Unmanned Aircraft Systems

Current market intelligence report*

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*The information contained in this document was current at the time of writing and is not exhaustive research.
1. BACKGROUND

So before we start lets address one issue – what do we call them?
UAS, UAV, RPAS, Drones and so the list goes on and all are in regular use depending on who you are talking to which can be seen in this document.

The next important issue is size matters. UAS

How big is the market – There is not really any reliable data, forecasts vary wildly but all agree it will be multiple billions of dollars. The forecast depends on how you measure it. It is a fact that with the limitation of use of UAS, military use is still the bulk of sales and the forecast is that military applications will continue to generate the largest sales if measured in revenue. However, once the integration of UAS into domestic airspace is approved for units with mass over 20kg the industry is poised to exploit the opportunity. There are many companies just waiting for the details of the approvals specification and the market is primed.

When will proliferation start - The U.S. Federal Aviation Administration (FAA) recently awarded special type certification to Insitu for UAVs for commercial Arctic operations and released a Roadmap for UAV certification (http://www.faa.gov/news/press_releases/news_story.cfm?newsid=15334).

Europe is working through the Remotely Piloted Aircraft Systems (RPAS) Roadmap proposed by stakeholders in June 2013 which they say paves the way for the safe integration of RPAS into the European airspace starting in 2016. http://publicintelligence.net/eu-rpa-roadmap/

The industry is now poised for the opening of the regulation floodgates to address a growing commercial demand.

2. METHODOLOGY

This report is another in the series by TFDI. It is part of our ongoing market intelligence which we regularly supply to our clients. A lot of the information is from the hundreds of conversations we have every day at executive level during the course of our daily work identifying market opportunities, routes to market, sales partners and FDI projects. This is then verified with industry leaders.

3. SUMMARY OF INTERVIEWS WITH INDUSTRY EXECUTIVES

TFDI recently attended DSEI 2013 & UAV Conference the Defence & Security Event – ExCel, London

Attending the event provided an excellent environment to understand the status of the UAV sector, the overriding challenge preventing the commercial industry from “exploding” is the FAA’s restriction preventing the use of UAVs in commercial airspace, experts feel that restrictions will be lifted in the next 2 years. It is worth noting that Insitu have the first commercial contract approved by the FAA for pipeline inspection across the arctic. This is felt to be a milestone and significant regarding FAA’s desire to approve UAV’

The one day conference was held in association with UAS CDC, UAVS, BUSC, Cranfield University and AUVSI providing an opportunity to learn about UAS future capabilities, the latest technologies and innovations, the future of civilian UAS applications and briefly the procurement and supply chain. There were about 200 attendees.
The conference confirmed that one of their main challenges is to educate people in the use of drones. Drones have many uses outside defence, for example agriculture, observing the icecap, researching animal populations and habits, border security and managing areas which are susceptible to fires, identifying “hot spots” in advance and therefore empowering the fire service. Recently permission was granted for the use of a drone to assist in the battle to extinguish the Yosemite National Park fires - http://www.huffingtonpost.com/2013/08/28/drones-yosemite-fire_n_3833528.html.

**Insitu** – we met with Paul Allen, VP Business Development, he is based at their offices on the WA/Oregon border. Paul was excited to talk of their development of the UAV market, the establishment of their own supply chain locally and the amazing success having been awarded in July 2013, the first commercial contract to fly their UAV, the ScanEagle following approval by the FAA to fly in commercial US airspace, for commercial purposes. The ScanEagle will be deployed to Alaska off a ship to scout for icebergs, count whales, protect drilling platforms and fulfil environmental requirements.

The ScanEagle can safely accomplish observation missions in hazardous Arctic locations, which is safer, cheaper, and more environmentally friendly than using manned aircraft. Commercial certification was the result of previous military certification and the Congressionally-mandated opening of airspace over much of Alaska to small UAVs. Insitu are now keenly awaiting the FAA’s certification for the use of domestic UAV’s in commercial airspace elsewhere, Paul Allen thinks this is about 2 years off.


**4. THE MARKET**

It appears that UK and the USA are in a similar stage of acceptance of UAS in terms of civilian use with the CAA and FAA both in the process of drawing up criteria for the authorisation of the systems and their eventual use.

Whilst there are already some UAS being used in Civil commercial applications as this is limited to line of sight most of the people we have spoken to do not predict any real growth in this sector until 2015/16 following the formal approval for use.

Future growth is anticipated to be rapid following legislation approval as there is already pent up demand from vertical sectors that have identified uses for UAS. This added to the fact that there are many systems already developed that will be able to be modified to comply with the new regulations.

For the UK Armed Forces, UAVs are likely to have a greater impact on the Royal Air Force than the other Services as they will be used to deliver the RAF’s core function of air power. The MOD identified unmanned aerial vehicles as a capability it intends to invest in, along with Typhoon and the Joint Strike Fighter, as part of its GBP£18.5 billion planned spend on Combat Air over the next ten years, as published in the Defence Equipment Plan 2012.

Applications appear to include survey, inspection and mapping services across industries such as civil engineering, emergency services, environmental, highway, oil & gas, marine, rail, utilities.

Beyond Line of Sight regulations are in place but two hurdles remain – Assured Communications and Detect & Avoid System, nobody has produced a workable system.
Whilst the military have gained significant experience in the use of unmanned aircraft under operational conditions in both Iraq and Afghanistan, the benefits of their use within the UK are becoming readily apparent to private companies and public bodies alike. The Police and the Fire & Rescue Services have shown particular interest as they recognise the versatility that unmanned aircraft can bring to search and rescue incidents and for aerial surveillance. Present applications range from large reconnaissance and surveillance platforms, such as Northrop Grumman’s (http://www.northropgrumman.com) Global Hawk with a wingspan of 130ft, down to small hand held systems such as Microdrones GmbH (http://www.microdrones.com) rotary wing unmanned aircraft which weighs less than 1kg. It is inevitable that there will be a requirement for their integration with other airspace users in all classes of airspace within the UK. Examples of leading military and commercial UAS manufacturers selling in the UK include:

Military - BAE SYSTEMS, Thales, General Dynamics, General Atomics, AeroVironment, Insitu, IAI, Lockheed Martin, Honeywell,
Commercial - DJI, Microdrones, Vulcan UAV, Quadcopters, Quest UAV, SenseFly, Trimble, Droidworx, Cinestar

The following provides information on the regulations that are currently in place for unmanned aircraft in the UK.

Unmanned aircraft, irrespective of their size, or mass are still classed as aircraft and any that operate in the UK must meet at least the same safety and operational standards as those for manned aircraft, their operation must not present or create a greater hazard to anyone (or anything) than the equivalent operations of manned aviation.

The requirement for avoiding collisions between aircraft, or between aircraft and people/objects applies equally to manned and unmanned aviation. Therefore, appropriate steps must be taken to cater for the absence of a pilot within the aircraft. For unmanned aircraft flights, the methods used to prevent collisions depend on whether the aircraft is being flown within, or beyond the ‘Visual Line of Sight’ of its pilot.

Visual Line of Sight Operations
Visual Line of Sight is termed as being the maximum distance that the flight crew is able to maintain separation and collision avoidance, under the prevailing atmospheric conditions, with the unaided eye. For flights within Visual Line of Sight, the pilot of an unmanned aircraft is required to employ the ‘see and avoid’ principle through continued observation of the aircraft and the airspace around it, with respect to the other aircraft and/or objects. Within the United Kingdom, Visual Line of Sight operations are normally accepted out to a maximum distance of 500m horizontally and 400ft vertically, from the pilot.

Beyond Visual Line of Sight Operations
For operations beyond Visual Line of Sight, it is not possible for the pilot to directly see the unmanned aircraft that he/she is in charge of and so he/she will not be in a position to be able to avoid other aircraft or objects; alternative arrangement to prevent collisions must therefore be taken. In these cases, the aircraft must either be fitted with a Sense and Avoid system or; in the absence of such a system; it must be operated within Segregated Airspace. The UK is not alone in this policy; the same policy is applied throughout Europe, the USA and internationally through the International Civil Aviation Organisation (ICAO).

All aircraft, whether manned or unmanned, must be airworthy. The airworthiness and certification standards for civilian unmanned aircraft are dependent on the aircraft’s mass as follows:

- Mass over 150kg – Airworthiness certification is the responsibility of the European Aviation Safety Agency (EASA), not the CAA, unless the aircraft is being used for a State purpose such as policing.
• Mass between 20kg – 150kg – Certification is the responsibility of the National Aviation Authority (in the UK it is the CAA).
• Mass 20kg or below – There is no specific airworthiness standards to measure against, however it is the responsibility of the operator to operate the aircraft in a safe manner, not to recklessly or negligently cause or permit an aircraft to endanger any person or property. (This is covered by UK Law).

Military Unmanned Aircraft
Military Unmanned Aircraft are certified by the military authorities, and are certified to a level of safety equivalent to that of a comparable military aircraft. Any aircraft which is not a military aircraft must, under United Kingdom aviation safety legislation, comply with civil requirements. There is no special provision for other types of non-military State aircraft such as those carrying out police, search and rescue, firefighting, coastguard or similar activities or services.
To assist potential UAS operators or manufacturers, the CAA has produced a guide to UAS operations in the UK: Unmanned Aircraft system Operations in UK Airspace – Guidance http://www.caa.co.uk/docs/33/CAP722.PDF

5. RECOMMENDED SOURCES OF REFERENCE

UAVS (Unmanned Aerial Vehicle Systems Association) - www.uavs.org
An independent non-for profit organisation funded by its membership subscriptions. It represents the UAS manufacturing and system integration industry to UK government and UK regulators and attends most of the important UAS committees and working groups. It is the world's longest established trade association devoted exclusively to the UAS community.

ICAO (International Civil Aviation Organization), Canada - http://www.icao.int/
Specialised agency of the United Nations, it sets standards and regulations for aviation safety and security worldwide.

The agency's responsibilities include drafting legislation and certification of aircraft and components. (Airworthiness certification of UAVs over 150 kilos Europe wide)

Eurocontrol - http://www.eurocontrol.int
The European Organisation for the safety of Air Navigation.

Unmanned Aerial Systems 2014 http://www.dsei.co.uk/page.cfm/Link=127/t=m/goSection=19