Drone Technology

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Introduction

The number of Unmanned Aerial Vehicles (UAS) commonly known as drones have seen a vast increase over the last 5 years and are expected to increase 10-fold globally from 2015 to almost 68m in 2021. As the pervasiveness of drones continues to gather pace they are put to a variety of industrial uses in agriculture, transport, media & entertainment and other industries. A recent study by PWC estimates their potential value generated can climb to $127 billion in the near future – with some of it reflecting current opportunities for airports and aviation itself. Modern drone technology has given rise to opportunities and challenges that are as numerous as its many applications. For airports this development gives rise to two key considerations: firstly, keeping airports safe from unwanted drone activities especially by hobbyists and potentially from terrorist or criminal acts. Secondly, facilitating the use of UAS technology where it adds value to an airport's operations or commercial activities. Integration of the technology into controlled airspace will be a critical component to reduce the risk that drone operations currently pose to the safety of manned aviation at and around airports, as well as challenges to privacy, and the security of aviation.

Context

1. **Diversity of drones:** Unmanned Aerial Vehicles (UASs) and the technologies that enable them come in a variety of configurations which continue to evolve. Behind the umbrella term drone one encounters a diverse array of aircraft types of different weights and sizes (e.g. multi-rotor, fixed wing, tilt wing) currently in operation and in development, and so it is important to remain mindful that each drone type may have significantly different implications for airports.

2. **Safety risk to aviation:** Europe's growing fleet of amateur drones poses serious risks to manned aviation including the risk of a collision with a passenger aircraft. Numerous near misses and incidents involving the unsafe use of amateur UASs around airports have occurred at European airports. Collisions with commercial aircraft have so far been avoided although Switzerland's Transportation Safety Investigation Board (SUST) has warned it is only a matter of time until one happens if measures are not taken. The risk is compounded by the fact that current technical knowledge is limited concerning the likelihood and the consequences of such a collision.

3. **Disruption of air transport:** Even if the aviation system is successful in preventing major accidents and incidents involving amateur drones, even sightings or near- misses prompt closures of busy airport runways such as Dubai Airport's hour-long closure in October 2016. Such disruptions will only become more frequent, affecting passenger journeys and entailing substantial financial cost to airports and airlines alike. Many airports will have to decide on the optimal technological and operational measures to guard against such potential disruptions.

4. **Opportunities for airports:** Despite these safety threats, drone technology bears great potential for aviation. UAS's are not by necessity a hazard and in fact properly operated in-house drones have a lot to offer airports. Today's technology boasts levels of performance and reliability that render them a potentially useful tool for several aspects of airport operations. When it comes to a number of tasks inside and around the airport perimeter, the deployment of drones could help drive process improvements and cost efficiencies.

5. **Drone applications currently feasible** include pavement surface condition or ground lighting inspections, but also obstacle surveys, security-related tasks such as clearing or securing areas and perimeters, construction work surveying and surveillance and improved situational awareness during emergencies and emergency exercises, 3D mapping etc. In as soon as 3-5 years' time, we could see operational tasks like runway and taxiway inspections, aircraft checks by airlines, and the calibration of navigational equipment (ILS, PAPI) done by drones. Several airports already use UASs for ad hoc aerial photography of their aerodrome.

6. **Cost improvements and efficiencies:** Surveying tasks can typically take 30-40% less time to conduct using drones whereas the current PAPI and ILS calibration costing 100,000 EUR can be cut by up to 50%. For other activities such as roof top or building façade inspections or surveying drones proved a much safer alternative to industrial climbers. Several other applications will undoubtedly surface once the technology and rules are in place. In many cases the obstacles to deploying drones are not technological but regulatory and operational.

7. **Future opportunities:** Wider business opportunities from accommodating drone flights will follow once UASs enter the core business of air transport. Several drone and aircraft

manufacturers (Singular, Nautilus, Airbus, Boeing) are currently developing prototypes that seek to establish the right balance of technical features necessary to achieve successful roll-out. By laying the ground through preparatory work today, airports and their partners will be in a position to reap the benefits of these new markets in the future. Otherwise airports risk facing the challenge of new entrants to potentially lucrative new and changing markets.

8. **Preparing airports for drones:** The operational concepts needed to allow drones to be integrated into busy airfields are only currently being developed and will require joint efforts from airports, ANSPs and authorities. Operating drones safely at airports will not be without pitfalls: over-regulating in terms of safety could make drone operations practically unattractive. Meanwhile, any operational concept that would cut off precious capacity for manned aviation would be equally problematic. EASA's upcoming regulation for drones envisages the development of Standard Scenarios for drone operations. As an industry we must encourage the early development of such Standard Scenarios for UAS operations on and around aerodromes.

9. **A new type of regulation and traffic management:** In order to lay the ground for the safe and full development of drones we will need to implement a more performance-based regulation complemented by modern, digital traffic management. Simply treating drones as manned aircraft would only end up placing limits on drones, conventional aviation, or probably both. Simplifying and automating traffic management (through UTM) will make the most out of limited ground and air capacities boosting aviation as a whole. The U-Space concept currently developed by the European Commission requires active participation from the airport community in order to ensure that the integration of UAS technology into the controlled airspace takes into consideration the airport industry's interests.

Integrating drones into airport operations

Letting drones into European airports is a complex but feasible endeavour. Necessary adaptations would include ATC technology & procedures, airport infrastructure & technology and procedures, as well as operator technical & operational profiles. Irrespective of the specifics of this future co-existence, it will be important not to lose sight of some ACI EUROPE priorities:

- Safety and security requirements should be **proportionate to the risks and should not be developed in fragmentation across Europe** leaving some airports unable to reap the benefits of drone technology. The principles applied at airports should be based on some common ideas across different European Member States, such as industry best practice or guidance material issued by regulators.

- Besides aviation safety, capacity effects should also be taken into account. The **compromise to airfield or airspace capacity that increased drone operations could lead to is another key aspect**. This could potentially be the case with runway crossings of in-house drones, arrival and departure sequencing affected by airspace reserved for drone operations, or even the effect that drone operations could have on ATC workload.

- They key change in integrating drones will lie in collaborative operational adaptations that although aided by digital systems must be based on true partnership among aviation stakeholders. It is necessary to come up with **commonly agreed operational concepts developed collaboratively by airports, ANSPs, airlines and authorities.**

- Any rules and regulations that are adopted must be designed to accommodate the rapid development of both the UAS technology and the resulting applications and services. **Future proofing of rules** and regulations, while clearly a challenge, will be critical for the successful development of a drone services market in Europe.

Part of this medium to long-run integration of drones will involve **adapting relevant ICAO documents** including those pertaining to airport operations. ACI World has also established a Drones Working Group that will be working to produce a future Handbook and global guidelines for airport members.

ACI EUROPE conclusions and recommendations

European safety rulebook: <u>As a matter of urgency, a European safety rulebook on drones should be finalised</u> to ensure a common approach and to avoid that each Member States sets up separate rules. The legislative breakthrough on the EU Aviation Safety ("EASA") Regulation has cleared a major hurdle to progress on drone deployment in Europe opening the path to finalising the rulebook. This rulebook should include a consistent approach to protected zones around airports, requirements for pilots, and be presented in a clear manner enabling ordinary users to understand what they can and cannot do with their buy-to-fly aircraft. This European rulebook by EASA should also:

- Set up a **registration scheme** for drone operators and UASs that means all owners are easily identifiable and that takes account of digital and mobile technology to facilitate signing up at minimum cost.

- These rules should be **performance-based** and not overly prescriptive. As far as possible they should be future-proofed anticipating technological developments in drone and traffic management technologies.

- The strong experience with risk assessments of ACI airport from their Safety Management Systems (SMS) should be used for the safe integration of UAS operation at the aerodromes.

- Be consistent with European policy on Unmanned Traffic Management (the U- space).

Protecting airports from drones. Guidelines and benchmarking are needed on the measures necessary to protect airports from drones, including on roles and responsibilities of different actors. ACI EUROPE will focus safety and security work in this area and engage local and European authorities to come up with effective answers to challenges, including:

- **<u>Airport-specific protection policies including standardised restricted zones</u>** are called for in this regard but may not be covered yet by European rulebook.

- Technical systems to detect and neutralise drones should properly be put in place by state authorities responsible for law enforcement.

- The **<u>roles and responsibilities of different actors</u>** both public and private in protecting airports.

Traffic management & drones at airports. For aviation to reap benefits from drones, authorities, ATC and operators must work out how drones can operate at busy airports. So far, technical and policy-making advances have been made on setting up a general framework for Unmanned Traffic Management, or U-Space, which ACI EUROPE strongly supports. The operational issues with drone flights at airports carry their own complexities, involving safety cases, ATC procedures, authority approvals, technology adoption, all of which are currently at an early stage. ACI EUROPE will continue with further technical work under the auspices of its Technical and Operational Safety Committee (TOSC) assisted by the Aviation Security Committee (AVSEC) meanwhile inviting aviation authorities to collaborate towards an ambitious integration of drones into airport environments.

- Begin with low hanging fruit and with **facilitating the approval of simple and lower-risk operations**, such as surveillance operations at a safe distance from the movement area of an aerodrome.

- So-called **standard scenarios** with risk assessments should be developed at the level of EASA for an accelerated authorisation using declarations of compliance.

- Aviation industry proposals on best practice technical and operational concepts available to European airports

Readying the industry for future opportunities. The foray of drone technology into aviation has the potential to reshape the industry in the long-run. As the arrival of aircraft like the Boeing 787 gave a new advantage to the possibility of point-to-point services, so in the future the development of pilotless aircraft with new configurations is likely to have consequences on the nature of demand for airport infrastructure. The 15-20 year horizon is difficult to forecast as changes to technology (aircraft, air traffic management) may be coupled by parallel changes in business models (e.g. in freight) and setting the right strategic direction for the aviation industry is very important.

- **<u>Developments in technology of future aircraft</u>** can have consequences for the future of the airport industry

- The **<u>input of manned aviation industry</u>** can be important in steering the direction of research and development.

ACI EUROPE

AIRPORTS COUNCIL INTERNATIONAL

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