



WITH GREAT POWER

NEAR AND ACTUAL COLLISIONS BETWEEN UAVS AND OTHER AIRCRAFT ARE BECOMING MORE COMMON. PHILIP CHURCH ARGUES THAT TO TRY TO PREVENT FURTHER INCIDENTS, IT'S NOT ENOUGH TO RELY ON TECHNOLOGY – USERS NEED TO UNDERSTAND THEIR RESPONSIBILITIES, TOO

Incidents in which UAVs have been too close to other aircraft are becoming increasingly common. We can see this from the statistics recorded by the European Aviation Safety Agency (EASA) 'Drone Collision' task force: between 2010 and 2015, the number of incidents reported increased from around 20 to nearly 500. Likewise, the US's Federal Aviation Authority recorded an increase from 43 incidents in 2014 to 226 incidents in 2015.

Yet at the same time, the number of applications and uses for UAVs commercially is increasing. In this fast-paced, changing world, the UAV and the technologies that enable it are posing an increasing challenge to the regulatory environment and the safety culture on which traditional aviation has been built. It's no longer about the skills someone needs to fly the platform – it's about how much they know about the need to integrate with the airspace and the relevant regulations.

Given the growing density of passenger air transport today and the demand that this places on airspace capacity, the challenge of integrating UAVs with manned aviation can only be expected to increase. This includes not only UAV applications operating beyond the line of sight (BLOS), but also those within the line of sight.

Ten years ago, no one would have predicted the existence of millions of small UAVs operating less than 150m above the ground. The predictions were always that large military platforms that had been used in the various Middle East conflicts would come back and find a way of being converted for civilian use. This made integration less complicated than it is today, as these platforms were relatively transparent to other airspace users and air traffic control and would be

operated in controlled airspace. Technically and in terms of safety, this is much simpler than the current situation with multiple small platforms undetectable to standard radar systems and able to fly to a kilometre or more above the ground and remain controllable.

To date, the rules for operating drones have targeted the professional user, whereas the problems of airspace incursions from UAVs have tended to come from the uninitiated exploring the operational envelopes and the capabilities of the cameras in the latest models. These recreational users have been provided with impressive capabilities but they often lack the knowledge to exercise them safely.

That's not to say that guidelines for professional users are unnecessary. But until the recreational market is controlled, there remains the risk that consumer pilots remain ignorant of their responsibilities with respect to airspace-use and what constitutes an acceptably safe operation.

Current initiatives

In this context, we have several regulatory initiatives underway: nationally in many countries around the world and internationally at the International Civil Aviation Organization and within Europe, driven principally by the European Commission. In parallel, standardisation activities are continuing and political pressure is growing for legislation to catch-up with UAVs' capabilities and enable the economic rewards that have been repeatedly forecast. This pressure has culminated in high-level statements such as the Riga Declaration by the European Commission in 2015 and the Warsaw Declaration of 24 November 2016. In turn, European Agencies have been tasked with implementing

actions to enable this turnaround, examples being the recent mandates to EASA to develop regulatory guidelines and to the Single European Sky Air traffic management Research (SESAR) programme.

These activities are already starting to have an impact, as demonstrated by the SESAR call for UAV research. A recent SESAR market outlook study has also highlighted the anticipated growth in UAVs and the number of applications for which they will be deployed is likely to result in a significant impact over the next few decades. Combined with the expected growth in air transport in general, this will lead to more use of airspace by an increasingly diverse mix of platforms that need to be coordinated, traced and kept on conflict-free trajectories.

The difficulty is that integration requires an understanding of the new risks that an operation might introduce for other airspace users, which is often difficult when the operation is in its infancy. Measures that end users might see as draconian will only increase the pressure on politicians and regulators if they don't allow sufficient flexibility for applications that have not yet been envisaged.

Shared space?

The UAV industry realises the importance of maintaining safe separation between UAVs and other aircraft, and has proposed measures to ensure that UAVs are not flown where they shouldn't be. One such measure, geo-fencing, is expected to become mandatory in the regulations and is already included as a mandatory function in the proposed open class of the EASA prototype regulation. However, this raises several questions. As geo-fencing is deployed, will it also become a limitation on true airspace integration? Doesn't it mean that UAVs are not truly integrated but are still working in a segregated airspace known only to them and their operators, not the whole community? What level of control should users have over such functionality, if any, and when should it be removed?

Regulations developed for manned aviation were intended to protect third-parties and took several years of operational experience before any progress was agreed internationally. The problem today is that the industry is already worth several billion dollars and the number of sold is only predicted to increase. So whilst regulations are being developed, this can only be considered a retrospective action, effectively trying to play catch-up given that the number of UAVs and their uses are unknown.

There is also no centralised record of the types of incidents that have affected operational UAVs, such as battery, command and control, or motor failures. These should be considered when setting the standards to which UAVs need to be built and for the approvals necessary for different types of operations, including recreational use.



We therefore come down to the basic principle cherished by general aviation and underpinning commercial air transport operations – freedom of the air. However, with freedom comes responsibility. Given that the airspace today is more complicated and heavily used than when manned flights were beginning, today's new UAV users need to be cognisant of their responsibilities. Placing technical requirements on equipment, such features for positioning and identification, to address concerns about airspace incursions and collisions between UAVs and other aircraft does not remove the UAV pilot's responsibility to understand the rules of the air or have a 'Plan B' when technology fails. Recognising that the technical advances of UAVs means uninitiated users will have access to shared airspace, manufacturers must also have a role in ensuring end users are either sufficiently

aware of their obligations and the safety requirements governing airspace integration, or have limitations placed on their use to retain some segregation. A flood of UAVs continues to arrive and without properly addressing these issues, we can only expect an increase in airspace interactions.

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