

Building Surveyors' Oxford Briefing 2017
Culham Science Centre | Friday, 13 October 2017



Sandy Halse
Chief Pilot | Operations Director

Agenda: high level inspections

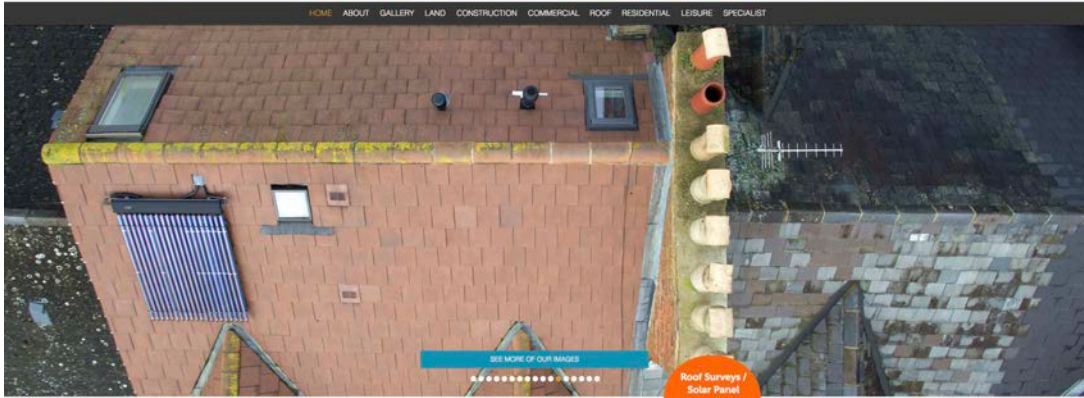
- Thames Valley Drones
- Drones (overview)
- Safety considerations
- Operating commercially / Getting license / Renewal
- Drone capabilities
- PROs & CONs of drones
- In-house vs outsourced
- Useful outputs for surveyors
- Q&A

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- Drone-based aerial photography, filming, inspections, surveys, 2D mapping & 3D modeling
 - Property (residential, commercial, agricultural, public)
 - Land
- **Building /structural inspections & surveys**

Work for surveyors

- Dilapidation / condition reports
- Pre & Post remedial work
- General inspections / trouble shooting
- Insurance
- Land / development opportunities

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ONE NIGHT ONE CHEF ONE TABLE

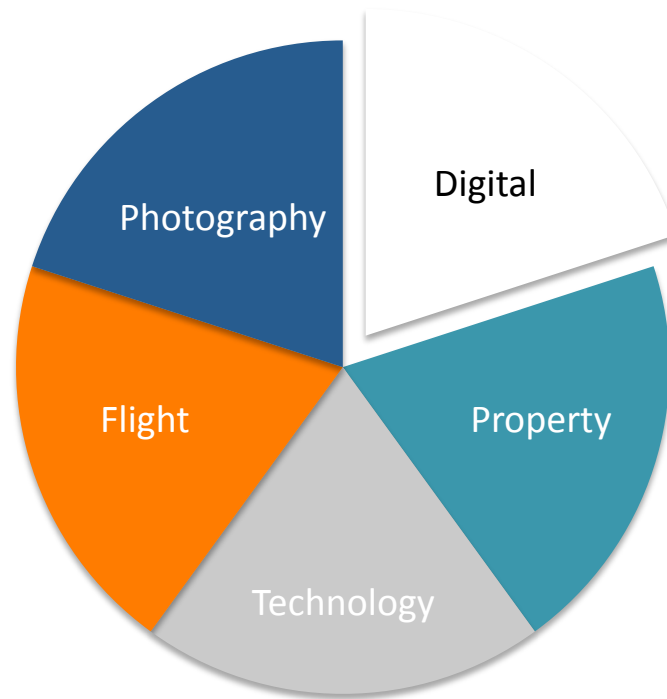
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Thames Valley Drones

- What else sets Thames Valley Drones apart ?
 - Professional ethos (all operational aspects [procedures to presentation])
 - End-to-end delivery:
flying > surveying > editing > post-production > delivery
 - Fly some of the latest equipment in its class, use professional software for image editing / project management
 - Customer centric – deliver what the customer requires / exceeding customer expectations
 - Where analytics & technology meets innovation & creative
 - We believe we are one of the most professional drone operators in the South East serving the property, construction & building management sector



Thames Valley Drones

- What else can Thames Valley Drones offer?
 - Thermal
 - Anyone can fly a drone but delivering actionable data especially for roofing is key
 - Not all roof types are created equal
 - Specialist drones



The drone business

- What is a drone?
 - Unmanned Aerial Vehicle / System (UAV / UAS)
 - Remotely Piloted Aircraft System (RPAS)
- Takes majority of principles from aviation - unmanned flight
 - Pilot
 - Aircraft ...
- Governed by
 - **Civil Aviation Authority & Air Accident Investigation Board**
 - Air safety
 - **Police**
 - Criminal activity / damage to private property / drone mis-use
 - Main reporting line for incidents
 - **Information Commissioner** (camera)
 - Privacy & data protection

Fly Drone Safe Guide

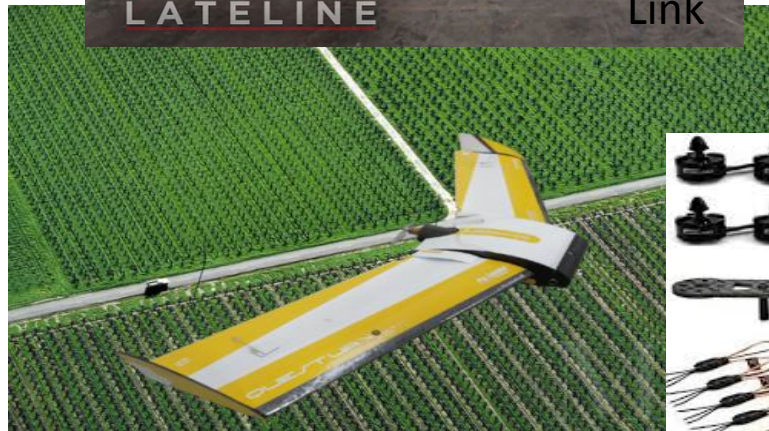
- **The Pilot is responsible for the drone at all times**
- **The operation must not endanger anyone or anything - especially aircraft**
- **Maximum height for flight 400 feet | maximum distance 500 meters**
- **The drone MUST be in sight at all times** (no First Person View) or Beyond Line of Sight (BLOS) and Extended Visual Line of Sight (EVLOS - remote observers) - require additional training, qualification & permission (CAA)
- **(With camera) Should not be flown within 50 meters of anyone or anything not directly under the control of the pilot (there for the sole purpose of the filming or have their explicit permission**
- **Not fly within 'no fly zones' ie airports, danger areas (military & civilian [hi-intensity radar or radio waves)**
- **Not fly for 'valuable consideration' (commercially) without PfCW**
- **If fitted with a camera you should not fly within 50 metres of congested area, large gatherings, other people or property**
- Careful when flying in the extreme cold - battery life is considerably shorter
- Don't fly if you aren't feeling 100% - most accidents are human error
- Know where you are flying www.skydemonlight.com

Categories of drone

- Toy quadcopters
- FPV / Racing
- Consumer camera
- Prosumer
- Consumer Industrial, Agricultural, Utilities & Transport
- VTOL (search & rescue / conservation)
- Military

Types of drone

Micro Drone 3.0



Our drones



Air Safety - people



Air Safety - aircraft



Type of licence (PfCW)

- Who you are
- What you are flying
- Why you are flying
- Where you are flying
- What you intend doing with any data (images / other)?

Basic Principle of Commercial Work

“Valuable consideration”

- which is available to the public
- or
- which, when not made available to the public, is performed under a contract between an operator and a customer, where the latter has no control over the operator,
 - in return for remuneration or other valuable consideration.'

Commercial Operation

- Qualified
 - ground school / theory (exam)
 - flight exam (practical)
 - operations manual CAA approved
- Licensed (Permission for Commercial Work)
renewed annually
- Insured

Ground School / Theory

Air Law: (rules of the air, regulations, airworthiness, airspace & air traffic services, accident investigation (safety))

Aircraft: software & hardware, operation / navigation methods, flight instruments, GPS, Li-Po battery management

Flight performance: (operational envelope, Max take-off weight, airspeed, altimeter settings, operational ceiling, weather limitations)

Human factors: pilot, ground crew, air crew

Meteorology: weather, international standards (atmosphere) air pressure / altimeter, visibility, cloud formations, wind

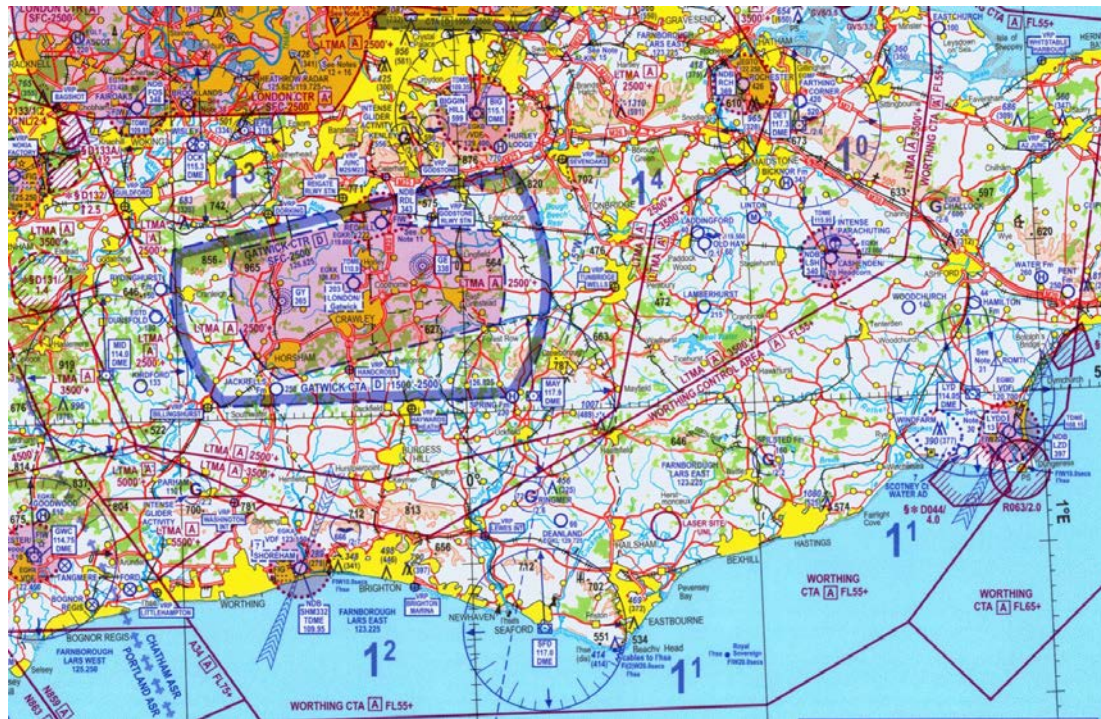
Navigation: aviation charts, flight planning, latitude & longitude

Operational procedures: everything operational from crew to Special Operational Procedures, exemptions & permissions, types of operations / limitations

Basic Principles of flight: lift, stall windshear, command & control

Communications: air traffic control, NATS, other air users

Aeronautical chart section(UK)



Operations Manual

| Thames Valley Drones | Operations Manual |
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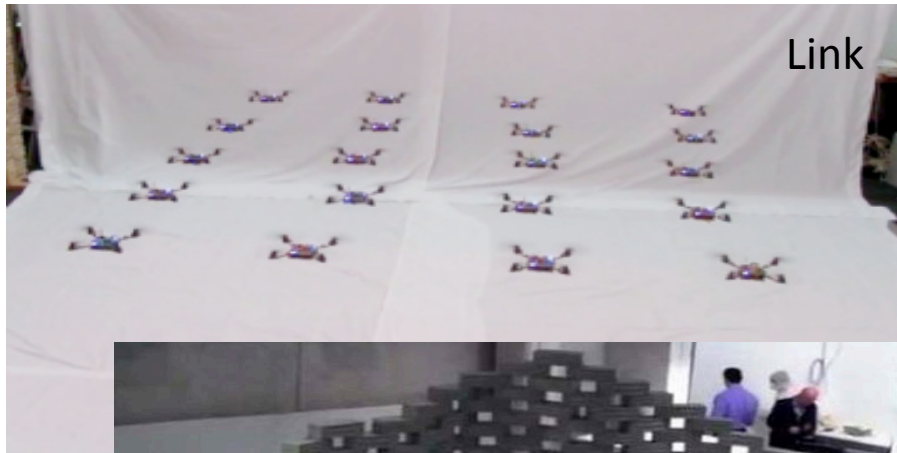
Compliance with various CAA regulations

| Reference | Full Title | Issue Number & Date of Issue |
|-------------------|---|------------------------------|
| CAP 382 | Mandatory Occurrence Reporting Scheme | Ninth Edition, 18 March 2011 |
| CAP 393 | Air Navigation: <i>The Order and Regulations</i> | Fifth edition, August 2016 |
| CAP 722 | Unmanned Aircraft System Operations - <i>Guidance</i> | Sixth Edition, 24 March 2015 |
| CAP 1059 | Safety Management Systems: Guidance for small, non complex organisations | June 2013 |
| N-2014/190 | Small Unmanned Aircraft Operations Within London and Other Towns and Cities | 21 November 2014 |

Renewal

- PfCW renewed annually
 - Updated Operations Manual for each drone (submit an SRG 1320 for different drone or type of activity)
 - Flight / Pilot / Maintenance logs
 - Flying hours
 - Insurance
- BNUC-S (Basic National UAS Certificate) re-submission for each different aircraft

Drone Capabilities



Benefits of drone inspections

- Increased efficiency (time / resources)
- Reduced cost
- Improved health & safety

Specific benefits of drones for surveyors

- In-built safety
- Minimal disruption
- Non-intrusive / reduced risk of further damage
- Greater / Full access to inaccessible rooves / areas
- Better quality images / information
- Reduced survey / working time (contractors)
- Environmentally friendly
- Remote monitor facility
- Flexible
- Easily repeatable

Cons of drones

- Specific no fly zones
 - Danger areas Danger Areas are areas of military airspace often used for activities such as fighter pilot training, live ammunition training or weapons and systems testing (including GPS jamming exercises)
 - Prohibited Areas are areas of airspace which for one reason or another have been prohibited from having aircraft enter them.
 - Controlled airspace Aerodrome Traffic Zones, they surround smaller airports and aerodromes that do not have additional controlled airspace
 - Restricted Areas protect sensitive locations such as prisons and nuclear facilities.
 - Military Aerodrome Traffic Zones
 - London Restricted areas EG R157 (Hyde Park), EG R158 (City of London) and EG R159 (Isle of Dogs)

<http://www.noflydrones.co.uk>

Cons of drones

- Weather?
- Specialist knowledge?

Factors that need special consideration

- Tree lines
- Telephone cables
- Neighbouring properties (terraced properties particularly)
- Other buildings / structures
- Railway lines
- Main roads
- Motorways
- High voltage power lines
- Power / Electricity / Substation
- Animals / Pets that are housed outdoors
- Site of Special Scientific Interest
- Wildlife / Nature reserve
- Elderly
- Children
- Special needs groups
- Police station
- Army barracks
- Other sensitive military sites
- Cranes
- Heavy / Plant machinery
- Golf courses or other outdoor recreational sites
- Other airspace users eg microlite, hang gliding, parasailing, parachute, gliders, hot air balloon clubs or sites who use the area
- High power radio or communications equipment (particularly on roof tops)
- Industrial - any stack or flue that is emitting any form of output

Challenges: in-house (balancing weather / requirements vs resource vs timescales)

- Heavy up-Front costs (business case / sizeable capital expense up front)
- Takes time to qualify & set up a project (esp while working full-time)
- Can take 6 - 9 months to qualify
- Part-time resource(s) - enough resource at the right time to cover all surveys required with other workloads
- Full time resource(s) - resources sitting idle in bad weather / when not required
- Can't easily scale up / down as requirements dictate
- Adding new technologies / skill sets takes time
- Reliant on one or two pilots (flexibility / scalability/ availability)

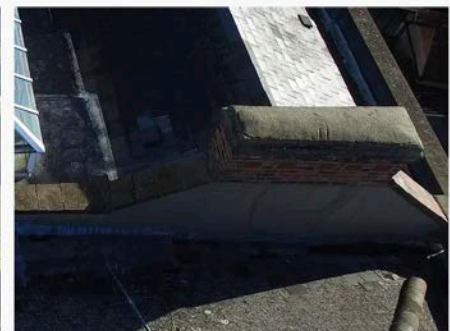
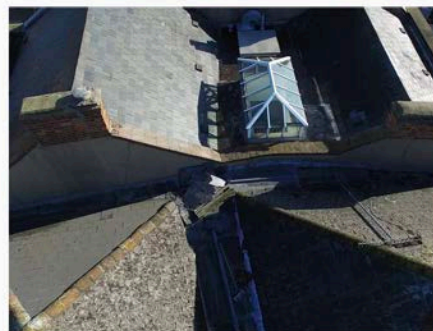
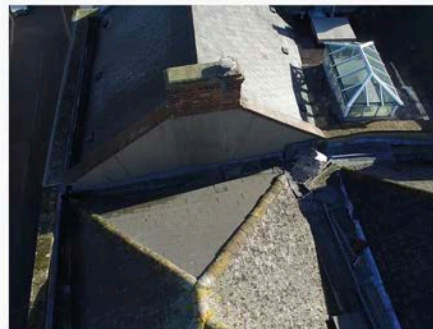
Benefits of using a 3rd Party Supplier

- We have the experience and the skills to manage the whole process, we work within the sector
- Networked into pilots / groups, know what to look for, can add additional skills (Infra-red / specialist drones), scale up or down as requirements change
- Pilot recruitment, management, project management, quality control - all outsourced to experienced team
- Develop bespoke standards & specifications
- No capital expense
- Fully scalable, additional skills sets easily added
- Regionally-based pilots means flexibility in cover / resourcing

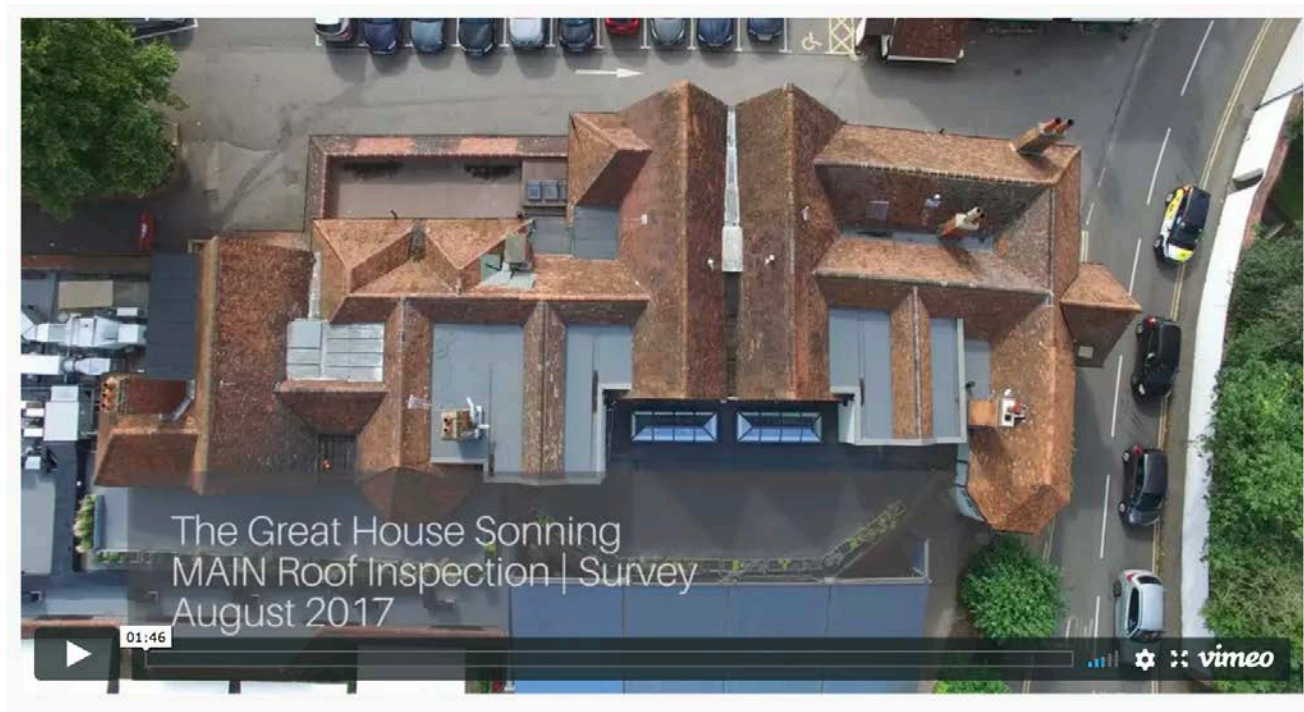
Outsource whole function

- Thames Valley Drones has the experience and the skills to manage the whole process
- Networked into pilots / groups, know what to look for, can add additional skills (Infra-red / Lidar [3D laser mapping]), scale up or down as requirements change
- One point of contact for clients
- Pilot recruitment, management, project management, quality control - all outsourced under one roof
- Scalable, additional skills sets easily added
- Regionally-based pilots means flexibility in cover

Types of output | photographic images



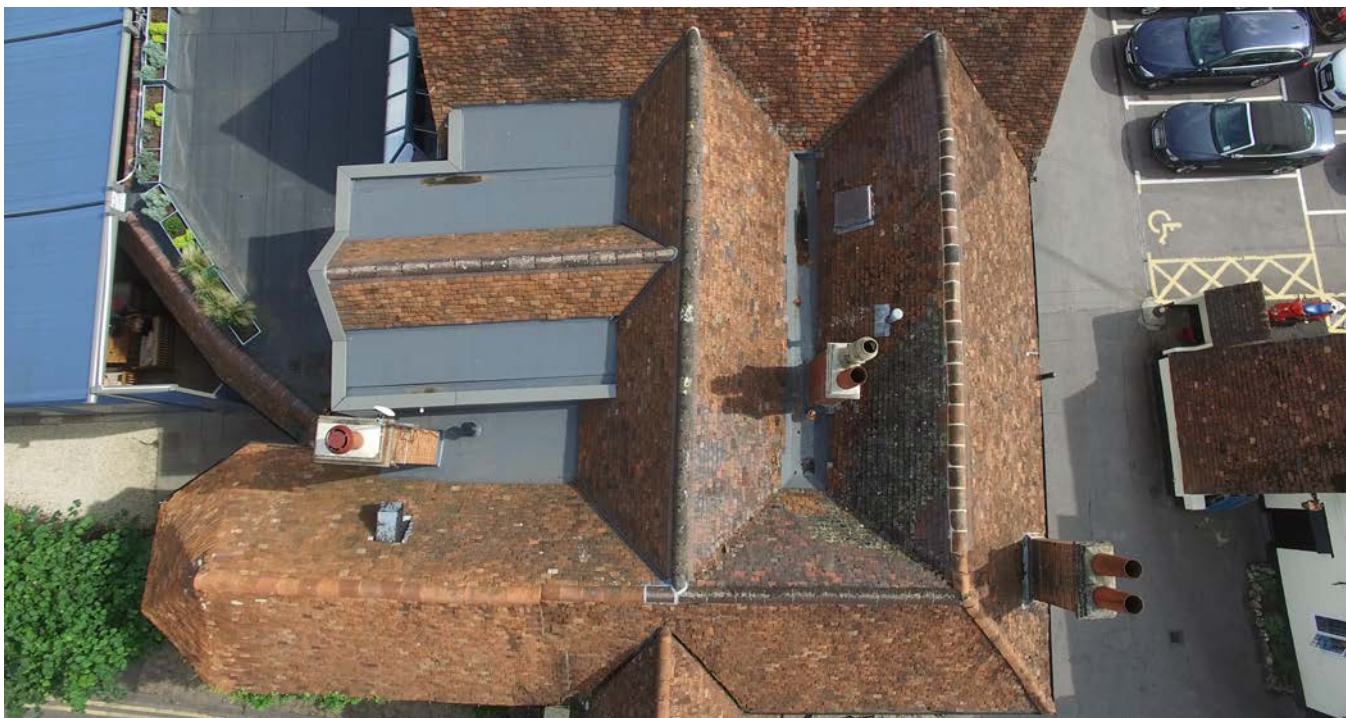
Types of output | video



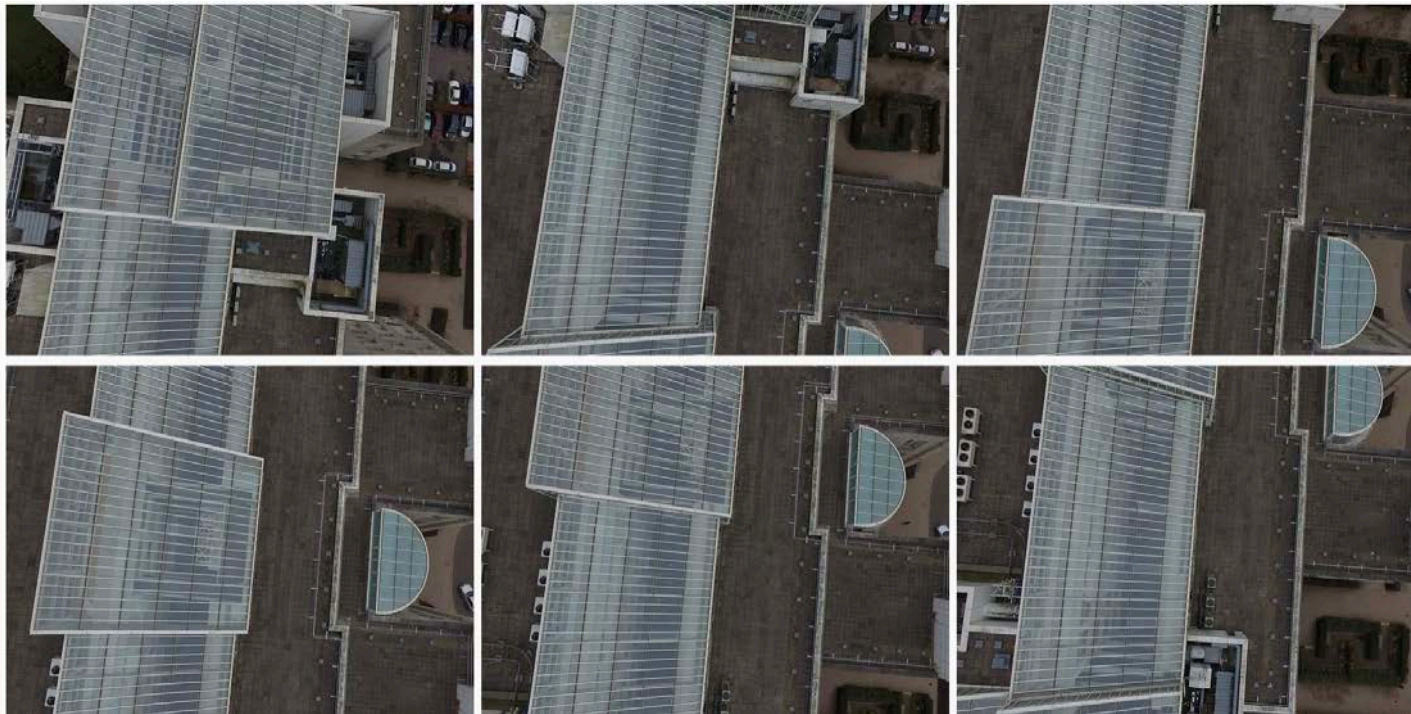
Types of output | video (stills)



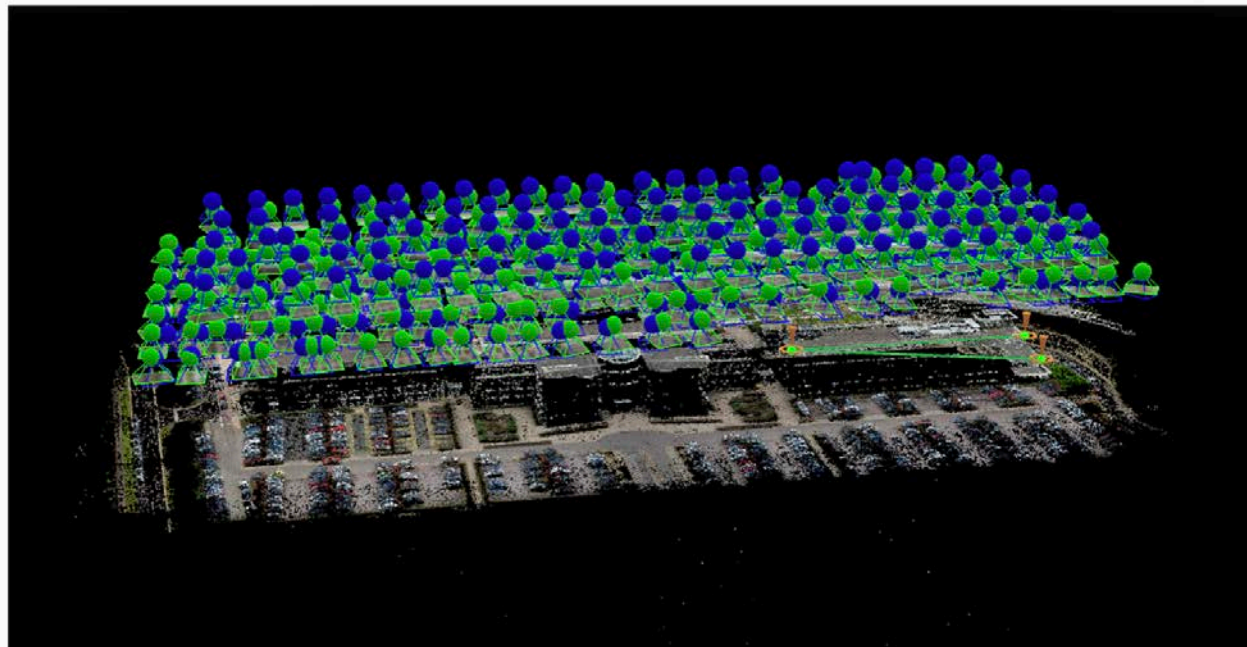
Types of output | video (stills)



Types of output | survey images

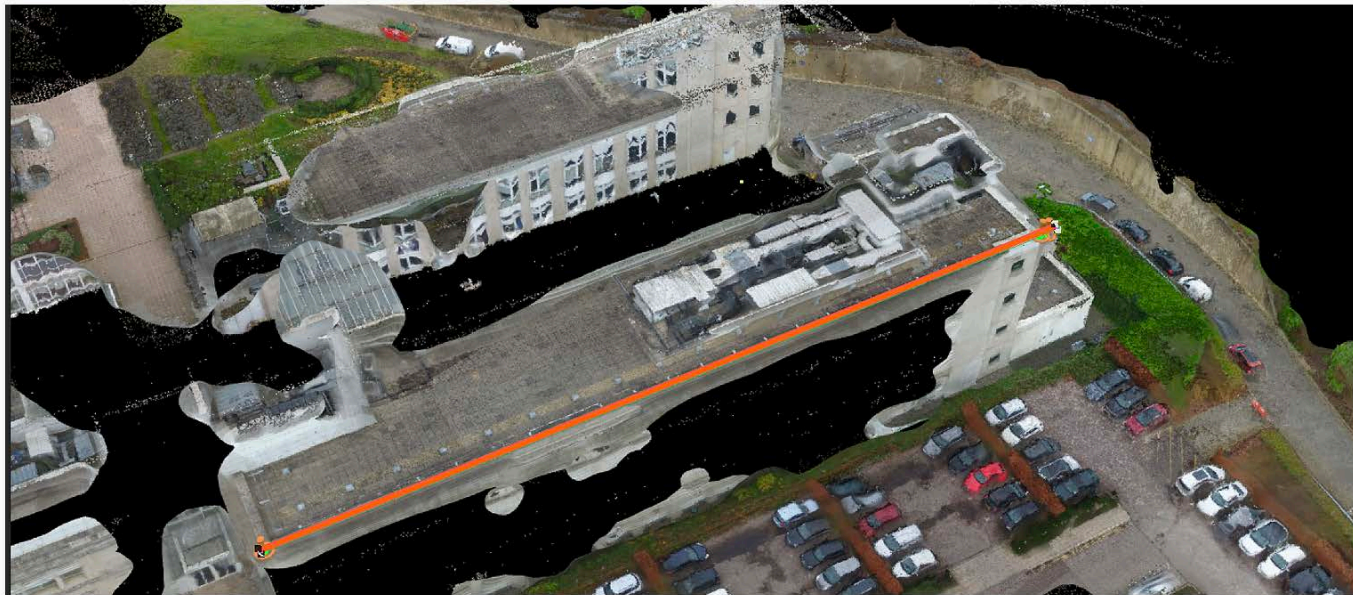


Types of output | point clouds (volumetrics)



Point Cloud with camera positions

Types of output | point clouds (volumetrics)

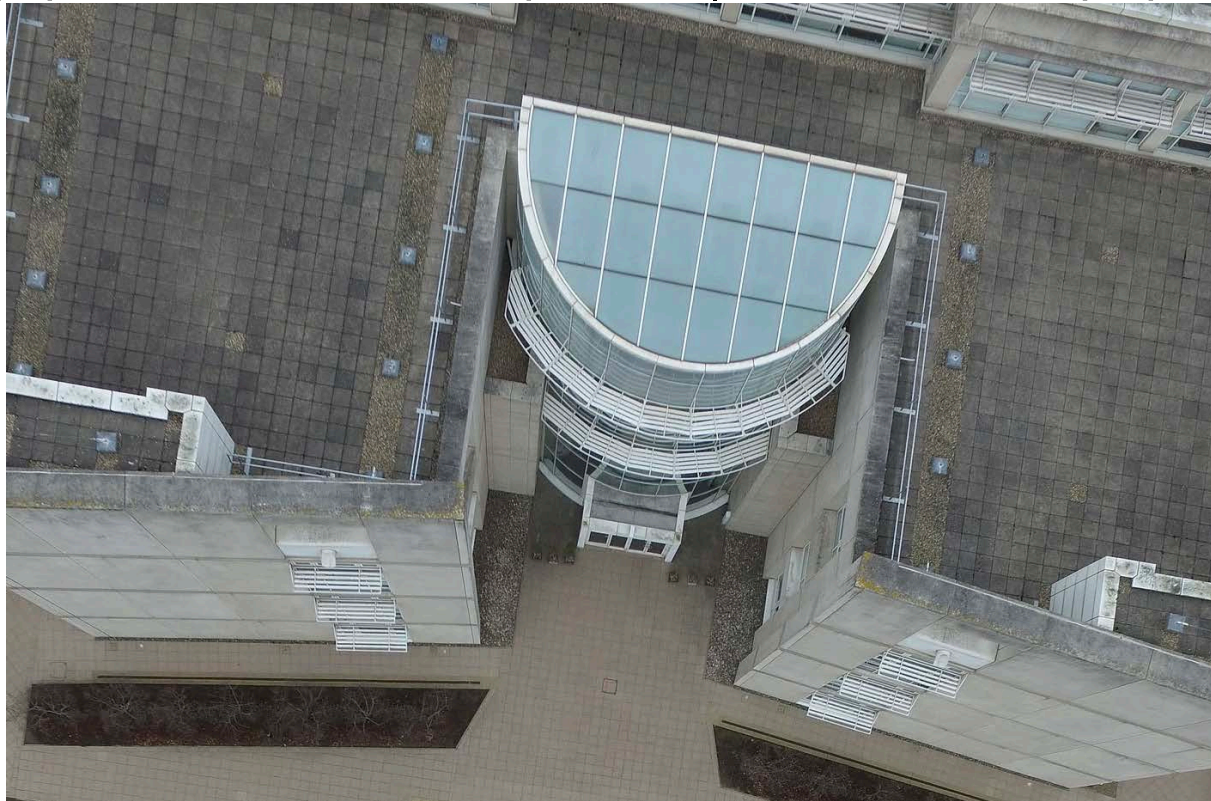


Example distance measurement

Types of output | 2D mapping



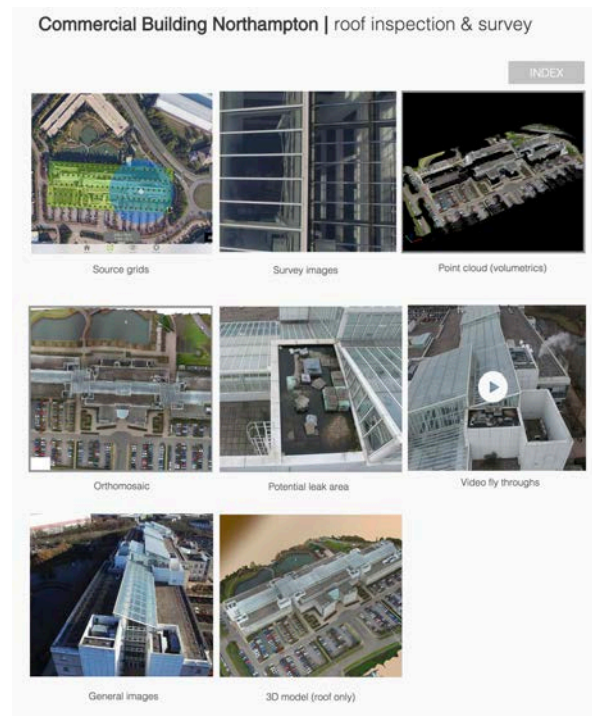
Types of output | 2D mapping



Types of output | 3D model



Types of output | complex projects



Credentials – Thames Valley Drones

- 10 years + successful delivery of complex digital projects for companies large & small
- Experienced in delivering land, building / property surveys
- Experienced in projects requiring comprehensive method statements & risk assessments
- PPE / CSCS ready
- Precision flying, image / video handling & editing skills, digital distribution – all under one roof

Q & A / Discussion

THAMES VALLEY



DRONES

Contact Details

Sandy Halse

Chief Pilot | Operations Director

sandy@thamesvalleydrones.co.uk

07595 662472

www.thamesvalleydrones.co.uk