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**SAFETY REGULATION DIVISION
POLICY AND PROCEDURES
OPERATIONS ADVISORY
MEMORANDUM**

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1 INTRODUCTION

This document details the IAA policy to be applied when assessing an application by an Operator to operate any Remotely Piloted Aircraft System (RPAS) within the territorial confines and airspace of the State.

The purpose of this document is to set out the safety requirements that will have to be met, in terms of airworthiness and operational standards, before any RPAS, irrespective of its mass, can be operated in Ireland. The long term aim of the Authority is to work in close co-operation with other bodies to develop a regulatory framework which will enable the full integration of RPAS operations with manned aircraft operations within Irish airspace.

2 REFERENCES

- IAA Aeronautical Notice O.63 - Operation of Remotely Piloted Aircraft Systems in Irish Airspace.
- FOD.F.305 - Application to operate an Remotely Piloted Aircraft System.
- ICAO Cir 328 - Unmanned Aircraft Systems (UAS).
- UK CAA CAP 722 - Unmanned Aircraft Systems Operations in UK Airspace.

3 TERMINOLOGY

The following are a list of terms and definitions used in the context of RPAS operations:

“aerial work aircraft” means any aircraft or remotely piloted aircraft system, not being a commercial transport aircraft, which is being flown for payment required to be made, or promised, to the operator of the aircraft or system in respect of the flight or of the purpose for which the flight is made;

“aeroplane” means a power-driven heavier-than-air aircraft deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

“aircraft” means any machine that can derive support in the atmosphere from the reactions of the air other than the reaction of the air against the earth’s surface;

“appropriate authority” means, in relation to the State, the Authority and, in relation to any other state, the relevant authority of the state having sovereignty over the



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territory being overflown, and in the case of a flight over the high seas, the relevant authority of the state in which the aircraft concerned is registered;

“commercial operation” means any operation of an aircraft, in return for remuneration or other valuable consideration, which is available to the public or, when not made available to the public, which is performed under a contract between an operator and a customer, where the latter has no control over the operator.

“congested area” means a densely populated area which is substantially used for residential, commercial or recreational purposes and is without adequate safe landing areas;

“controlled airspace” means an airspace of defined dimensions designated by the Authority within which an air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classifications in Rule 26 of the Schedule to the Irish Aviation Authority (Rules of the Air) Order, 2004 (S.I. 72 of 2004);

“model aircraft” means any small aircraft which is being used for the sole purpose of recreational flying.

“prescribed” means prescribed by a direction given by the Authority and the expression “prescribe” shall be construed accordingly;

“recreation” means the act of relaxation and/or amusing oneself by engaging in a sport or pastime;

“remotely piloted aircraft system (RPAS)” means any aircraft and its associated elements, other than a balloon, kite or small aircraft which is intended to be operated with no pilot on board;

“segregated airspace” means airspace of specified dimensions allocated for the exclusive use of a specific user(s);

“small aircraft” means any unmanned model aircraft, other than a balloon or kite, weighing not more than 20 kilograms, excluding fuel, but including any articles or equipment installed or attached to the aircraft at the commencement of a flight;

“small remotely piloted aircraft system” means any aircraft and its associated systems, both airborne and ground, other than a balloon, kite or model aircraft which is intended to be operated with no pilot on board, weighing not more than 20 kilograms, excluding fuel, but including any articles or equipment installed or attached to the aircraft at the commencement of a flight;



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“visual flight rules (VFR)” means the rules contained in Part III of the Schedule to the Irish Aviation Authority (Rules of the Air) Order, 2004;

“visual line-of-sight operation (VLOS)” mean the operation of an unmanned aircraft system during which the system operator maintains direct visual contact with the aircraft to manage its flight and meet separation and collision avoidance responsibilities;

“visual meteorological conditions (VMC)” means meteorological conditions expressed in terms of visibility, distance from cloud and ceiling equal to or better than the minima specified in Part III of the Schedule to the Irish Aviation Authority (Rules of the Air) Order, 2004.

4 DETAIL

4.1 Background

Civil aviation has until recently been based on the principle of a pilot operating an aircraft from within the aircraft itself flown with passengers and/or cargo onboard. Removing the pilot from the aircraft raises important technical and operational issues, the extent of which is currently being studied by both the aviation community and the developers of these new technologies.

Unmanned or Remotely Piloted Aircraft Systems are a component in the aviation sphere of activity which ICAO, National Aviation Authorities and the aerospace industry are working to define, understand and facilitate. These systems are based on cutting edge developments in aerospace technologies which ultimately may offer advancements and open the way for new and improved civil/commercial applications as well as improvements in the safety and efficiency of all civil aviation.

In the broadest sense, the introduction of RPAS does not change the existing distinctions between model aircraft and aircraft. Model aircraft are recognised as aircraft solely intended for use for recreational purposes and as such they fall outside the provisions of the Chicago Convention and, therefore, are subject to national regulations, where they exist.

4.2 Legal Considerations

4.2.1 ICAO and the Chicago Convention

As a signatory to the Chicago Convention and a member of ICAO, Ireland undertakes to comply with the provisions of the Convention and Standards contained



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in Annexes to the Convention save where it has filed a Difference to any of those standards.

Article 3 of the Convention provides that the Convention applies only to civil aircraft and not to State aircraft. State aircraft are defined as being aircraft used in military, customs and police services. No State aircraft may fly over the territory of another State without authorisation. Contracting States undertake when issuing Regulations for their State aircraft that they will have due regard for the safety of navigation of civil aircraft.

Article 8 of the Convention provides that no aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a Contracting State without special authorisation by that State.

Article 8 of the Convention also requires that “each contracting State undertake to ensure 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”.

4.2.2 European Regulation

EC Regulation 216/2008 (the Basic Regulation) establishes the European Aviation Safety Agency (EASA) and makes provision for Implementing Rules dealing with airworthiness certification, continuing airworthiness, operations, pilot licensing, air traffic management and aerodromes. At present, however, the only Implementing Rules that have been made are those containing detailed requirements for airworthiness certification, continuing airworthiness and flight crew licensing.

Neither the EASA Regulation nor the Implementing Rules apply to aircraft carrying out military, customs, police, search and rescue, fire-fighting, coastguard or similar activities or services (State aircraft). EU Member States must, however, ensure that such services have due regard as far as practicable to the objectives of the EASA Regulation.

Certain categories of civil aircraft are also exempt from the need to comply with the EASA Regulation and its Implementing Rules. These exempt categories are listed in Annex II to the EASA Regulation (Annex II aircraft). The exempt categories, which are of relevance for RPAS, are:

- aircraft specifically designed or modified for research, experimental or scientific purposes and likely to be produced in very limited numbers;
- aircraft whose initial design was intended for military purposes only; and
- unmanned aircraft with an operating mass of less than 150 kg.



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Any aircraft which is subject to the EASA Regulation and Implementing Rules, e.g. an unmanned aircraft with a mass greater than 150 kg which is neither experimental nor used for State purposes, will be required to have an EASA airworthiness certificate.

An aircraft, which is not required to comply with the EASA Regulation, either because it is a State aircraft or because it comes within one of the exempt categories, remains subject to national regulation insofar as airworthiness certification, continuing airworthiness, pilot licensing and flying operations are concerned.

Equipment requirements, operational rules, personnel licensing, aerodrome regulation and regulation of air traffic services governing the operation of RPAS are not as yet dealt with by European Regulations and are, therefore, all currently a matter for national regulation.

In the case of Ireland, the national regulations and requirements are as described in paragraph 4.2.3 below.

4.2.3 National Legislation

In Ireland, the only specific legislation governing RPAS operation has been the Irish Aviation Authority (Rockets and Small Aircraft) Order, 2000 which is currently under review. Additionally, Aeronautical Notice O.63 sets out the requirement for an operator to have obtained a specific Permission from the IAA to operate a RPAS.

It is IAA policy that RPAS operations in Ireland must meet at least the same safety and operational standards as manned aircraft. Therefore, RPAS operations must be as safe as manned aircraft insofar as they must not present or create a greater hazard to persons, property, vehicles or vessels, whilst in the air or on the ground, than those attributable to the operation of manned aircraft.

The underlying policy is that a RPAS may not be flown in Ireland without the operator obtaining a specific Permission from the Authority. Additionally, where such a RPAS is to be used for commercial purposes such as filming, photography, survey, surveillance, etc, the operator must apply to the Authority for an Aerial Work Permission to cover such activity.

In summary, RPAS are required to comply with all applicable national legislation. Any RPAS with a mass greater than 150kg must comply with EASA requirements.



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4.3 RPAS Operating Principles

The basic operating principles associated with RPAS activities within Irish airspace shall be based on the segregation of RPAS from other airspace users to provide a safe operating environment. The process for establishing such airspace, however, reduces the flexibility of operation sought by the user community. It is therefore important to establish what can be achieved outside of segregated airspace and to identify the associated constraints on RPAS operations.

4.3.1 Airspace Principles for RPAS Operations in Ireland

Irish aviation legislation is designed to enable the safe and efficient operation of manned aircraft in all classes of airspace, RPAS operators must operate within the same regulatory framework.

RPAS do not have an automatic right to airspace use. This applies particularly if accepted levels of safety provision cannot be maintained or, if such operations would have an unreasonably negative effect on other airspace users. In order to integrate with other airspace users, RPAS operators must ensure that their aircraft can demonstrate an equivalent level of compliance with the rules and procedures that apply to manned aircraft.

RPAS operators should recognise the expectations of other airspace users. As such, the routine flight of any RPAS outside of segregated airspace cannot be permitted to increase the risk to existing users and should not deny use of the airspace to them.

Until RPAS can comply with the requirements of current Irish legislation, including the Rules of the Air, one-off or occasional RPAS flights outside of Segregated Airspace may be considered by the Authority on a case by case basis. Additionally, the operation of RPAS with a mass of less than 20kg may be approved in accordance with specific operating conditions set out by the Authority in paragraphs 4.4 and 4.5 of this document.

As the use of Segregated Airspace would afford the exclusive use of that airspace to the RPAS operator, sufficient time must be allowed to consult with other airspace users and to complete the planning process before airspace submissions are made. Where an application for Segregated Airspace is to be considered, a minimum lead-in time of 90 days is required for this process. It should be noted that the establishment of Segregated Airspace will deny access to the associated airspace for legitimate airspace users; as such, it is not an acceptable method for enabling the routine operation of RPAS. All applications will therefore be closely scrutinised to ensure the most efficient use of the airspace concerned.



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Unless special provision is made with the Air Traffic Control unit (ATC) handling RPAS activity, the provision of an Air Traffic Service (ATS) to a RPAS must be transparent to the Air Traffic Controller. In other words, the controller must not have to do anything different in the use of R/T or landlines than he would for other aircraft under his control nor should he have to apply different rules or work to different criteria. The following points are of note:

- the RPAS must be able to comply with instructions from the ATC provider and with equipment requirements applicable to the class of airspace within which they intend to operate.
- on first contact with the ATC provider the operator must ensure that air traffic controllers are fully aware that they are dealing with a RPAS flight.
- where “special provisions” are made with the associated ATC unit, it is essential that these do not reduce the situational awareness of other airspace users.

For all flights outside segregated (exclusive use) airspace, the aircraft performance and all communications with the ATS provider must be continuously monitored by the RPAS operator. To comply with ATC instructions in a timescale comparable with that of a manned aircraft, it is imperative that the capability of taking immediate active control of the aircraft exists at all times.

Any requirement for special equipment (e.g. SSR Transponder) mandated for manned aircraft in certain classifications of airspace shall also be mandated as a minimum requirement for a RPAS intending to fly in such airspace, however, an RPAS with an operating mass of 20kg or less does not have to comply with this requirement.

4.3.2 Sense and Avoid

In order to provide an equivalent level of collision avoidance to manned flight an approved method of aerial collision avoidance is required. RPAS operations will not be permitted in Irish airspace, outside the direct unaided visual line-of-sight of the operator, without an acceptable sense and avoid system. Use of vision enhancing systems such as remote vision goggles is not permitted

The overriding principle when assessing if a proposed RPAS Sense and Avoid function is acceptable is that it should not introduce a greater hazard than currently exists. Any proposed function must demonstrate at least equivalence with manned aircraft safety standards and, where these standards exist, the RPAS must comply with the rules and obligations that apply to manned aircraft including those applicable to separation and collision avoidance.

The separation and collision avoidance capabilities must be able to:



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- Detect and avoid traffic (air and ground operations) i.a.w. Rules of the Air;
- Detect and avoid all airborne objects, including gliders, hang-gliders, paragliders, microlights, balloons, parachutists etc;
- Avoid hazardous weather;
- Detect and avoid terrain and other obstacles;
- Perform equivalent functions, such as maintaining separation, spacing and sequencing that would be done visually in a manned aircraft.

An approved method of assuring terrain clearance may be required.

4.4 RPAS Operating Procedures - General

Standard Operating Procedures will be required; these will normally be contained within an organisation's RPAS Operations Manual. Amongst other things the following procedures should be covered:

- Take-off and landing procedures;
- En-route procedures;
- Loss of control data link;
- Abort procedures following critical system failure

The RPAS must comply with the Visual Flight Rules as they affect manned aircraft.

The RPAS shall not be operated other than under the direct, unaided visual contact of the operator.

4.5 RPAS Operating Procedures - System with a Mass Less Than 20kg

In addition to the operating conditions detailed in 4.4 above the following specific conditions will be applied to RPAS operations for systems with a mass of less than 20kg as part of the IAA permissions and exemptions process:

- (a) the aircraft shall not be operated beyond Visual Line of Sight (VLOS) and not further than 500 metres from the point of operation;
- (b) the aircraft shall not be operated at a height of more than 120 metres (400 feet) above ground level;
- (c) the aircraft shall not be operated over or within the confines of a congested area except with the written permission of the Authority;
- (d) the aircraft shall not be operated within controlled airspace except with the written permission of the Controlling Authority;



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- (e) the aircraft shall not be operated within an aerodrome traffic zone or closer than 8 kilometres (5 nautical miles) from an aerodrome boundary, whichever is the greatest distance, except with the written permission of the Controlling Authority;
- (f) the aircraft shall not be operated over any assembly of persons on the ground nor closer than 150 metres laterally from such an assembly;
- (g) the aircraft shall not be operated within 150 metres of any person, vessel, vehicle or structure not under the control of the aircraft operator; during take-off or landing however, the aircraft must not be flown within 50 metres of any person, unless that person is under the control of the aircraft operator.
- (g) the aircraft shall not be operated closer than 2 kilometres from an aircraft in flight;
- (h) the aircraft shall not be operated unless there is in place a third party liability insurance policy covering the operation of the system which is acceptable to the Authority.

4.6 Operator Qualifications

Training requirements are essential to the establishment of safe and efficient operations in any sector of the aviation industry. Some of the difficulty in establishing an acceptable standard of training criteria for RPAS operations is the wide variety of RPAS types, sizes, technology and diversity of operations to be undertaken. Some criteria may apply to all RPAS while others will be type or class specific.

While there is currently no common European standard relating to operator qualification, the Irish Aviation Authority will expect the following aspects to have been covered.

4.6.1 Ground Training

RPAS operators should have completed thorough ground instruction equivalent to that undertaken by aircrew for manned flights. The depth of knowledge will depend on the specific operating environment. The following topics, which are not exhaustive, should be covered:

- (a) aerodynamics, including effects of control;
- (b) aircraft technical systems, specific to the system to be operated;
- (c) aircraft performance, specific to the system to be operated;
- (d) aircraft limitations, specific to the system to be operated;
- (e) navigation;
- (f) meteorology;
- (g) airspace;



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- (h) rules of the air and air law;
- (i) radio telephony procedures, where appropriate;
- (j) emergency procedures, specific to the system to be operated.

Ground instruction should be delivered by personnel with appropriate experience and/or qualifications.

4.6.2 Flight Training

RPAS operators should have undertaken through practical training in the operation and control of a RPAS in flight, this may include a proportion of simulated flight training. The training should enable the operator to demonstrate that he/she can control a specific RPAS throughout its design parameters and potential operating conditions, including dealing in a safe manner with any system emergencies and malfunctions.

All flight instruction should be conducted by an organisation or persons who hold a qualification to conduct RPAS flight training which is acceptable to the Authority.

4.6.3 Operator Proficiency/Currency Requirements

The currency and proficiency of RPAS operators should be maintained through regular practice some of which may be computer based. Additionally, all RPAS operators should be subject to periodical theoretical and practical examination carried out by the operator. Such requirements should be set out in the Operator's Operations Manual which must be acceptable to the Authority.

4.7 RPAS Maintenance and Fitness to Fly

Currently there are no national regulations in force addressing the issues of registration, certification and continuing airworthiness for RPAS. An operator, therefore, must ensure that the system to be operated is in a safe condition prior to the commencement of any flight.

Maintenance and/or repair of RPAS should follow the manufacturer's guidance and persons carrying out maintenance and repair should be appropriately trained and qualified.

Maintenance of the ground control equipment should similarly be carried out in accordance with the system manufacturer's guidelines.



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4.8 Accident/Incident Procedures

Accidents/Serious Incidents involving the operation of a RPAS are to be reported to the Air Accident Investigation Unit of the Department of Transport, Tourism and Sport and also to the Flight Operations Department of the IAA.

Incidents are to be reported to the Flight Operations Department of the IAA.

4.9 Radio Frequency Spectrum

The allocation of frequencies for any type of radiocommunication system in Ireland is the responsibility of the Commission for Communications Regulation (ComReg).

There are, however, a number of RPAS safety critical systems such as Command and Control for which no dedicated spectrum has as yet been identified. These systems rely on the use of ad-hoc frequency allocation by individual States.

It is recommended that, where an operator identifies a requirement for a dedicated frequency to protect the integrity of a RPAS, they should contact ComReg at the following address:

Commission for Communications Regulation
Block DEF
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1

Tel: 00353 1 804 9600
Fax: 00353 1 804 9680
Email: info@comreg.ie

RPAS operators who intend to use radiotelephony must ensure that they hold a Flight Radio Telephony Operators qualification valid for the privileges intended to be exercised.

4.10 Application Process

Application to operate a RPAS in Irish airspace can be made by submitting a Flight Operations Department Form FOD.F.305, available on the IAA website,



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accompanied by supporting documentation. The minimum timescale for submission is 30 days prior to the intended date of commencement of operations.

Applicants are strongly advised not to submit applications until they have obtained all relevant approvals and qualifications. Applications cannot be processed until the underlying approvals are in place.

Any enquiries, etc relating to the operation of RPAS should be made to the following e-mail address:

rpas.fod@iaa.ie

4.11 Aerial Works Manual

Prior to an Aerial Work Permission being issued, renewed or amended to allow the commercial operation of a RPAS to be carried out, the Operator shall have in place an Aerial Work Manual acceptable to the Irish Aviation Authority which shall, as a minimum, cover the requirements set out in this document.