



Drone Traffic Management in Europe

The views of the Drone Alliance Europe

Introduction

Remotely piloted/unmanned aircraft have been a part of the aviation world for many decades. Indeed, the Chicago Convention recognises unmanned aircraft and has created a regulatory arrangement for them, which can be found in Article 8. Unfortunately, that is not enough, for while the aviation regulatory world struggles to bridge the gap between traditional aviation constructs and unmanned ones, the actual and potential uses for drones, both commercial and recreational, continue to move forward at a breath-taking pace.

The discussion is no longer about remotely piloted devices – the pilot of which can remain in contact with air traffic controllers. Instead, we are now developing fully autonomous unmanned aerial vehicles (UAVs), or drones.

Apart from their autonomy, these devices have a number of unique characteristics: in many cases they fly at very low altitudes and at speeds much slower than manned aircraft; sometimes even the same vehicle can be deployed alternately for both recreational and professional uses; they range in size and capacity from a few grams to several hundred kilos; and, we are currently watching an explosion of growth in the number of drones on the market that is orders of magnitude greater than traditional aviation growth. Current estimates put the number of drones of all sizes sold worldwide at well above two million. Europe is in a leading position in the development of drone technology.

Given that number and the growing number of commercial users and commercial uses that have been identified, it is clear that we need now to put in place procedures to ensure that the airspace in which these devices operate is safe and orderly. This is commonly known as UAV Traffic Management, or UTM. UTM has to be distinguished from the air traffic management provided today for aircraft that operate in controlled airspace.

The success of the European drone industry requires a network of low-cost, interoperable UTM system providers working on common standards, to ensure that all drone operations are safely integrated into the airspace efficiently. Such a system will enable the types of advanced operations that will propel the industry to broad economic success and job growth: fully autonomous (no human in the loop) and beyond line of sight operations, as well as the ability to test new devices and operations anywhere in Europe. Being able to secure such a system will allow the European drone industry to continue to grow.

Drone Alliance Europe is uniquely placed to comment on this topic. Its members are commercial operators and companies that are looking to provide the infrastructure to facilitate commercial operations of these devices across Europe. The potential for both jobs and growth from drones is enormous. The industry needs appropriate structures to deliver its potential for Europe.

Background

Generally, manned aviation operates within a series of designated airspace areas controlled from the ground by air navigation service providers (ANSPs). Pursuant to Article 1 of the Chicago Convention, states are responsible for this airspace and designate air navigation services to particular ANSPs in accordance with Article 28.

In Europe advancing technologies have exposed the limitations of the traditional state sovereignty-based approach to air traffic management. Consequently, Europe as a whole now has a sub-optimal air navigation system that is behind the technological possibilities. Not only is it expensive but it involves significant duplication.

Even more significantly, the vast majority of airspace in which most commercial drone operations are currently envisioned is outside controlled airspace, where ANSPs do not provide air traffic management and separation services. This uncontrolled airspace is the low altitude area that varies in altitude but generally rises at least up to 150 metres (500 feet) above the ground. The airspace is used by a number of users today, ranging from police and ambulance helicopter operators to general aviation, gliders, balloonists and hang-gliders.

Simply adding low altitude commercial drone operations to that mix of users without any form of overarching management would be difficult. That would particularly be the case for autonomous drone operations, operating beyond the line of sight of the operators. Consequently, to facilitate the introduction of drones into the system there is a clear need for a systematic approach to creating a UTM for all.

The alternative of asking ANSPs to take control of this air space is not tenable. ANSPs are subject to a very rigorous regime of procedures and practices built up in the manned aviation environment over 70 years. Furthermore, it would recreate national sovereignty-based entities, building in duplication and confusion. ANSPs operate with work practices and expectations inappropriate to the low altitude operations envisaged by the drone community. The sheer volume of drone operations would place a tremendous burden on controllers and take up time and effort best focused on deconfliction of manned aircraft in controlled airspace.

The Characteristics of the UTM

The UTM, first and foremost, must provide a means to ensure that all drone operations are safe and are safely integrated into the airspace. This means that the flight trajectory of each drone operation in a particular category of airspace must be coordinated to maintain separation. Given the projected number of drones that will be operating in the low, unsegregated airspace and the nature of those operations, particularly operations beyond the visual line of sight, it is impossible to assume that the current, human-driven system of separation control will be suitable. Instead, there is a need to find technology-led automated solutions.

At the same time, the drone operations will need to respect the physical realities of the ground beneath it. Operations will need to avoid tall objects – whether permanent, such as a church spire, or temporary, such as a crane derrick – locations likely to have helicopter operations, such as hospitals, and sensitive locations such as public administration buildings, power stations and so on. Consequently, the UTM must be built on the back of high quality data and mapping. It must also be able to incorporate dynamic data, such as real time airspace closures associated with items such as accident response and search and rescue, and population movements.

Recreational users will make up a huge percentage of all drone operations and the UTM must find a way to address those operations without needing to put those users to a burdensome amount of work before or during operations.

This has two aspects. First, recreational vehicles should be designed and their operations conducted in such a way as to avoid airspace and locations defined as off limits by government authorities: geo-fencing is one means to meet that objective. Second, a robust identification system should be instituted so that operators, both recreational and professional, can be identified quickly and efficiently. Work continues on these issues. Solutions are needed that can easily be adopted by a multitude of operators, and all such solutions must not only be easily adoptable, they must also be easily accessible by all.

Accessibility also has a financial aspect. There is a fundamental question about whether or not the UTM should be operated on a for-profit, or not-for-profit basis, and by whom, including whether multiple entities may manage a UTM. The NASA designed concept being put forward in the USA for use under the auspices of the FAA is not directly transferable to Europe, with multiple ANSPs that operate on a fee for service basis.

It is undeniable that the UTM will require the development of a platform on which trajectories will be compared and managed. That will call for a layer of infrastructure, which clearly must be funded. However, asking each ANSP in Europe to develop their own layer, even if done on common standards, will see significant duplication and expense.

The European UTM must be an integrated single system, made up of multiple sub-systems operating on common standards. It will need to be built on open standards so that all operators and putative operators can accommodate its requirements and can participate. At the same time, it must be integrated into the wider airspace. There is a role for the SESAR Joint Undertaking to develop the UTM, and for a single provider to operate it into the future.

The UTM can then build in a common Europe-wide registration and identification system, as well as maintain geo-fencing restrictions and standards. All three of these issues need to be seen as part of a common whole for safe, reliable drone operations.

DAE strongly believes that the development of the UTM should be industry-led, but also acknowledges the role that government will need to play in helping to create and formalise the

standards necessary for the UTM to be established, in mandating its use and providing oversight, as well as in providing access to relevant mapping data.

The Drone Alliance Europe Vision for a European UTM

Europe is a world leader in drone technology and drone development. To capitalise on that the nascent European drone industry needs a platform for the management of the drone traffic, to generate and maintain confidence in the reliability and safety of its operations.

That UTM system must:

- Be an integrated single system made up of multiple sub-systems operating on common standards
- Be based on open source standards
- Facilitate competitive service offerings from all parts of the industry
- Work from reliable, dynamic, data sources
- Facilitate, without overburdening, recreational users
- Allow for appropriate geo-fencing
- Be accompanied by a reliable registration and identification service
- Be available at a transparent and reasonable cost.