

# Eurocontrol UAS ATM Integration

By Mike Strong



In its role as the European organisation for the safety of air navigation, EUROCONTROL is central to the development of air traffic management (ATM) for UAS in European airspace. However, ATM is just one part of the larger jigsaw that must fit together before UAS can begin to integrate safely with other airspace users with any degree of operational freedom. This article reviews the Eurocontrol UAS ATM Integration Activity and how it links with vital work being undertaken by other bodies and agencies.

### Eurocontrol UAS ATM Integration Activity

Eurocontrol has long considered that UAS ATM integration will be an incremental process, with initial UAS flight taking place in airspace where the present lack of a sense-and-avoid system does not pose a hazard to other airspace users. Then, as technology developments allow, UAS can be introduced progressively into more challenging classes of airspace. Hence early work by Eurocontrol has focused on en-route flight under instrument flight rules (IFR) in Classes A to C airspace, where all aircraft are known to ATC and where ATC is able to provide a separation service. Eurocontrol is likewise proactive in support of UAS flying visual line-of-sight (VLOS), where the UAS pilot retains situational awareness by keeping the UAS in sight at all times, and is thereby able to undertake responsibility for separation provision and collision avoidance.

These scenarios (IFR in Classes A-C and VLOS) have provided the basis for two Eurocontrol projects - a study of human factors relevant to the integration of UAS into the European ATM System and a series of generic ATM safety assessments. Additional Eurocontrol projects have examined other aspects of UAS flight in non-segregated airspace. One study determined the ATM collision requirements for UAS and the need for interoperability with airborne collision avoidance systems; another study considered the impact of multiple UAS on command, control and communication (C3) links in terms of spectrum and bandwidth; and an assessment is under way on UAS ATM security. The outcome of all this effort will be or is being made available to other groups working with Eurocontrol on UAS integration.

It is worth noting that when it comes to flight in non-segregated airspace, Eurocontrol regards military and civil UAS in essentially the same light. Their capabilities and missions might differ, but the requirement for them to integrate with other traffic and to fit seamlessly into the existing ATM system - whether as General Air Traffic (GAT) or Operational Air Traffic (OAT) - is the same.

### Cooperation

As will be appreciated, Eurocontrol does not work alone. Indeed, close cooperation within Europe and elsewhere is key to the timely, harmonized and safe integration of UAS. Eurocontrol therefore coordinates its activities, and works closely with a raft of organisations, including the European Organisation for Civil Aviation Equipment (EUROCAE), NATO, the European Defence Agency (EDA), the European Aviation Safety Agency (EASA), the European Space Agency (ESA), the Aerospace & Defence Industries Association of Europe (ASD) and the Joint Authorities for Rulemaking on Unmanned Systems (JARUS). A

Memorandum of Cooperation ensures effective liaison between Eurocontrol and the Federal Aviation Administration (FAA), and Eurocontrol participates in the work of the International Civil Aviation Authority (ICAO) UAS Study Group.

### EUROCAE WG-73

Eurocontrol places great consequence on the work of EUROCAE Working Group 73 (WG-73), which is presently engaged in the production of a document entitled A Concept for UAS Airworthiness and Operational Approval in the Context of Non-Segregated Airspace. When complete, this will comprise four volumes:

- General Considerations for Civilian Operation of Unmanned Aircraft.
- UAS Operations.
- UAS Airworthiness Certification.
- UAS for VLOS Operations.

Once again, coordination and cooperation are essential to ensure that different standards do not evolve around the world. WG-73 therefore works very closely with its US counterpart, the RTCA (Radio Technical Commission for Aeronautics) SC (Special Committee) 203, which is seeking the safe, efficient and compatible operation of UAS with other aircraft operating in the National Airspace System (NAS).

### JARUS

In Europe, EASA has responsibility for certification and flight-crew licensing of civil UAS above 150kg, while national aviation authorities have corresponding responsibility for UAS below this weight. But the demand for small UAS flying VLOS - maybe no more than a few hundred metres from their pilot - is already with us, and prospective operators are very keen to know what rules and regulations they need to comply with. Eurocontrol therefore attaches great importance to JARUS and its work in drafting technical and operational requirements for the certification and airspace access of 'light' UAS, with the potential for these requirements to be considered by participating States for incorporation into their national regulations. This represents an excellent opportunity to avoid duplication of effort and to achieve a degree of harmonisation that might not otherwise happen. JARUS is liaising on light UAS with EUROCAE WG-73, RTCA SC-203, ICAO and NATO.

### SESAR

The Eurocontrol UAS ATM Integration Activity described above addresses UAS operations in the context of current rules, regulations and ATM/CNS (communications, navigation and surveillance) technology. However, ATM in Europe will undergo major change as the result of SESAR (Single European Sky ATM Research) and the subsequent progressive implementation of the European Commission-driven Single European Sky Initiative.

SESAR is intended to develop a modernised ATM system for Europe that will ensure the safety and fluidity of air transport over the next thirty years, and make flying more environmentally friendly and reduce overall ATM costs. Although primarily aimed

at accommodating the needs of commercial airlines, SESAR must also take into consideration other airspace users, including UAS. Indeed, there are elements of UAS operation that may be particularly well-suited to SESAR, given that SESAR embraces SWIM (System Wide Information Management), improved sense-and-avoid, advanced communications, precise trajectory management, new command-and-control techniques, autonomous flight, ASAS (Airborne Separation Assistance Systems) and new collision avoidance solutions. There is nothing new or novel here that does not already feature in UAS expert and industry thinking about how to integrate UAS with other airspace users - before and after SESAR.

### **Global Hawk**

Global Hawk (GH) and Euro Hawk (EH) are due to become operational in Europe in late-2010. The United States Air Force (USAF), United States Navy (USN) and NATO will eventually base approximately 20 GHs at Sigonella in Sicily and the German Air Force (GAF) will operate EHs out of Manching initially, before basing 5 of them at Schleswig in Northern Germany. At the request of these GH/EH operators, Eurocontrol is producing a set of Eurocontrol Guidelines that seek to establish minimum ATM requirements for GH/EH in European Airspace.

The Guidelines are a sub-set of previous Eurocontrol Specifications for the Use of Military UAS as OAT Outside Segregated Airspace, published in December 2007, and accordingly follow the same basic ATM principles prescribed within the Specifications.

Because GH/EH lacks certain capabilities, including sense-and-avoid, it is necessary to fly the UAS in airspace that, effectively, isolates it from other airspace users. Thus, climb-out and recovery will normally take place in segregated airspace, while the cruise portion of the mission will be flown as OAT in

accordance with IFR at altitudes above those normally occupied by manned aviation, ie +FL510. The Guidelines accordingly address flight both within and outside segregated airspace.

### **Conclusion**

Over the past year, Eurocontrol has been extremely active in driving forward its own UAS ATM Integration Activity and in its support for and cooperation with other bodies and agencies working towards the same end. Nevertheless, the challenge of integrating UAS with other airspace users remains considerable and progress can seem frustratingly slow. It is therefore essential that the organisations mentioned in this article coordinate their various efforts in order to avoid duplication and to make best use of scarce resources, and then be prepared to share their subsequent results. UVS International has a part to play in pushing for just such national and international cooperation.

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