

Presented By:

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Drone Technology and 2020 Vision



Natural Resources Wales Conference:
Application of Drones in Environmental Regulation and
Monitoring.

Wrexham Glyndŵr UNIVERSITY



Wrexham Regent Street
Art School campus



Hawarden Airport -
Composite Research
Centre



Plas Coch - main campus



Wrexham FC -
campus stadium



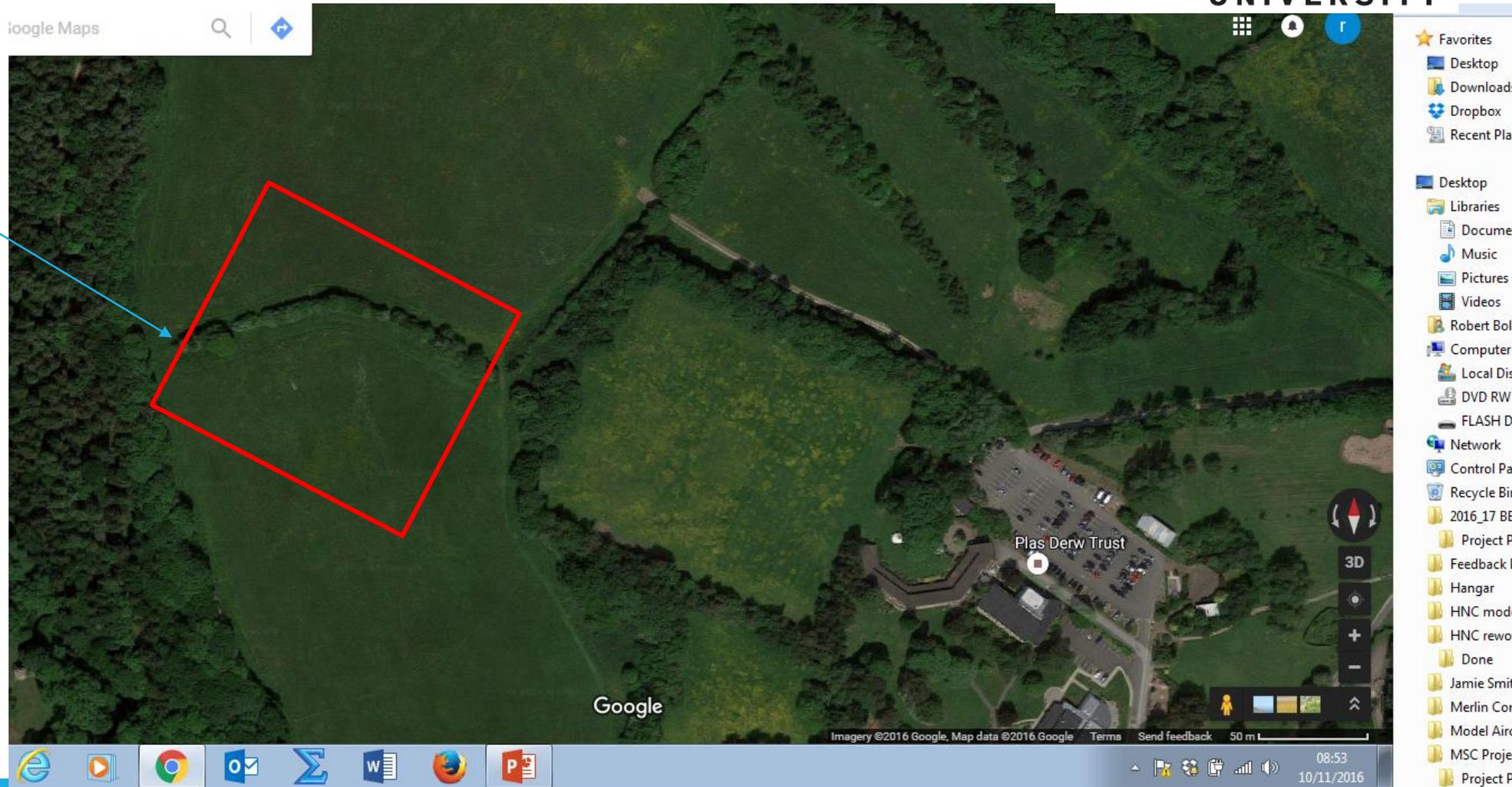
Northop campus - Horticulture and Equestrian Studies



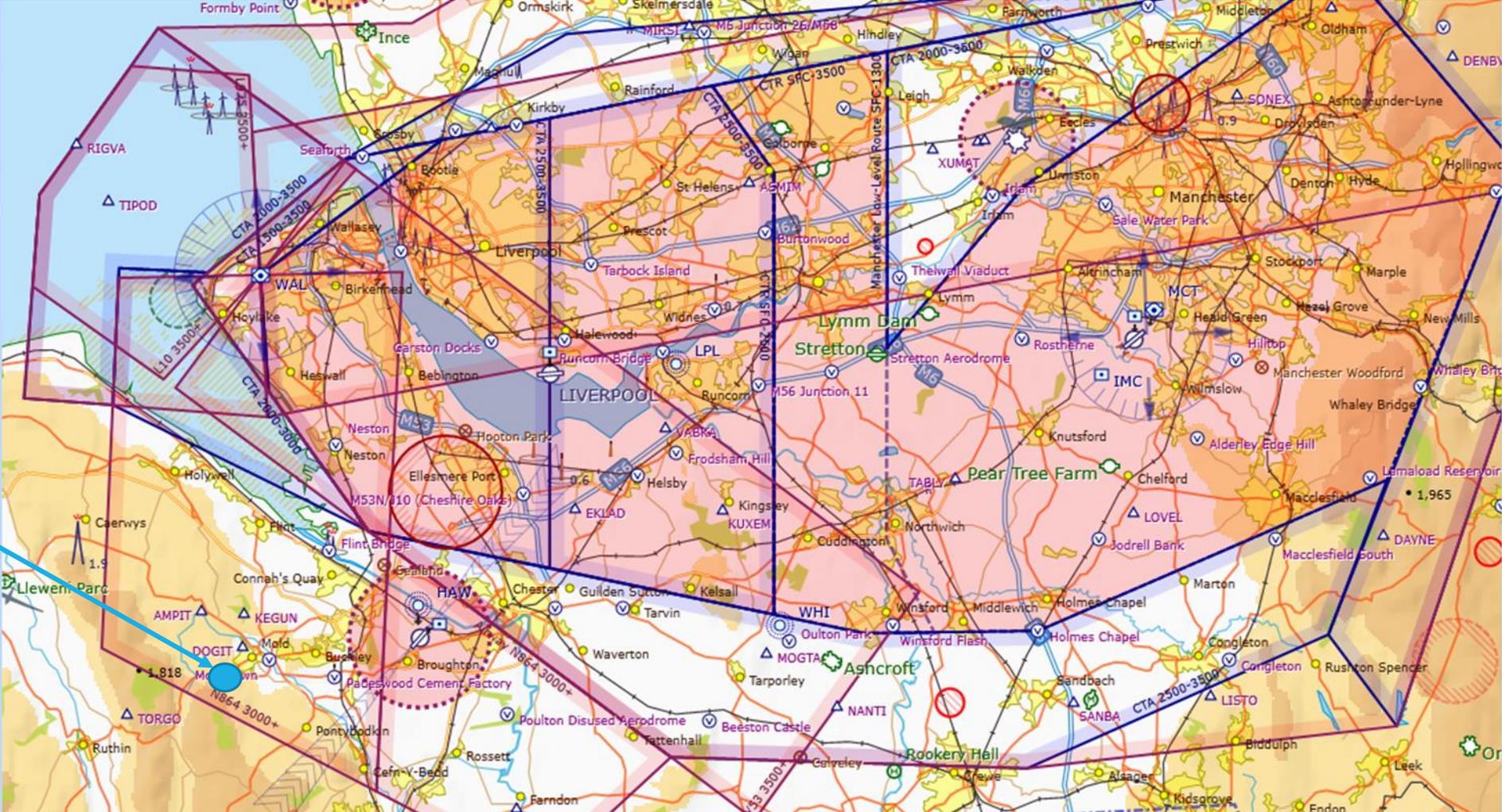
Optic - Research Centre, St. Asaph

Northop Campus Multi-Rotor Test Site

Boundary of
Flying Zone



Aviation Chart



R

WGU
Northop
Test Field



Our Drones:



Inspire 1 V2



Mavic Air



DJI F550



Phantom 4 Pro

Drone Operations: Student Learning Opportunities



UAS Technology Sustainability / Funding Model



STEM

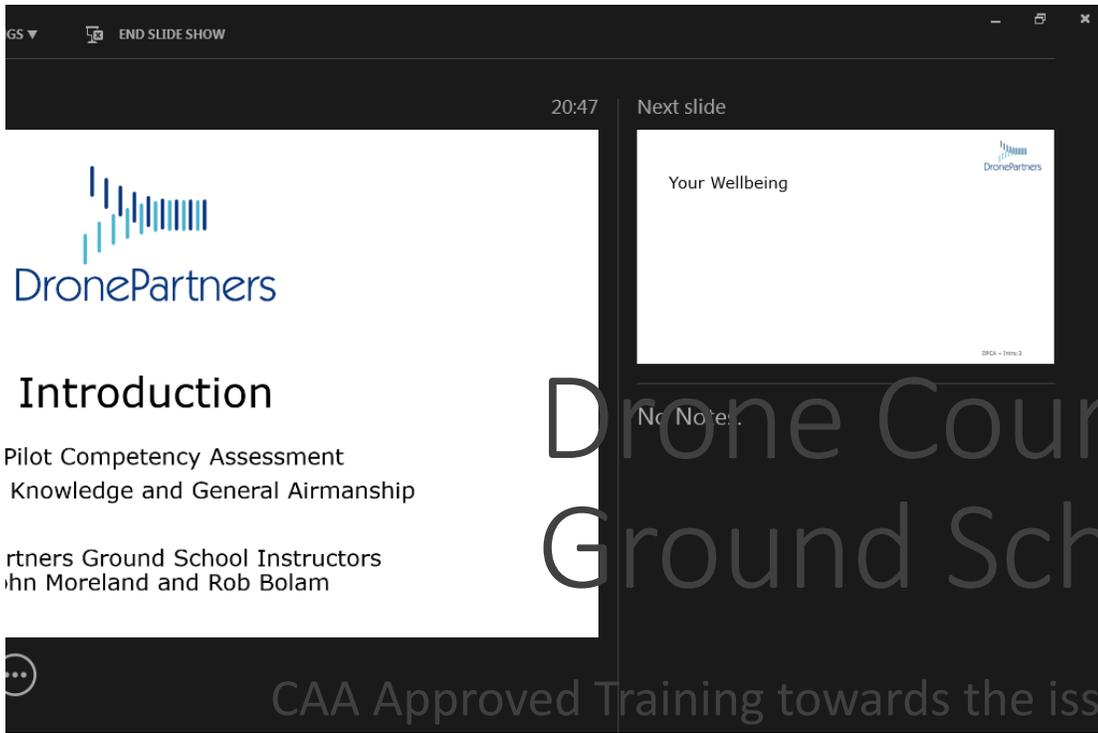
SCIENCE | TECHNOLOGY | ENGINEERING | MATH



Partnering with
Government initiatives and
Industry to promote UAS
Technology in local High
Schools.

Wrexham
glyndŵr
UNIVERSITY





DRONEPARTNERS

Drone Course (ENG 481) Ground School Itinerary

Introduction

SUA Pilot Competency Assessment

Theoretical Knowledge and General Airmanship

CAA Approved Training towards the issue of a Certificate for Permission to Conduct Commercial Operations (PfCO)

Delivered as a collaboration between Drone Partners & Wrexham Glyndwr University

Theoretical Knowledge Syllabus

Air Law & Responsibilities

UAS Airspace Operating Principles

Airmanship & Aviation Safety

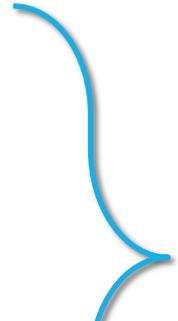
Human Factors

Meteorology

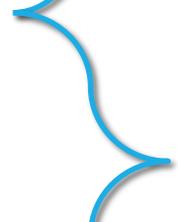
Navigation Charts

Aircraft Knowledge

Operating Procedures



Day 1



Day 2

Day 3 Content

Operations Manual Status Review

- Template Run Through
- Pre-Requirement for the Practical Flight Assessment

Safe Set Up Demonstration

Flying Skills Evaluation and Instruction

Q and As

CAA Approved Training : Flight Assessment at Northop



First Cohort : Passed in August 2018



The Role of Unmanned Aircraft Systems in Education



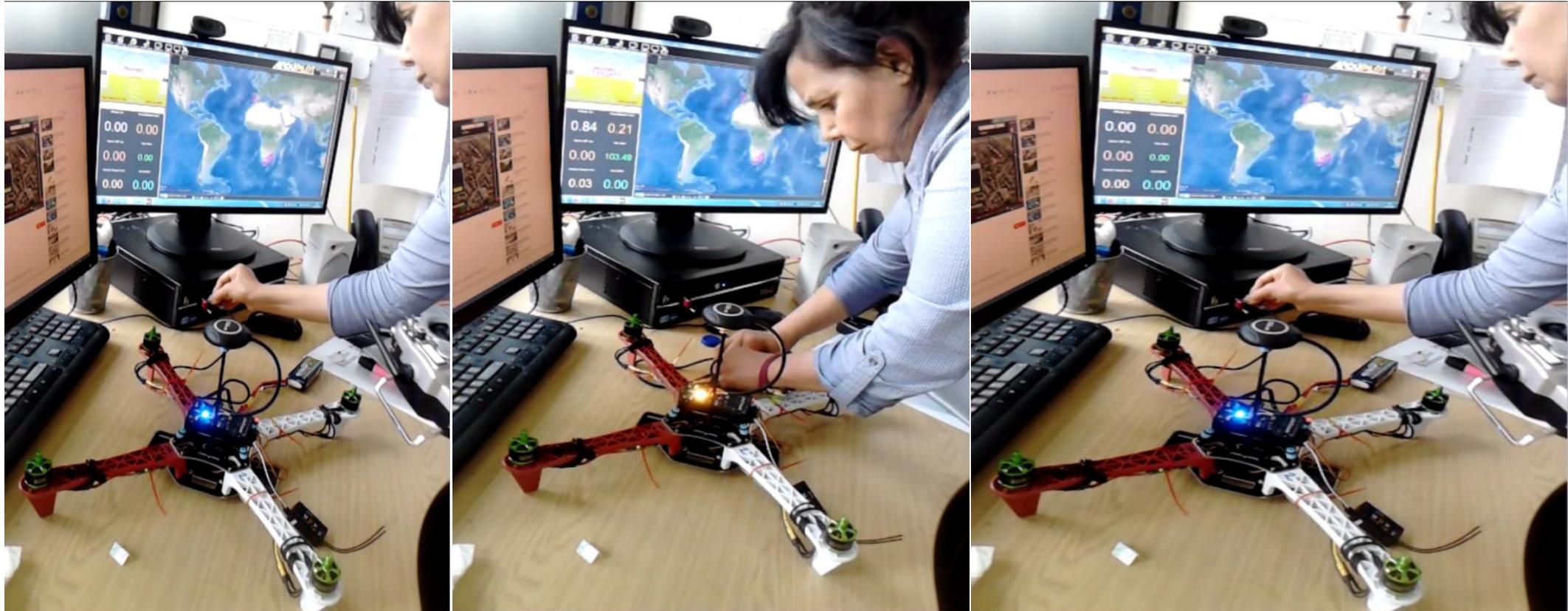


BEng Project: V-Tail
Quadcopter configured
with Telemetry for
Flight Testing.

Examples of Undergraduate BEng/BSc. Final Year Drone Projects

Project Description
Design and manufacture of an FPV racing drone
UAV Sonic Sensors
Portable Drone Design
Infra-red Sensor technology for UAV applications
Design of a foldable photographic adventure drone
UAV/UMV Hybrid Drone
Design of a V-tail Quadcopter
Design of a 3 axis UAV Gimbal Mechanism
Drone Flight Controller using an Arduino Mega
Design of an Agricultural Crop Spraying Drone

UAV Construction



MSc. Unmanned Aircraft System Technology

Specific Modules:

- ⇒ Drone Technology & Operations.
- ⇒ Drone Construction.
- ⇒ Advanced UAV Operations and the Law.
- ⇒ UAV Sensor Technology and Measurement Techniques.

Common Modules:

- ⇒ Research Methods.
- ⇒ Sustainable Design and Innovation



Bryniau Clwyd a
Dyffryn Dyfrdwy
Clwydian Range
and Dee Valley

Ardal o Harddwch Naturiol Eithriadol
Area of Outstanding Natural Beauty

Wrexham
Glyndŵr
UNIVERSITY

- 3D imaging and measurement of Heritage sites and monuments.

Moel Famau Jubilee Tower (Denbighshire)

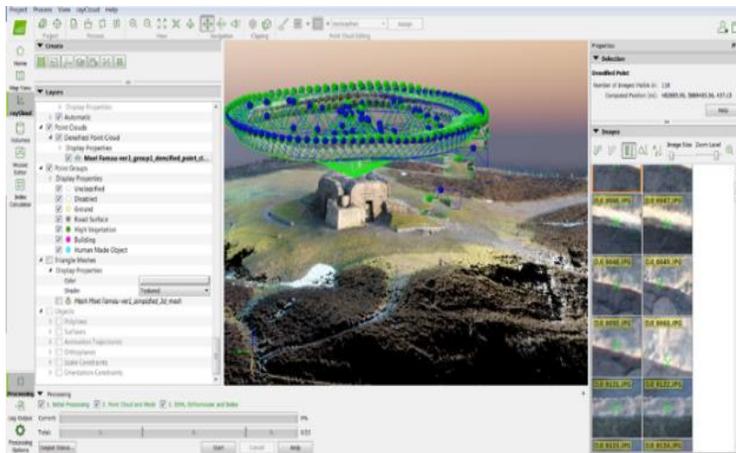
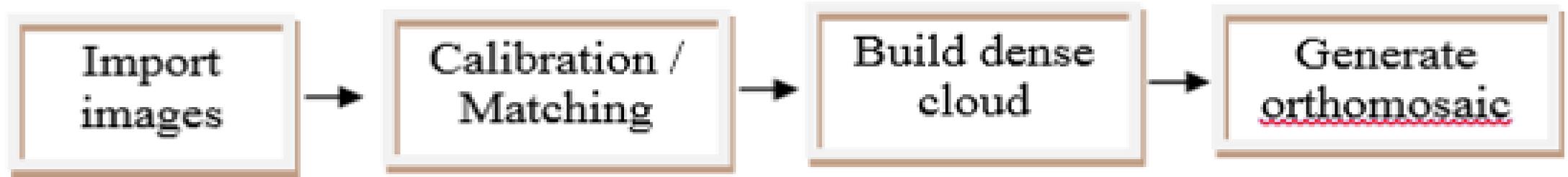


photograph



Phantom 4 : 3D model photogrammetry

Image Processing



point clouds



the produced DSM



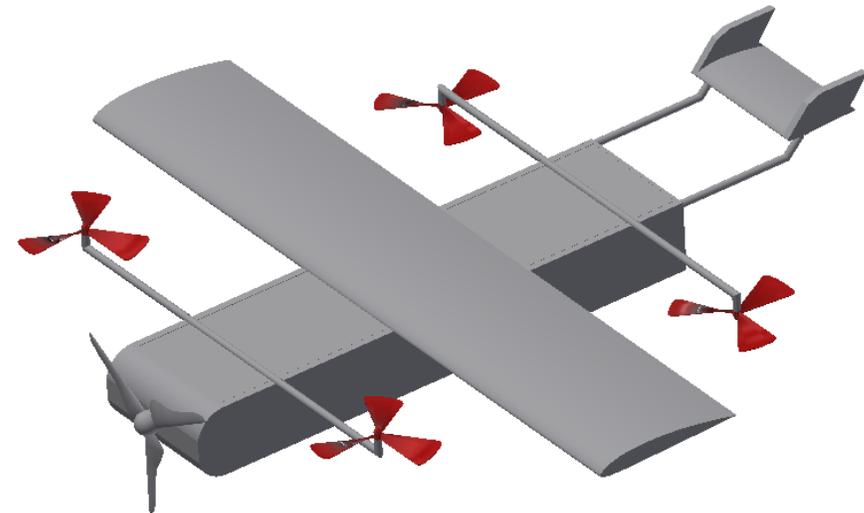
A mosaic of the remains of remains of Jubilee tower

+ medicash
A positive approach to health

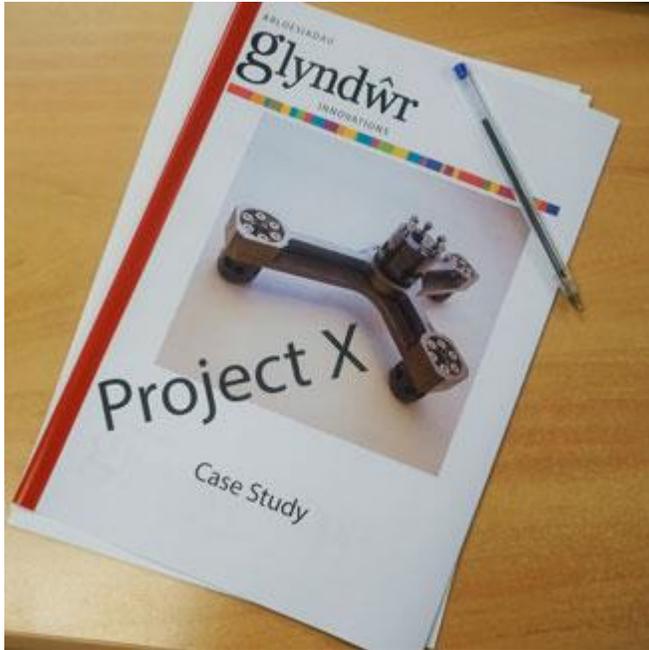
✓ TRUSTPILOT
★★★★★

Institution of
**MECHANICAL
ENGINEERS**

16.-18. JUNE UAS CHALLENGE 2019



UAV Research Activities



Precision Optical Components and Systems

Optic:
Glyndwr, St. Asaph Campus,
North Wales



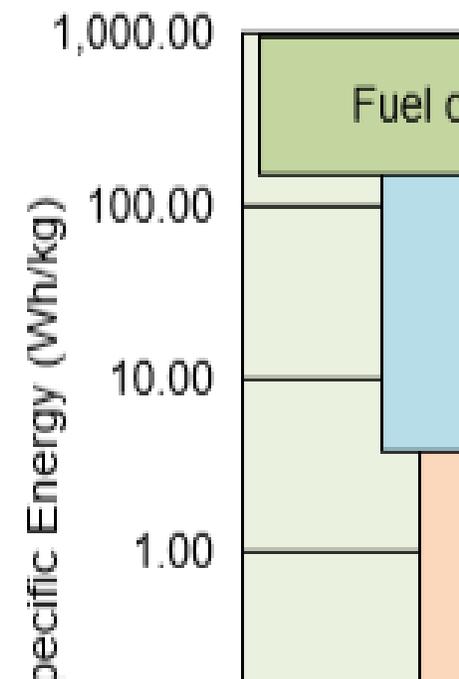
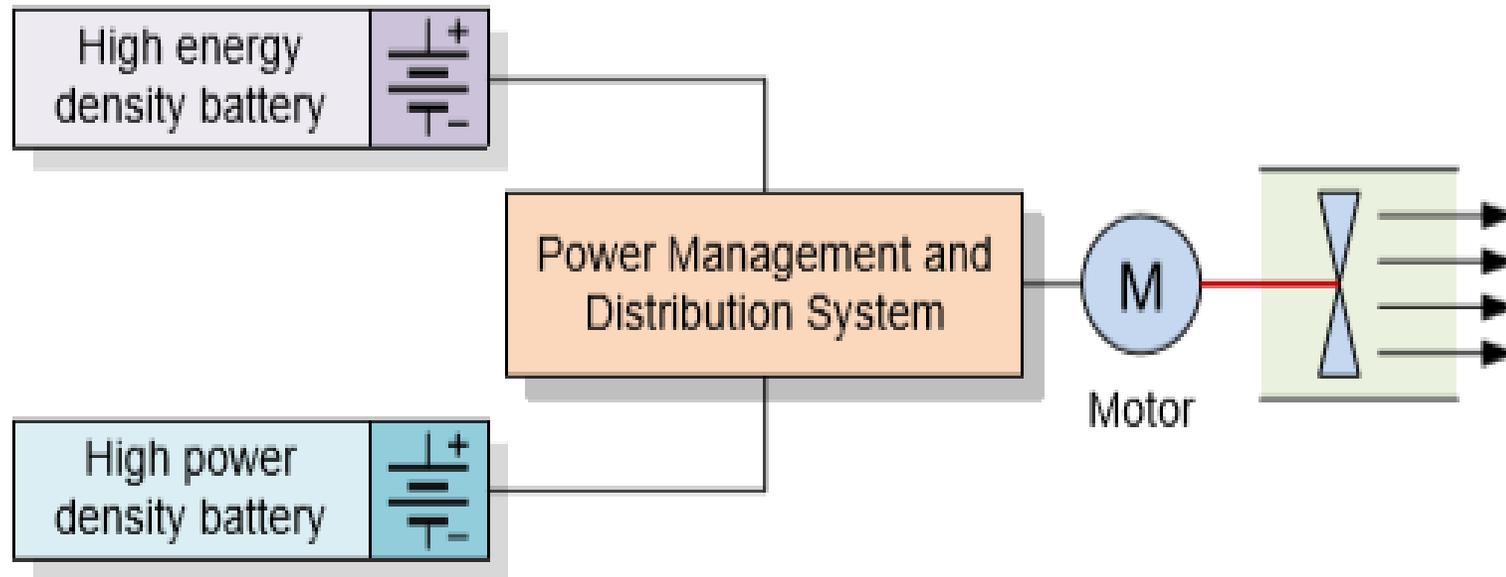
Metrology capabilities available at Glyndwr Innovations include the following:

- Contact Metrology
- Interferometric Metrology
- Bespoke Metrology
- General Facilities



Ragone Chart

Electrical Power Generation and Storage



6. Battery System Design for high specific power and energy [27].

Always on the Look-out for Student Project Ideas



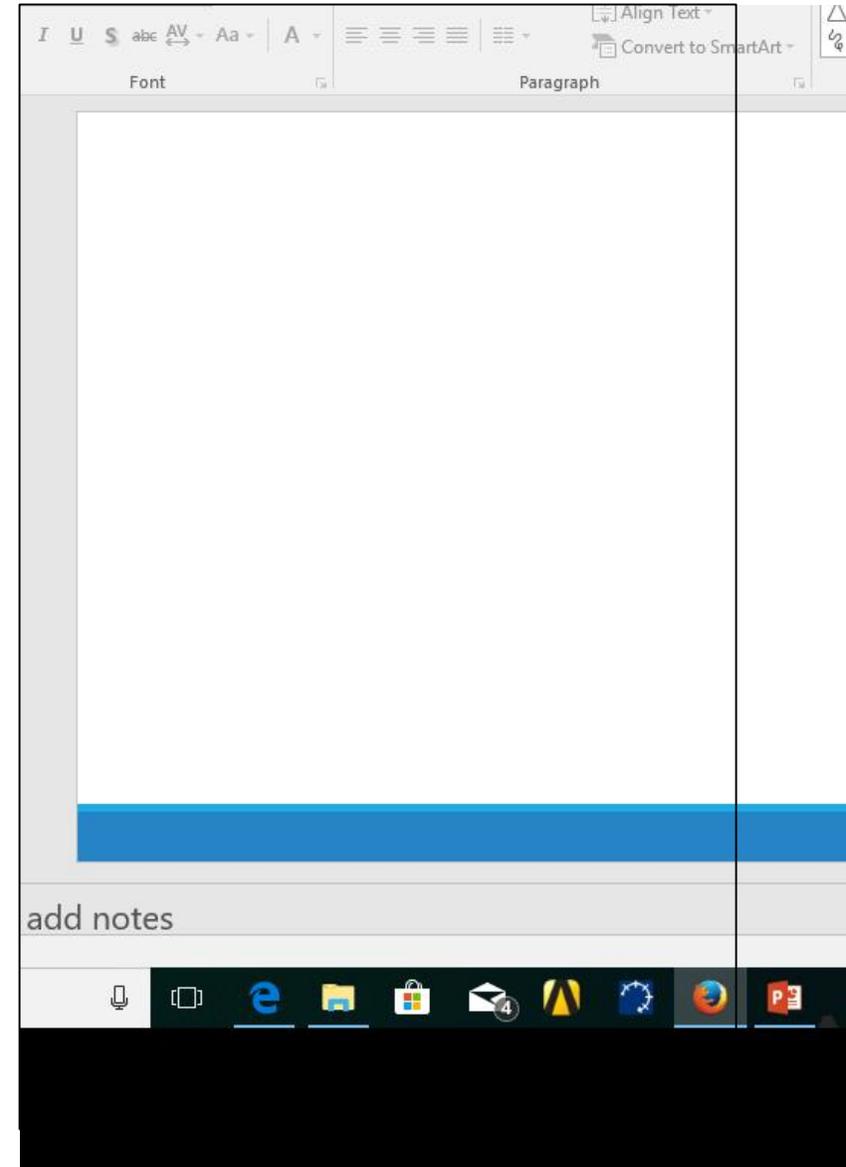
- Real-life Projects
- Great student experience
- Working with organisations

Predictions...by The Year 2030

- **£42 billion** Forecasted increase in GDP generated by drone technology.
- **76,000** Number of drones predicted to be in use across the UK.
- **36%** percentage of drones likely to be utilised by the public sector.
- **£16 billion** UK net cost savings that drones could deliver through increased levels of productivity.
- **628,000** Number of people working in the drone economy.

January 2019 – The UK Government
Published its Response to the
Consultation on the Future of
Drones in the UK

- The findings of a 2 year Public Consultation which closed in September 2018.
- There were 5,061 responses to the consultation.
- 1,947 respondents categorised as “Model” flyers.
- 2,310 respondents used drones for leisure.



Taking Flight: The Future of Drones in the UK Government Response
Subtitled: “Moving Britain Ahead”

- The Government wants to maintain the UK at the forefront of the drones market.
- But recognises the balance required between the UK’s aviation safety and security and supporting this emerging industry.
- It mentions the recent disruption to Gatwick airport operations.
- The Government is finalising a Draft Drones Bill which will give the police powers (e.g. fixed penalty notices) and intend to bring this Bill forward in 2019.
- The Department of Transport will amend the ANO 2016 to implement changes including further restrictions to drone flights around listed “Protected Aerodromes”.

commercial operators and the estimated number of commercial drones.



Chart 1. Scenarios for the number of commercial operators based on assumptions outlined in the consultation.

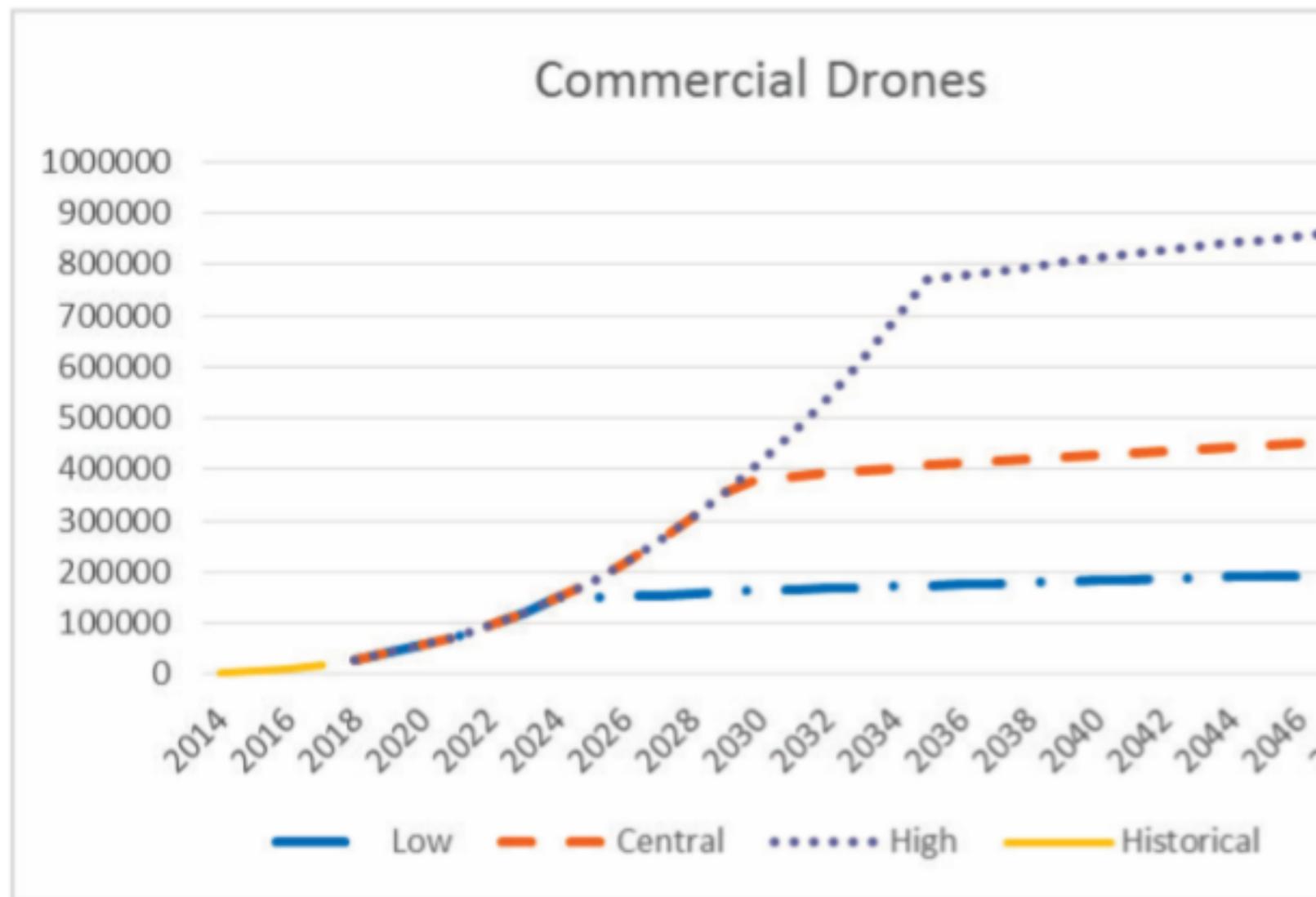


Chart 2. Scenarios for the number of commercial drones based on assur

Commercial drone scenario modelling *(Ref UK Government Response doc.)*

In general, there was variation in the estimates of current and future drone usage, but responses show there would be an increase in drone operation both in the short and long term.

The dominant view was that respondents felt the number of commercial users outlined in the scenarios were overestimates.

Many respondents believed that the market had already saturated or would do so in the next few years due to factors such as price, regulation, public perception, crowding in the market and technological advancements.

There were a substantial number of respondents who felt that the numbers were realistic due to the potential prospects of the industry.

Unmanned Aircraft Systems morph into “manned”

Ehang 184 Drone

Chinese drone manufacturer Ehang Inc. has revealed their 184 human carrying drone at CES 2016.



Vertical Aerospace

<https://www.vertical-aerospace.com/>

