

# Proposals for the Regulation of UAS in Common Airspace

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For many years UAS have been widely used for military missions. Over the next few years the development and operation of European UAS – either military or civilian – will be one of the most important challenges and, at the same time, one of the biggest opportunities for the European Community and its industries, allowing them to stay in the vanguard of technological and commercial development in the aerospace industry.

Where it has been identified that existing regulations cannot accommodate civil UAS, a regulatory framework needs to be developed to determine what technologies or procedures are essential to reach the objective of a safe introduction of UAS for civil purposes. The technological progress made over the last few years, which has made these planes capable of longer flights, has raised interest in their use for non-military activities such as reconnaissance activities for civil purposes, territory monitoring, for the surveillance of automobile traffic, meteorological research, etc.

The use of UAS for these purposes calls for their operation outside the areas normally reserved for their use (segregated areas), which raises some concerns about civil air traffic. These concerns have not been properly considered in the set of regulations currently in force, which only provide a few measures specifically for this kind of air navigation.

## Shortcomings of the Present Legal Framework

Although the matter of regulating the use of unmanned air vehicles is clearly relevant today and is being examined by many international authorities, the present legal framework is inadequate. The most important treaty is certainly the 1944 Chicago Convention, which introduced (in Article 8 – Chapter II concerning flights over member states) a prohibition against unauthorised flights of unmanned air vehicles over member states<sup>1</sup>. In fact, this regulation states that: «*No aircraft capable of being flown without a pilot shall be flown over the territory of a contracting State without special authorisation by that State and in accordance with the terms of such authorisation. Each contracting State undertakes to insure that the flight of such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obviate danger to civil aircraft.*»

The article clearly states that consent for flying over contracting states is only granted when several conditions are met, such as authorisation from the state to be overflown, compliance with overflight terms, the commitment of the state to be overflown to take all steps necessary to ensure that the overflight does not affect the safety of civil aircraft.

Therefore, there are various requirements for authorising UAS overflights. These requirements involve undertaking complex measures in order to guarantee the safety of all related operations as established by the Chicago Convention.

Consequently, for a UAS to have such authorisations,

international regulations demands that it complies with the relevant airworthiness requirements as stated, for example, in Articles 20 et seq. and 29 et seq. of the Convention as well as the subsequent ICAO Annexes.

This procedure has been applied to ordinary aircraft ever since the international regulation's adoption, and it has been reinforced by recent measures taken by the European Union; for unmanned air vehicles, however, technical regulations have yet to be drawn up regarding contracting state recognition of certification and the subsequent issue of authorisation.

This deficiency has been acknowledged on various occasions both within the EU and internationally, forcing the authorities involved to try to find a solution.

## Principles Introduced by Regulation 216/08 and their Application to UAS

The absence of a legal framework offering solutions to the various legal problems created by the use of the aircraft in question and the interest shown for their use for civil purposes have led to the start of a process involving many EU and international authorities and attributable to the efforts of the *European Air Safety Agency* (EASA).

The definition of aircraft and related products contained in Article 3 of Regulation 216/08 appears to be broad enough to include UAS<sup>2</sup>. Annex II of this regulation also supports a broad interpretation. While the article states that aircraft and related products must comply with the regulation's technical requirements, the exempted categories are mentioned in a specific annex. This list of exempted categories includes «(i) *unmanned aircraft with an operating mass of no more than 150 kg*», which could lead to the conclusion that those weighing more than 150 kg must comply with the essential airworthiness regulations to be established by the EU agency.

The European Economic and Social Committee, which recently gave its opinion on the matter during the drafting of Regulation 216/08, reiterating that «*EASA must have the necessary powers to regulate this area of the industry not only airworthiness and design but also the certification of ground operators, launching systems, etc.*»<sup>3</sup>.

In order to facilitate this process and authorise the use of UAS in civil airspace, the regulation has reiterated that UAS be subject to the existing rules for conventional aircraft, confirming the above interpretation of the concept of aircraft. Article 11.2 of the committee's written opinion states, indeed, that «*All regulations pertaining to conventional aircraft must be considered obligatory for UAS and all airspace users should be consulted where this type of activity could affect those users*».

The conclusion that the same technical norms applicable to conventional aircraft be applied to UAS and the need to issue the

<sup>1</sup> It should be pointed out that the Chicago Convention is applicable, as stated by Article 3, only to civilian aircraft, and it is not applicable to aircraft used for state, military, customs and police flights. For such aircraft, excluded from the international regime, flying over or landing in other states is permitted only with previous special authorisation and conditions (Article 3(c)).

<sup>2</sup> These considerations have already been contemplated by the European Air Safety Agency; in its description of the *policy for UAV systems certification (Airworthiness and Environmental Protection)*, it states that «the proposed policy is applicable to UAV systems with a maximum take off mass of 150 kg or more; which are not excluded by article 1(2) or Article 4(2) and Annex II of EC Regulation 1592/02.»

<sup>3</sup> Opinion of the European Economic and Social Committee on Air Safety, 2006/C, 309/11, in OJEU, 16 December 2006, C309/51.

protocols required by Regulation 216/08 so that this may actually take place have led EU authorities to identify some criteria for this process.

### **The Principle Considerations Regarding UAS Certification**

In order to ensure flight operation safety, it was decided that certification must apply to all the equipment involved in such flights.

The equipment comprises the control station and any other element required for performing these flight operations, such as the communication link and the launch and recovery element. Moreover, this equipment may admit the use of more than one vehicle, various control stations and launch and recovery elements.

This configuration of the UAS system raises many delicate questions that must be examined in order to identify the essential requirements for ensuring flight safety. Particular attention should be given to the number of control stations and the number of flying UAS. When one or more stations control the same UAS, no problem should arise because the airworthiness certificate, which states the vehicle's compliance with the safety regulations, could be issued so that it covers more than one control station for a single UAS.

It appears to be more complex when one station controls more than one UAS that are different types. In this case, it should be decided whether to issue the control station with two or more airworthiness certificates (according to the number of UAS) or a single certificate specifically created for control stations with this particular feature.

In addition to these considerations, as of yet to be resolved, a decision has been made to follow an approach similar to the one used for conventional aircraft as far as the pilot in command is concerned, reiterating the need for personnel to be in possession of licences analogous to those accepted in Europe for manned flights.

The tendency emerging in Europe to move towards a «system» certification – one that is not limited to just UAS – appears to be justified in the light of how UAS function.

The *European Organisation for Civil Aviation Equipment* (EUROCAE)<sup>4</sup> has stressed that the lack of a clear legal framework in this regard limits UAS use in Europe. EUROCAE proposed to apply not only to aircraft but also to the personnel employed at the control stations (even though they are not on board the aircraft), the structure organised by the operator for this purpose, airport and air traffic controllers.

ICAO has also formed an important Study Group<sup>5</sup> (Unmanned Aircraft System Study Group). This international organisation was requested to establish this group by member states and, in particular, by EU countries, which have encouraged the organisation to define its role in the creation of a set of regulations for this sector in order to harmonise terminology, principles and strategies for the sector's future regulation. As a result, it has been suggested that the ICAO Annexes be reviewed in order to introduce new *Standards and Recommended Practises* for this kind of aircraft. ICAO's *Air Navigation Commission* has examined the guidelines of the aforementioned UAS Study Group, stressing that they adequately address the many issues that have been raised. In particular, a proposal has been made to change the term *Unmanned Air Vehicles* into *Unmanned Aircraft System*

(UAS) because it may be more difficult to insert UAS into national regulatory regimes. The need to ensure the safety of the whole system calls for all equipment related to UAS operations to be certified; however, this raises many legal issues that require further clarification. Recently working groups of this Study Group were instructed to make a general review, and more specifically a review of ICAO Annexes, so as to find gaps between existing SARP's and those that will be needed for UAS<sup>6</sup>. This involves an analysis of existing rules, UAS procedures and gaps, with the aim of identifying suitable changes of ICAO procedures by best practice to accommodate the distinct nature of UAS. For example, search and rescue procedures (SAR services) in Annex 12 will require additional procedures for ditched or crashed UAS due to the distinct nature of this type of vehicle. Given that the main objective of SAR is to save the passengers or crew of an aircraft and that in the future it would be possible for UAS to carry passengers, it is essential that procedures are established so that the authorities know whether a UAS is carrying passengers or not, perhaps by means of extra flight plan information or via ELT registers and broadcasts. It was also suggested that the relevant authorities are informed of the carrying of dangerous goods by UAS.

### **Essential UAS Airworthiness Requirements**

In order to avoid the risk of unfairly penalising the UAS sector and impeding its development, it is clear that the requirements necessary for UAS certification and the corresponding technical regulations and procedures for ensuring the safety of these flights should be as similar as is possible to those existing for manned aircraft. This view is evident even in the first studies produced by the European Union<sup>7</sup>.

The UAS systems subject to member state control comprise UAS with an operating mass of no more than 150 kg, those designed for scientific or research purposes, or produced in limited numbers, as well as those used for military, customs or police activities. Particular regard has been given to the objective of not creating certification requirements with considerably different elements from those required for manned aircraft. The reasoning behind this is to remain as close as possible to the requirements already established, although the particular nature of UAS does call for some specific adjustments.

The principle of impartiality (or fairness) and, consequently, using as much of the existing legal framework for manned aircraft as possible is fundamental to avoid creating regulations exclusively tailored to UAS systems.

Therefore, UAS will also have to comply with the regulations in force for manned aircraft and applied by ATC service providers. The ATS provisions for UAS must be transparent (principle of *transparency*). There should be no difference in landline communications or transponder data procedures, nor should the controller apply different rules or different criteria. Similarly, the principle of *equivalence* (equivalent risk, equivalent operation) is fundamental. This principle refers to the need to maintain a safety standard at least equivalent to the one required for manned aircraft. Finally, on various occasions it has been stressed that the regulations on *responsibility* and *accountability* must also be established in line with those applicable to manned aircraft.

### **Legal Problems Arising from UAS Use**

#### **Civil Liability for Third Parties & Identification of the Liable Party**

On examining the recent initiatives undertaken by the European

<sup>4</sup> WG-73: Unmanned Aerial Vehicle – Working Paper, 25 October 2006.

<sup>5</sup> ICAO Exploratory Meeting on Unmanned Aerial Vehicles, Montreal, 23-24 May 2006, ICAO-UAV WP/2.

<sup>6</sup> See ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue (ICAO/IMO JWG-SAR/15-WP19, presented by the Netherlands) 12 September 2008.

<sup>7</sup> Advance-Notice of Proposed Amendment (NPA) No 16/2005. EASA.

Union to allow UAS use in non-segregated areas (and to move beyond the prohibition contained in Article 8 of the Chicago Convention), it appears that the EU bodies have decided to create a legal framework to guarantee the safe use of UAS, without imposing onerous measures that would impede their utilisation. As a consequence, the efforts of such authorities mainly focus on developing this specific legal framework, while modest attention has been given to further legal implications deriving from the use of such aircraft.

An important topic in this regard concerns the regulation of civil liability deriving from UAS use. Liability for damage to persons or property that can occur as a result of an incident caused by a UAS requires a number of issues to be resolved, such as identification of the applicable law(s) and of the liable party. For this reason, it should be decided whether the Rome Convention of 7 October 1952 can be considered applicable to incidents involving UAS.

The Convention does not contain any reference to UAS; however, in some cases, its regulations have been considered applicable to all kinds of vehicles, including spacecraft, provided they are «usable for transport».

Whenever the notion of aircraft is interpreted broadly (as is the case with the 1944 Chicago Convention and Regulation 216/08), the set of regulations contained in the 1952 Rome Convention may apply.

The Italian legislator, for example, has come to the same conclusion: the recently reformed air navigation code does not exclude the application of the regulations in question to UAS<sup>8</sup>. The application of the Rome Convention, based on the aircraft operator's strict liability<sup>9</sup>, does include a debt limitation scheme for incidents. The Convention establishes the amount of financial compensation to be paid on the basis of the weight of the aircraft that caused the damage. This is another aspect that must be dealt with in any future legal framework as a 'light' UAS could cause a considerable amount of damage.

Applying the same set of regulations on civil liability for damages caused to third parties to UAS raises another question, which is the identification of the liable parties. The traditional approach to this involves distributing liability between the pilot in command of the aircraft and its operator. The pilot is usually liable under public law, as legal systems generally impose on the person in physical control of the aircraft responsibility for the observance of such obligations. In contrast, the liability for any other obligations, whether contractual or extra-contractual, is on the operator. In this perspective, the Rome Convention places the liability for damage to third parties on the operator.

Therefore, considering the complexity of UAS systems, it is vitally important to make a clear distinction between the commander, the pilot and the operator; that is, between the person who has the authority to direct a flight under his command (UAS commander), the person in direct control of the UAS (the UAS pilot), and the legal entity operating a UAS system (the UAS operator).

As mentioned in the previous paragraphs, EU institutions have clearly suggested considering the UAS system as a single entity (UAS, control stations, UAS system elements, such as

communication links, launch and recovery equipment etc.) while creating a set of regulations for this kind of aircraft. As a consequence of this concept, the roles of the UAS operator and pilot in command must be defined in relation to the system.

In this perspective, the liability for damages caused on the surface by a UAS crash should be attributed to the operator, that is, the person or entity that, on the basis of Article 2 of the Rome Convention, set up the UAS system, ensures its functioning and makes known his or its status as operator so that the aircraft's registered owner is not wrongly presumed to be its operator. The figure of the pilot can be identified as the subject to whom is entrusted the command of one or more aircraft owned or at the disposal of the operator<sup>10</sup>.

### Other International Regulations Applicable to UAS

The principle of applying to UAS international regulations adopted for manned aircraft, especially those regarding safety, has been accepted within the EU and internationally. This approach implies that other international regulations may be applicable, such as the *Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation* signed in Montreal on 23 September 1971, and the more recent *Cape Town Convention* of 16 November 2001. Both conventions, however, do not apply to military, customs or police aircraft.

The Cape Town Convention aims at creating specific international protection, fully applicable in all member states. The convention provides for the constitution and effects of an international interest in certain categories of mobile equipment and associated rights. In the case in question, on the occasion of the approval of the Convention, an aircraft protocol was signed; as a result, those regulations created for conventional aircraft may now also be considered for application to UAS.

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<sup>8</sup> As amended by the legislative decree 969 of May 2005 and legislative decree 151 of 15 March 2006. Article 743 of the air navigation code now states that: «...aircraft will also be considered aerial means with remote control so defined by special laws, by regulations of the Italian CAA (ENAC) and, should they be military, by the Ministry of Defence's decree».

<sup>9</sup> Determining the operator's liability is made without regard to personal responsibility (negligence or wilful misconduct). Therefore, it is strict liability based on the risk of a lawful activity. The regulation relating to the liability for damages to third parties on the surface is applicable any time an aircraft's fall causes damages to persons or property, even for reasons beyond the operator's control. In these cases the operator is liable on the basis of a strict liability regime (which is alleviated by some exceptions listed in the same Convention).

<sup>10</sup> In this respect EASA (Advance – Notice of proposed amendment (NPA) No 16/2005, 25, op. cit.) defines the UAV commander as: «A suitably qualified person responsible for the safe and environmentally compatible operation of a UAV System during a particular flight and who has the authority to direct a flight under her/his command.»