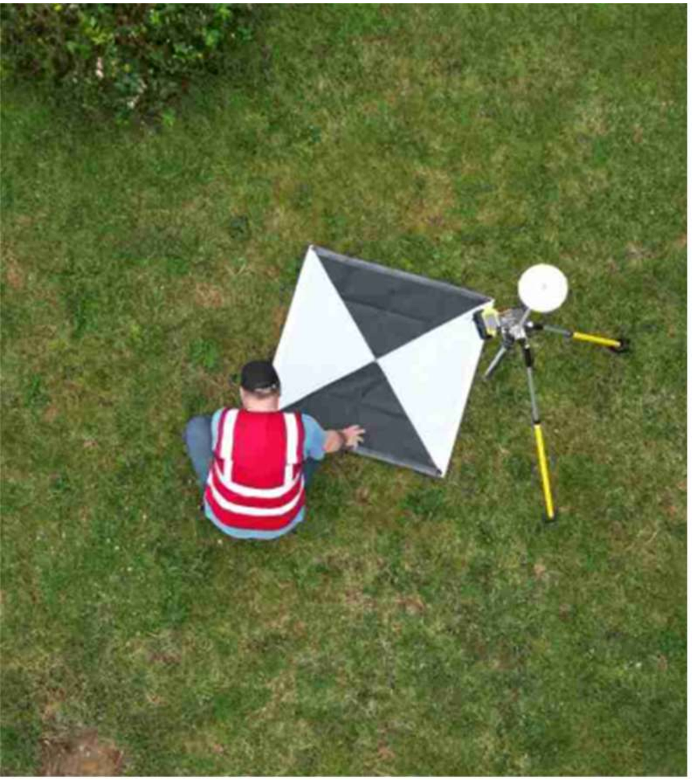

Combined a range of technologies

Quality data – integrity, checks and workflow

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3. ***Shutter Speed***: Chosen to reduce **motion blur** based on flying speed. Faster shutter speeds (1/1000s to 1/500s) help freeze motion and provide clarity.
4. ***Ground Sampling Distance* (GSD)**: The **GSD** becomes finer as the drone flies closer to the object. For the **35mm lens, a GSD of 0.18 cm/px** can be achieved at 10m. With the **50mm lens**, an even better **GSD of 0.13 cm/px** is possible at 10m. Whereas the Mavic 3 E only achieves **GSD of 0.27 cm/px** at 10m
5. ***Motion Blur and Flying Speed***:

Motion blur is reduced by keeping the drone's flying speed below the blur threshold.

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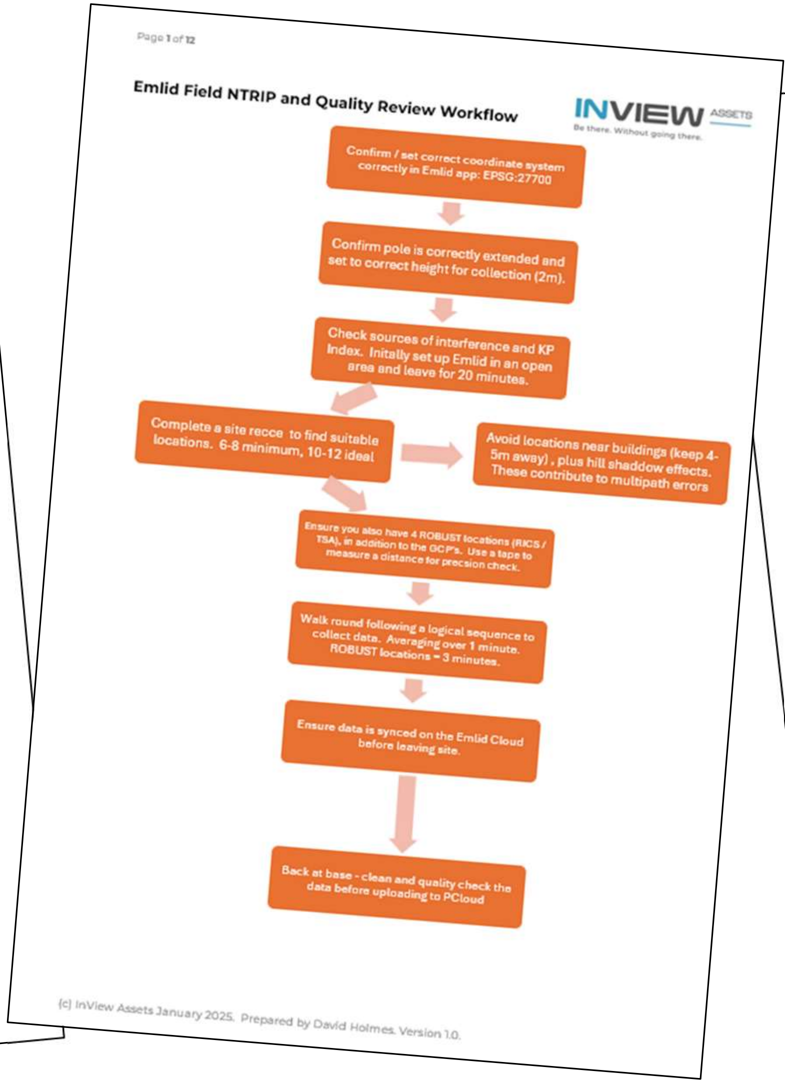

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Emlid Field NTRIP and Quality Review Workflow

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Confirm / set correct coordinate system correctly in Emlid app: EPSG:27700

Confirm pole is correctly extended and set to correct height for collection (2m).

Check sources of interference and KP Index. Initally set up Emlid in an open area and leave for 20 minutes.

Complete a site recce to find suitable locations. 6-8 minimum, 10-12 ideal

Avoid locations near buildings (keep 4-5m away), plus hill shaddow effects. These contribute to multipath errors

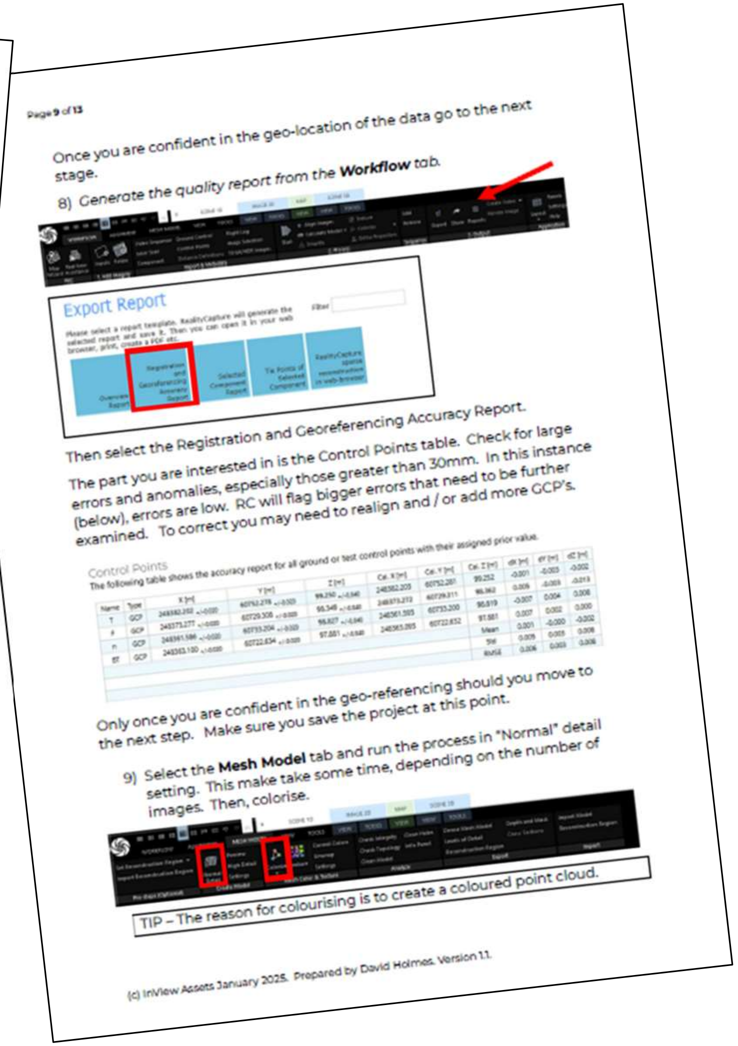
Ensure you also have 4 ROBUST locations (RICS / TSA), in addition to the GCP's. Use a tape to measure a distance for precision check.

Walk round following a logical sequence to collect data. Averaging over 1 minute. ROBUST locations = 3 minutes.

Ensure data is synced on the Emlid Cloud before leaving site.

Back at base - clean and quality check the data before uploading to PCloud

(c) InView Assets January 2025. Prepared by David Holmes. Version 1.0.



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Once you are confident in the geo-location of the data go to the next stage.

8) *Generate the quality report from the* ***Workflow*** *tab.*

Export Report

Then select the Registration and Georeferencing Accuracy Report.

The part you are interested in is the Control Points table. Check for large errors and anomalies, especially those greater than 30mm. In this instance (below), errors are low. RC will flag bigger errors that need to be further examined. To correct you may need to realign and / or add more GCP's.

Control Points

The following table shows the accuracy report for all ground or test control points with their assigned prior value.

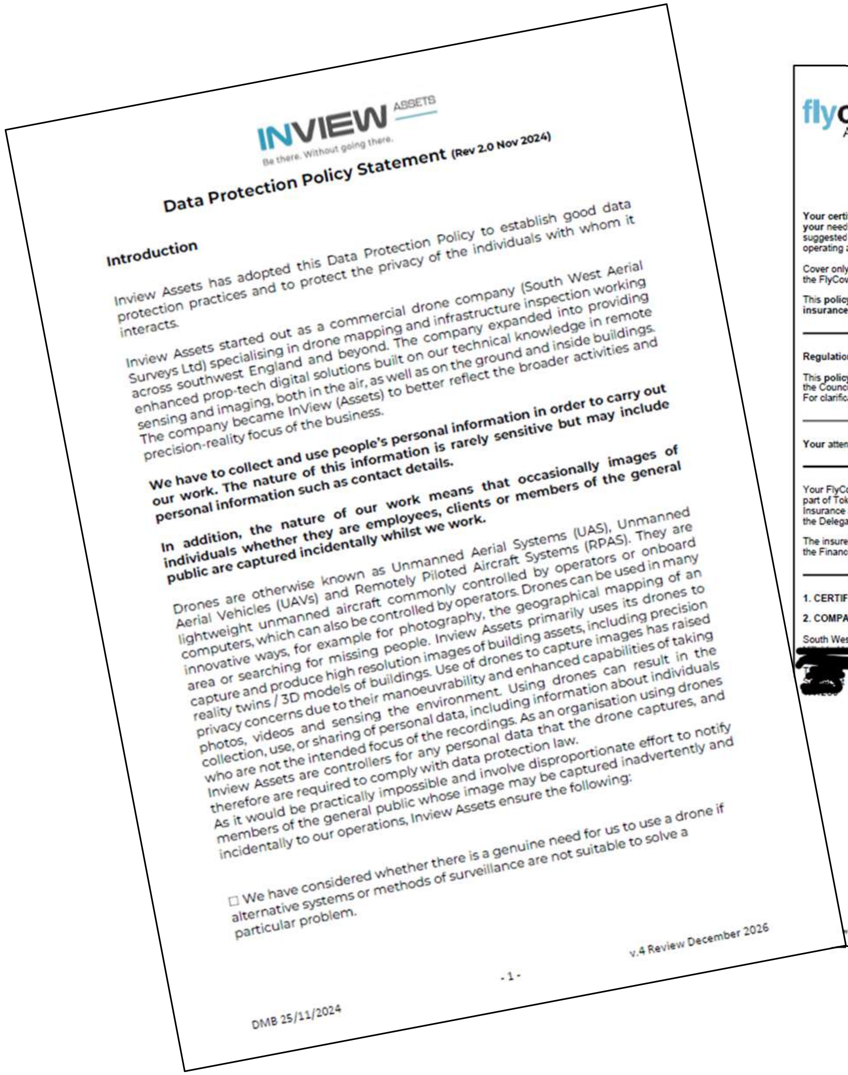
Only once you are confident in the geo-referencing should you move to the next step. Make sure you save the project at this point.

9) Select the **Mesh Model** tab and run the process in "Normal" detail setting. This make take some time, depending on the number of images. Then, colorise.

TIP – The reason for colourising is to create a coloured point cloud.

(c) InView Assets January 2025. Prepared by David Holmes. Version 1.1.

Risk and liability



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Data Protection Policy Statement (Rev 2.0 Nov 2024)

Introduction

Inview Assets has adopted this Data Protection Policy to establish good data protection practices and to protect the privacy of the individuals with whom it interacts.

Inview Assets started out as a commercial drone company (South West Aerial Surveys Ltd) specialising in drone mapping and infrastructure inspection working across southwest England and beyond. The company expanded into providing enhanced prop-tech digital solutions built on our technical knowledge in remote sensing and imaging, both in the air, as well as on the ground and inside buildings. The company became InView (Assets) to better reflect the broader activities and precision-reality focus of the business.

We have to collect and use people's personal information in order to carry out our work. The nature of this information is rarely sensitive but may include personal information such as contact details.

In addition, the nature of our work means that occasionally images of individuals whether they are employees, clients or members of the general public are captured incidentally whilst we work.

Drones are otherwise known as Unmanned Aerial Systems (UAS), Unmanned Aerial Vehicles (UAVs) and Remotely Piloted Aircraft Systems (RPAS). They are lightweight unmanned aircraft commonly controlled by operators or onboard computers, which can also be controlled by operators. Drones can be used in many innovative ways, for example for photography, the geographical mapping of an area or searching for missing people. Inview Assets primarily uses its drones to capture and produce high resolution images of building assets, including precision reality twins / 3D models of buildings. Use of drones to capture images has raised privacy concerns due to their manoeuvrability and enhanced capabilities of taking photos, videos and sensing the environment. Using drones can result in the collection, use, or sharing of personal data, including information about individuals who are not the intended focus of the recordings. As an organisation using drones Inview Assets are controllers for any personal data that the drone captures, and therefore are required to comply with data protection law.

As it would be practically impossible and involve disproportionate effort to notify members of the general public whose image may be captured inadvertently and incidentally to our operations, Inview Assets ensure the following:

☐ We have considered whether there is a genuine need for us to use a drone if alternative systems or methods of surveillance are not suitable to solve a particular problem.

v.4 Review December 2026

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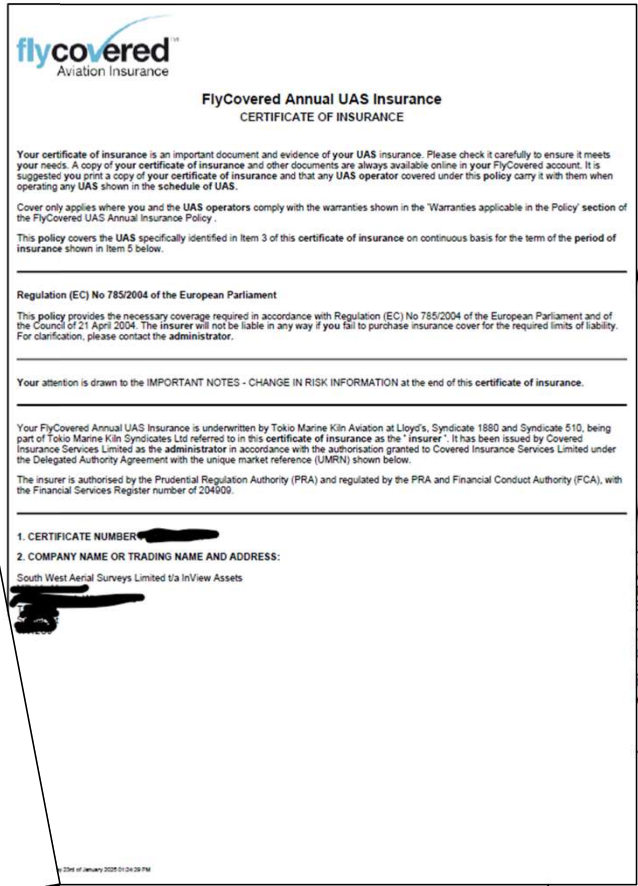
DMB 25/11/2024



flycovered Aviation Insurance

FlyCovered Annual UAS Insurance
CERTIFICATE OF INSURANCE

Your certificate of insurance is an important document and evidence of **your UAS** insurance. Please check it carefully to ensure it meets **your** needs. A copy of **your certificate of insurance** and other documents are always available online in **your** FlyCovered account. It is suggested **you** print a copy of **your certificate of insurance** and that any **UAS operator** covered under this **policy** carry it with them when operating any **UAS** shown in the **schedule of UAS.**

Cover only applies where **you** and the **UAS operators** comply with the warranties shown in the 'Warranties applicable in the Policy' **section** of the FlyCovered UAS Annual Insurance Policy .

This **policy** covers the **UAS** specifically identified in Item 3 of this **certificate of insurance** on continuous basis for the term of the **period of insurance** shown in Item 5 below.

Regulation (EC) No 785/2004 of the European Parliament

This **policy** provides the necessary coverage required in accordance with Regulation (EC) No 785/2004 of the European Parliament and of the Council of 21 April 2004. The **insurer** will not be liable in any way if **you** fail to purchase insurance cover for the required limits of liability. For clarification, please contact the **administrator.**

Your attention is drawn to the IMPORTANT NOTES - CHANGE IN RISK INFORMATION at the end of this **certificate of insurance.**

Your FlyCovered Annual UAS Insurance is underwritten by Tokio Marine Kiln Aviation at Lloyd's, Syndicate 1880 and Syndicate 510, being part of Tokio Marine Kiln Syndicates Ltd referred to in this **certificate of insurance as the ' insurer '**. It has been issued by Covered Insurance Services Limited as the **administrator** in accordance with the authorisation granted to Covered Insurance Services Limited under the Delegated Authority Agreement with the unique market reference (UMRN) shown below.

The insurer is authorised by the Prudential Regulation Authority (PRA) and regulated by the PRA and Financial Conduct Authority (FCA), with the Financial Services Register number of 204909.

1. CERTIFICATE NUMBER [redacted]

2. COMPANY NAME OR TRADING NAME AND ADDRESS:

South West Aerial Surveys Limited t/a InView Assets
[redacted]

OFFICIAL - Named Parties Only. This information is intended for the Named Party at Section 2.1 of this OA and the UK CAA only.

UK Civil Aviation Authority

UNMANNED AIRCRAFT – OPERATIONAL AUTHORISATION

SPECIFIC CATEGORY

1.	**AUTHORITY RELEASING THE AUTHORISATION**
1.1. State	United Kingdom (UK)
1.2. Issuing Authority	United Kingdom Civil Aviation Authority (UK CAA)
1.3. Authorising Signatory Position	Adam Stow RPAS Technical Inspector
1.4. Point of Contact Telephone E-Mail	SSC Technical Services 0330 022 1908 uavenquiries@caa.co.uk
2.	**UNMANNED AIRCRAFT SYSTEM (UAS) OPERATOR**
2.1. UAS Operator Name Operator ID UK CAA reference	South West Aerial Surveys Ltd, t/a InView Assets GBR-OP-NB5L4CTS37MW UAS 15364
2.2. Accountable Manager Telephone E-Mail	David Holmes [redacted]
3. uthorisation Number	1
. erations Manual (OM)	OSC July resubmission for InView Volume 1 (b), Version OSC 01.05, 29/07/24 OSC July resubmission for InView Volume 2, V02.05, 29/07/24 OSC July resubmission for InView Volume 3 , V03.05, 29/07/24

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Part 3
Outcomes, impact and lessons learnt

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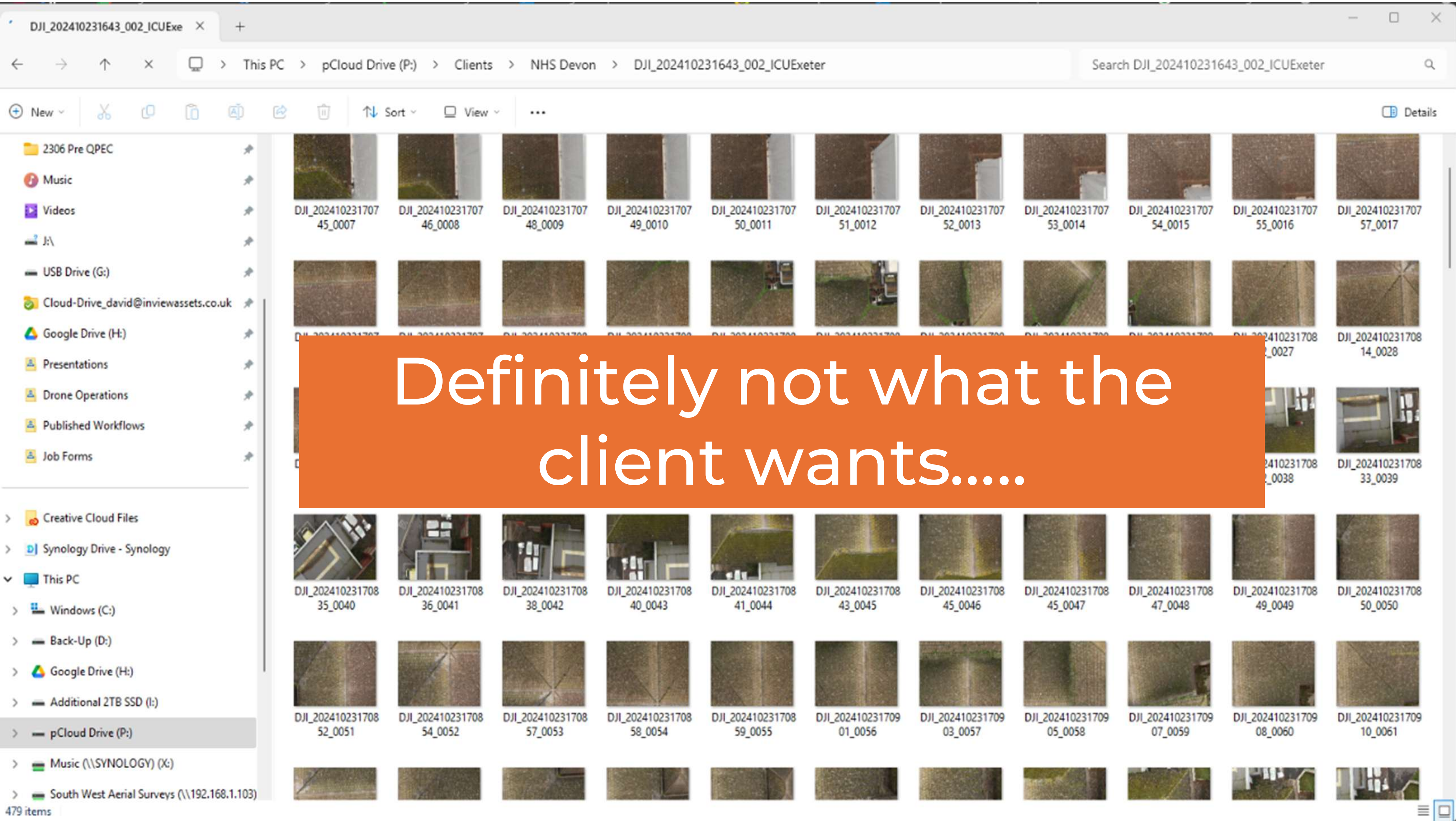
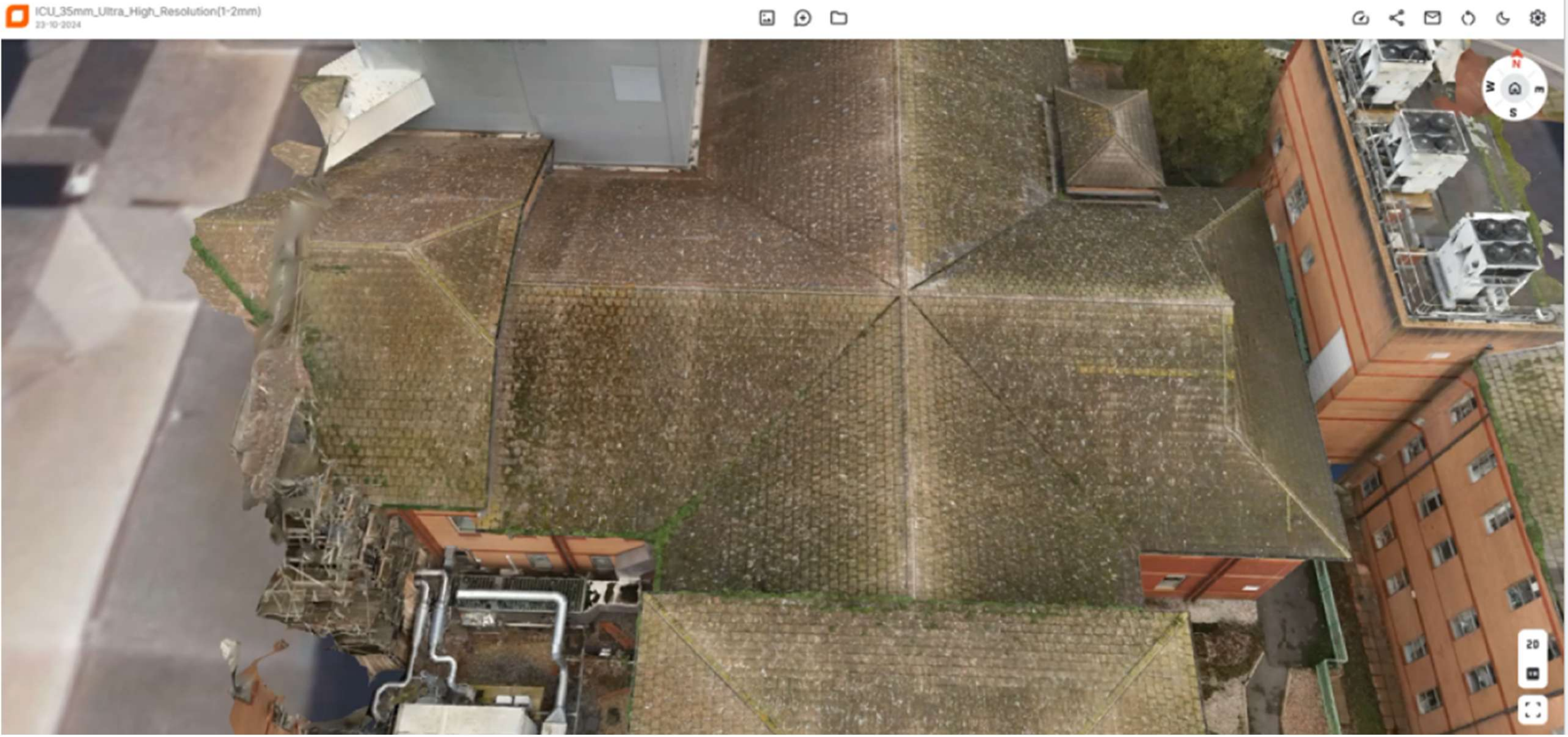


Definitely not what the client wants.....

3D Precision Reality Model - NHS

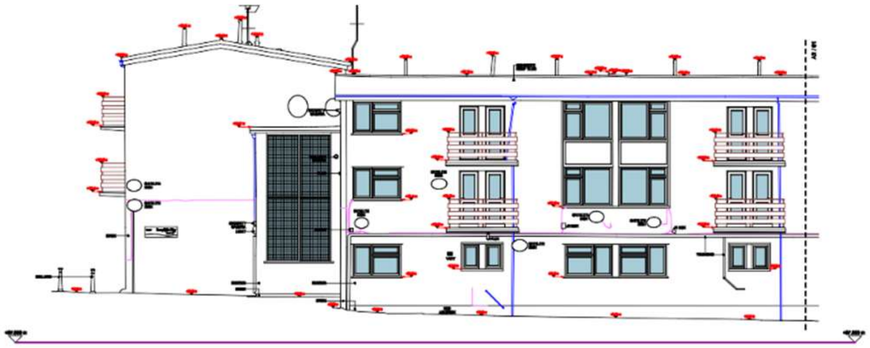
NHS
Royal Devon and Exeter
NHS Foundation Trust



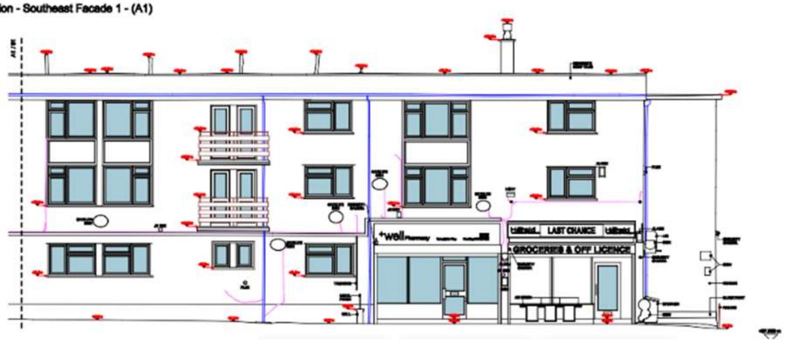
3D Precision Reality Model – PCH (1)

Plymouth Community Homes

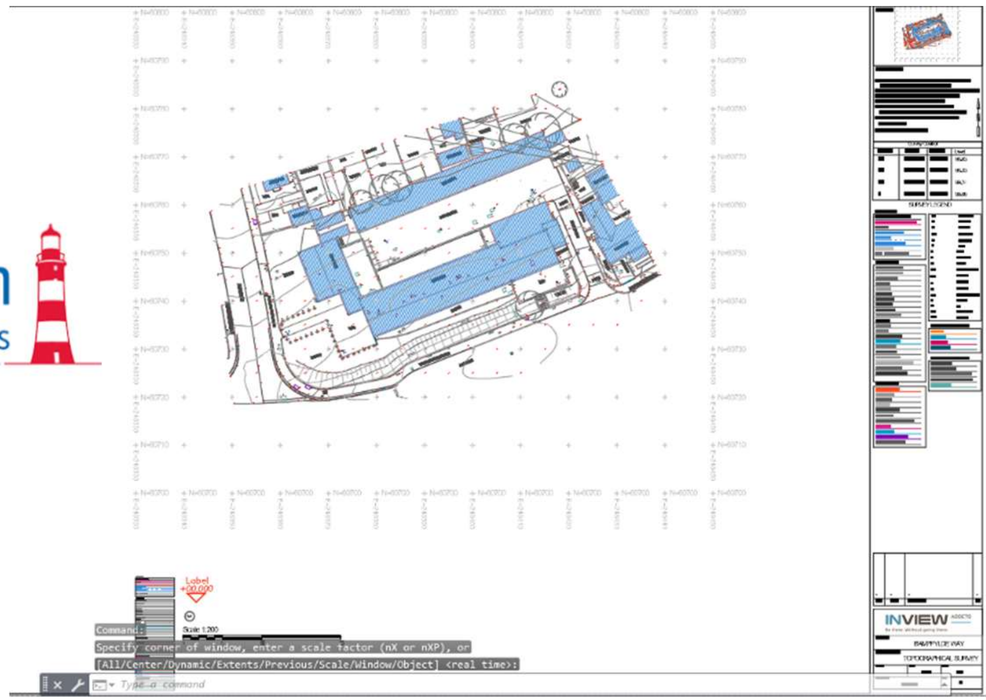
Topo, 2CAD, BIM – PCH (2)



(A1) Elevation - Southeast Facade 1 - (A1)
1 : 50



Plymouth
Community Homes



CAD

Revit

Architecture Engineering
& Construction Collection

Impact and Reflections

1. UAV solutions **usually cheaper (up to 75% less)**
2. Data delivery from UAV data can be **2x as fast**
3. Drones are **much less disruptive** to people and operations compared to scaffold / traditional inspection
4. It's not about the technology, its about the **outputs and deliverables**
5. Use a **hybrid solution** – ground and aerial data
6. Survey **grade data** is paramount to client trust
7. Build a strong relationship with the client to become an **integrated + turn-key supplier.**

Part 4
Reviewing the evidence – beyond PCH and NHS

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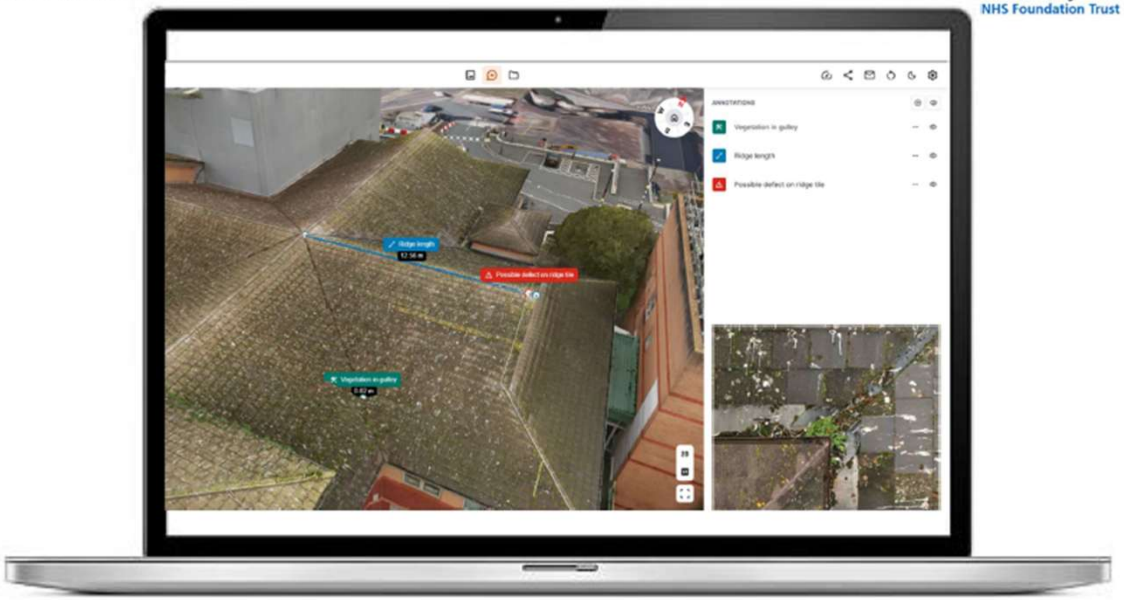
Evidence (1)



ROI RDUH Roof Survey ICU - PPM Redefined (~1000m²)

ROI Metrics	Traditional Survey	INVIEW ASSETS
Survey cost	£ 30,000	£ 3750
Project delivery	9 days	2 days
Data points	<100	>100,000
Risk	working at height	ground-based
Area captured	< 50%	> 95%
Output format	paper-based report	interactive 3D model
Project sharing	email / post	cloud-based
Disruption	weeks / months	zero

Impacts

>75% cost saving
more than 3x faster
vastly more data
much safer
evidenced-based decisions
rich contextual outputs
collaborative sharing
no disruption

Evidence (2)

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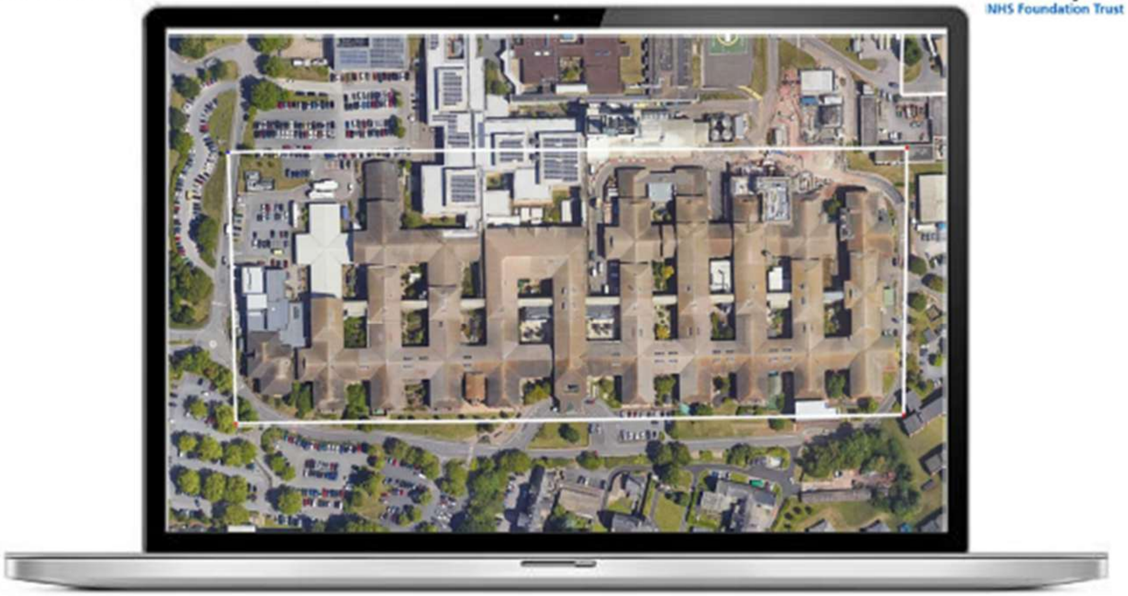
Royal Devon
University Healthcare
NHS Foundation Trust



ROI RDUH Roof Survey Wonford (~32,000m²)

ROI Metrics	Traditional Survey	INVIEW ASSETS	Impacts
Survey cost	> £ 1 million	< £ 100,000	90% cost saving
Project delivery	months	days	more than 10x faster
Data points	thousand's	10's of millions	vastly more data
Risk	working at height	ground-based	much safer
Area captured	< 50%	> 95%	evidenced-based decisions
Output format	paper-based report	interactive 3D model	rich contextual outputs
Project sharing	email / post	cloud-based	collaborative sharing
Disruption	months / years	zero	no disruption

Evidence (3)

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NHS Royal Devon University Healthcare NHS Foundation Trust

RDUH - Maintenance Costs

Recent figures from the NHS Estates Return Information Collection show it cost **£96.5m** to run **Royal Devon University Healthcare** NHS Foundation Trust's estates in the year to March. Meanwhile, the bill to clear **the backlog of repairs** needed at the trust is now **£163m**.[1]	The site requiring the most expensive work is Royal Devon and Exeter Hospital in Wonford, with the provisional statistics estimating it **needs £99.8m in maintenance and repairs.** The Royal Devon University Healthcare Trust needs about **£13m to address "high risk" repairs**.[2]

Accredited Savings and Safety

According to **RICS and Deloitte**, drones can drastically reduce the time and cost involved in surveying and data capture. Traditional surveying methods are labour-intensive and time-consuming, whereas drones can capture data for large sites in a fraction of the time with no need to work at height, leading to a **30-50% reduction in operational costs**. Drone data allows for more precise bids on construction projects, optimizing costs and **reducing the need for extensive site visits**.[3]	**Drone technology significantly improves safety** by reducing the need for manual inspections in hazardous areas, such as high structures or active construction zones. Surveyors no longer need to physically access unsafe locations, as **drones can capture aerial views in real-time**. This leads to a notable **decrease in workplace accidents — by around 91%** according to some reports — enhancing overall site safety.[4]

Conclusions

These projects demonstrate it is possible to capture aerial data safely and effectively in complex and busy environments.

- Client trust and building a relationship
- Data-driven decision-making
- ESG and Sustainability
- Innovation and enterprise
- Collaboration and communication
- Risk mitigation and resilience