Unmanned Aerial Vehicles - the new aviation revolution

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When posterity looks back on the history of aviation the advent of the unmanned aircraft will rank alongside the Wright brother's flight at Kitty Hawk and Frank Whittle's invention of the turbojet. As with all new innovations come opportunities for those with the foresight to grasp them.

The 28 ton Aevum RavnX, World's largest UAV

From the 7 gram Buzzbee nano-drone to the 24 metre long Aevum RavnX with its 18 metre wingspan, these aircraft have something in common. Each one is operated and controlled by a pilot on the ground via a communications link.

The range of unmanned aircraft that have come to the market in the last ten years has seen an explosion in the type of designs available and the scope of applications for which they have been employed.

The Buzzbee nano-drone, World's smallest drone available commercially for £19.99

THE FUTURE

The future for drone technology and associated commercial opportunities looks very bright.

Miniaturisation is likely to play a massive role in the future of drone development and, as components are made smaller and smaller, drones will also be dramatically reduced in size.

Continued development and expansion of drone applications and capabilities continues to encompass operations in the fields of:

- Aerial photography, video and film making;
- Aerial survey and mapping for construction and mining operations;
- Thermal survey of solar installations, housing stock and plant;
- Plant and structural

THE REGULATIONS

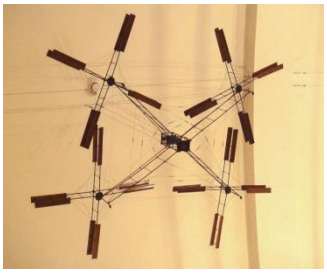
It is obvious that such expansion should not proceed on an uncontrolled and unregulated basis since UAVs and manned aircraft share the same airspace and the unregulated use of UAVs has the potential to seriously endanger the public and other airspace users.

A number of high profile incidents caused by irresponsible users led to an outcry by the press and public to address the use of these aircraft. As a result the EU and UK Civil Aviation Authority have established a common set of regulations which cover unmanned aircraft classifications, rules for their operation, and pilot competency requirements for those that wish to fly them.

The EU Implementing Regulation (EU) 2019/947 (EU) 2020/639 Rules and Procedures for the Operation of Unmanned Aircraft as adopted by the CAA came into force on 31st December 2020 and applies to all UAV Aircraft - large and small, operators and pilots in the UK.

As an essential part of the work required, to ensure compliance with the above the CAA has appointed a limited number of UK companies as Recognised Assessment Entities (RAE) to train, examine and certificate UAV pilots in the

UAV History



Designs for a quadcopter aircraft date back as far as the early 1900s when in 1908, brothers Jacques and Louis Bréguet together with French physiologist Charles Richet, developed an early example of a manned gyroplane, a forerunner of the helicopter.

In 1916, driven by the conflict of the Great War, the Ruston Procter Company of Lincoln developed the first pilotless aircraft called the *Ruston Proctor Aerial Target* which used a radio guidance system developed by British engineer Archibald Low

Low's projects had some success, and he was nicknamed “the father of radio guidance systems” but his work was not appreciated by the British government and was not followed up by the military after the war.

Others clearly saw the importance of his work and two attempts by foreign powers were made to assassinate him in order to deprive the British military of this technology.

The 1930s saw the development of a remotely-controlled model aircraft called Radioplane OQ-2 by British actor Reginald Denny and engineer Walter Righter. This became the first mass-produced UAV product and almost 15,000 military drones were manufactured during World War Two.

It took until the 1970s before the next big advancement in drone technology took place, when during the Vietnam war the US engaged in the widespread deployment and use of drones as dedicated Reconnaissance UAVs.

However, it was the development of the transistor in the 1960s that recreational consumer drones of the kind we see today became a possibility. Radio-controlled components could then be miniaturised and sold to civilian customers at a reasonable cost.

This led to a boom in radio controlled (RC) model aircraft which started to appear in kit form enabling enthusiasts to build and fly RC craft either indoors or outdoors.

Mini and micro versions of UAVs were introduced in 1990, and the last 20 years has seen a huge explosion in drone innovation and commercial interest as more and more applications for their use have been identified.

While prior to this, drones were primarily used for military purposes or hobbyists, from the early-2010s a host of new uses and applications were identified for these low cost, highly capable, small drones.

With improvements in stabilisation, drone platforms with cameras become commonplace in commercial photography and videography as radio control and smartphone technologies were merged. With the further addition of on-board GPS capabilities, UAV applications have extended rapidly into aerial survey and mapping. Costs have reduced as well, for example, an entry level drone mounted LIDAR survey system which only four years ago cost over $60,000 can now be bought for less than $15,000.

THE OPPORTUNITIES

This new arm of aviation presents a host of opportunities both in the development of UAV systems and subsequently its exploitation by users.

Aeronautical, Electronic, Production and Radio Engineering disciplines all have a role to play in drone design, system development and UAV construction.

For operators and pilots the range of capabilities available from drone mounted equipment is expanding faster than the market's ability to assimilate their potential, and equipment costs are falling all the time.

Airborne radiation frequency sensing cameras have added the ability to conduct thermal inspections of structures, plant and equipment and so identify overheating electrical circuits, gas leaks, areas of heat loss and poor insulation. The international move towards 'green energy' will add to demand as these small airborne platforms are able to perform tasks in a fraction of the time required by current methods.

Training for Commercial Drone Operations

Based in Peterborough, with flying exam sites around the UK, Airborne Platforms UK Ltd is a Civil Aviation Authority Recognised Assessment Entity and was the first organisation to provide a complete on-line theory training course to meet CAA requirements for the grant of a Permission for Commercial Operation (PfCO). As from 1st January 2021 the company now trains, examines and certifies pilots in the Open (A2 Certificate of Competence) and Specific (General Visual Line of Sight Certificate – GVC) categories.

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