Official course for drone pilot certificate

Permission for Commercial Operation (PfCO) financed by The Douglas Bomford Trust foundation

To facilitate understanding of this document, SUAS or small unmanned aerial vehicle will be defined with the term "drone".

1. Description of the course

The course was host by the company Heliguy (http://heliguy.com) approved by the Civil Aviation Authority (CAA). To operate a drone commercially within the UK, operators require a PfCO (Permission for Commercial Operation), issued from the CAA. In order to obtain a PfCO, operators must be competent drone pilots and have in place an Operation Manual ratified by the CAA. In the case of research purpose, the CAA agreed that pilots must have the PfCO and pass the different exams using the Operation manual from the host institution (Edinburgh University in my case). The operators must pass two steps process: a theory assessment and a practical assessment to evaluate the pilot capacity to carry out a safe operation in both planning and execution and provide the necessary certification required for an application for a PfCO.

The course was undertaken from the 12th of September 2017 to the 14th of September 2017 included at the Shrigley Hall Golf course, Macclesfield, England. As described below in the table, the course was organised over three days and finished by a theory assessment on Thursday afternoon. I organised to pass the practical test on Thursday or Friday morning but due to the weather conditions the test had to be rescheduled and will take place in Newcastle in the next months. During the course, I have been staying at the Church House Inn in Bollington at only 5-10 minutes transport from the venue.

	DAY 1 Tuesday	DAY 2 Wednesday	DAY 3 Thursday
09.00 (Register 08.30) Lesson 1	Airlaw	Aircraft Knowledge	Recap & Weather
Lesson 2	Maps & Charts	Human Factors	Operating Procedures
Lunch	Lunch	Lunch	Lunch
13.30 Lesson 3	Airspace Classification	Ops Manual	Planning Exercises
Lesson 4	Airmanship & Aviation Safety	Flight Test Prep	Theory Test
Recap	Recap	Recap	Recap

Time and organisation of the three days training (source: Heliguy)

On the left, Juliette training flight. On the top-right, Selection of five DJI drones at the course. On the bottom-right, photo of the course.

2. Benefits and outcomes

The principal objectives of the course were to train drone operators, to certify them with a ground school certificate (see the end of this document) approved by the CAA and to prepare them for a practical test and writing the OPS.

A. Personal benefices

The main difference between before the course then and now is to gain self-confidence in order to undertake more diverse work: working closer to congested area, with bigger drone and more complex tasks. My work next year will be in Edinburgh which contains a large airport and a lot of other hazards to consider such as low flight military training area and a large number of hobbyists. This training will allow me to finish creating the tool I am working on by surveying with the drone different conditions (climate, rain, farm management and type of grazing animal).
The second direct benefit is the role of networking during the course. The course was attended by in total 14 people: one of them was working at University in the geography department looking at the evolution of the sea coast of Wales. His study was focused on soil erosion and sand formation. Another person was from BBC technical crew looking at using drone to film news and documentary. There was also a person using drone technology to survey farms looking at crops diseases, one looking at pesticide spreading using drone to limit the amount of pesticide applied each year to the strict minimum. This is a selection of the great range of background and project the attendees had. It also provides insight and opportunities in the Drone industry for innovation, work, and project in the future.

B. Project research benefit

Thanks to this course, I feel now confident to proceed of a whole farm survey considering the danger of roads, trees, buildings, animals and farm staff. It offered to me also the possibility to fly other drones with different potential such as Lidar based technology drone and maybe thermal camera equipped drone (heavier drone). Moreover, undertaking this course confirmed the knowledges I had on laws and regulations but also increases my knowledge on airspace classification, emergency procedures, pre/post flight procedures, data analysis collected by the drone etc.

After this course, I will be able to pass to the next step and survey and analysis bigger dataset of image collected with the drone to develop a more user friendly interface for the excreta patch detection software.

C. Benefit to the Trust and wilder community through my PhD

Any accident or incident involving drone are a bad advertisement for this technology beyond his advantages in agriculture and environment. To continue to work on the link between technology as such as drone survey and agriculture, it is essential to train people to survey as safely as possible. This course is a necessary step to avoid and limit any hazards that this activity can be facing and promote the advantages of this technology.
I acquired all knowledge and skills essential to teach others about safety/security/risks and benefits of using this technology for agricultural and environment projects. This is also in a short term scale, beneficial for my project. This training allowed me a better knowledge of how to train my crew members for each flight.

In a larger scale, my PhD project is one step towards the creation of an automatic and low cost monitoring of urine and dung patches in grazed grassland. My study is focus on sheep and dairy cows grazing but the project could be adapted to other grazing animals. The detection of these patches of grass that appear upon deposition of animal excreta is an essential tool for precision farming on grasslands. This tool will allow companies/farmers to develop and use “precision” spreaders for fertiliser application to avoid the patches where the level of nitrogen is already too high. This will have a positive effect on fertiliser cost for the farmers. We can expected around 20-30% of the field to be cover by excreta each year and so the same percentage of reduction of fertiliser application for the farmer. This tool will be at the same time limiting the unnecessary addition of nitrogen through the fertiliser which can lead to nitrogen leaching, enhance greenhouse gas emissions (nitrous oxide and ammonia mainly) and to a waste of nutrient which will not be mobilised for grass production. Therefore, this tool can be used to help to estimate grass production and grass quality, and it can help to choose better management processes specific to the farm and to the time of the year.

In the scientific community, the detection of excreta patches can be used to study variability of soil properties such as soil pH, soil nitrogen content or grass variability such as the grass height, grass density or grass nutrient content at the field or the farm scale. I have been contacted by researchers interested for example to see if different diets could change the excreta impacts of dairy cows. Also researchers had contacted me due to their current work on insect biodiversity inside the excreta patches. They are studying the mechanism of movement of the insects between patches. Mapping the patches regularly using a drone is definitely an interesting tool for them. Finally, I can easily imagine in a near future using this technology to detect other specifics “object” such as excreta patches, the drone imagery could be used to detect crop diseases impact on production, nutrient balance of farms or weed/ invasive plants to spread automatically herbicides with an accurate application. This could reduce dramatically the amount of pesticide/fertilisers needed by field.

3. Budget

Type	Price	Quantity	Total	Currency
Accommodation at the Church house Inn	65£/per night	4	260	£
Transportation*				
Paris-> Macclesfield	140£	1	140	£
Macclesfield->Edinburgh	42£	1	42	£
Taxi from Macclesfield to the venue	5£	2	10	£
Course Heliguy + theory and practical tests	999£	1	999	£
Insurance for fly test (CoverDrone.com)	56£	1	56	£
Food				
Dinner at the Church House Inn	13£	4	52	£

**Transportation from Dublin to Paris and Edinburgh to Dublin have been paid by the student for personal travel (112£)*

TOTAL COST	1509	£
The Douglas Bomford Trust foundation financed	1500	£

4. Copy of the certificate of Competence in Remote Pilot Theoretical Knowledge and General Airmanship Syllabus

HELIGUY

UK CAA NQE Approval Number: 1011/1447

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Certificate of Competence in Remote Pilot Theoretical Knowledge/ General Airmanship Syllabus

This Certificate of Recommendation confirms that the named individual has been assessed as competent in the Remote Pilot Theoretical Knowledge/ General Airmanship Syllabus elements as set out in CAP 722 Appendix E29 (Obligations of the Holder) and in accordance with the terms of Approval granted to NQE: 1011/1447.

Students Name: Juliette Maire

Nominated Personnel signature: 

Nominated Personnel name: Thomas Anderson (Head of Safety)

Date: 14/09/2017