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NEW REGULATIONS FOR UAS FLIGHTS

INFORMATIVE ARTICLE

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Abstract

The paper deals with the legislation in the field of unmanned aircraft systems (UAS) in the Slovak Republic. The main goal of the paper is to analyse the current legislative framework, which sets the basic rules and restrictions. The article's contribution is a description of the latest Implementing Regulation (EU) 2019/947. The solution to the issue consists of an analysis of the requirements for changes in current legislation based on people's experience from practice. The reason for the changes is to facilitate flying with UAS for all user groups, provided that safety is maintained, and risks are minimised. These new regulations are causing the most significant changes, especially for organisations that will perform aerial work with the UAS in the Specific category. These organisations need to transform their operations manuals and extend the aerial work system with a risk analysis.

Keywords

UAS, legislation, EASA, Slovak Republic, operation, implementing regulation

1. Introduction

The new European legislation has brought significant changes to UAS air traffic. On the one hand, it simplifies the possible commercial operation of "hobby pilots". On the other hand, it requires a marked change in previously approved aviation organisations' procedures through the UAS.

This article provides an overview of the new European legislation that is coming into force across the EU Member States. The first part is devoted to Decision No. 2/2019 issued by the Transport Authority of the Slovak Republic. It describes the common rules of category A3 and category B. It is followed by an explanation of the latest EC implementing regulations. These Regulations are described in terms of novelty.

1.1. Literature review

Following documents, Decision No 2/2019; Commission Implementing Regulation (EU) 2019/947) and Commission Implementing Regulation (EU) 2019/945) are an essential part of the studied material. In addition, the following articles were studied, which dealt with UAS concerning their various uses within the applicable regulations.

UAS regulations review by Pecho et al. was done during scrutiny of technology in the process of UAV missions. Ažaltovič et al. (2020) calculated the ground casualty risk during aerial work of Unmanned Aerial Vehicles in the urban areas. Regulations for UAS operations were considered in the flight inspection scope with unmanned aircraft (Novák et al., 2020). Unmanned Aircraft Vehicle Flight Precision was measured by Sedláčková, A.N. et al. (2020).

2. Decision No 2/2019

The Transport Authority, as a state administration body competent pursuant to § 7 par. 2 of Act No 143/1998 on Civil Aviation (Aviation Act) and on Amendments to Certain Acts, as amended later regulations, in conjunction with Art. 1 par. 4 of Commission Implementing Regulation (EU) No Regulation (EU) No 923/2012 of 26 September 2012 laying down common rules of the air and operating provisions for air traffic services and procedures and amending Implementing Regulation (EU) No 216/2008 1035/2011 and Regulation (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010, as amended, taking into account Annex IX of Regulation (EU) 2018/1139 of the European Parliament and of the Council from 4 July 2018 on common rules in the field of civil aviation, establishing a European Union Aviation Safety Agency and amending Regulation (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council and repealing Regulations (EC) No 552/2004 and (ES) No 216/2008 and Council Regulation (EC) No 3922/912 and respecting other special regulations, determines in agreement with the Ministry of Defence of the Slovak Republic the conditions of the flight of unmanned aircraft in the airspace of the Slovak Republic.

For the purposes of this Decision, the following definitions shall apply:

(a) autonomous aircraft means an unmanned aircraft equipped with an independent control system that does not allow human intervention in the aircraft's control during flight.

(b) remotely piloted aircraft (unmanned pilot-operated aircraft) from a control station not located onboard the aircraft.

(c) model aircraft means an aircraft model according to a special regulation with or without an engine, which is not equipped with a device enabling automatic flight to a designated place, is controlled by a pilot at a distance throughout the flight by a control station and with which the pilot maintains direct visual contact.

Unmanned aircraft system (UAS) flight means any unmanned aerial vehicle operation from start-up, take-off to landing. Automatic flight means a method of conducting a flight by an unmanned aircraft, during which the unmanned aircraft independently performs predetermined turns or flight tasks, the remote pilot being able to intervene in the control of the unmanned aircraft at any time.

2.1. UAS categories

- Class C0 UAS, a remotely piloted aircraft or an aircraft model with a maximum take-off mass not exceeding 250 g,
- Class C1 UAS, a remotely piloted aircraft or an aircraft model with a maximum take-off mass, which is greater than 250 g and does not exceed 900 g,
- Class C2 UAS, a remotely piloted aircraft or an aircraft model with a maximum take-off mass, which is greater than 900 g and does not exceed 4 kg,
- Class C3 UAS a remotely piloted aircraft with a maximum take-off mass, which is greater than 4 kg and does not exceed 25 kg and has a typical size of less than 3 m,
- Class C4 UAS, an aircraft model with a maximum take-off mass, which is greater than 4 kg and does not exceed 25 kg,

2.2. General conditions for UAS flight

ACCORDING TO A SPECIAL REGULATION, an UAS flight may be performed if the basic requirements comply with the following rules.

A pilot must not fly an UAS if he/she is under the influence of a psychoactive substance. Flight by an UAS may be performed in uncontrolled airspace of class G at a maximum height of 120 m (400 ft) above the highest obstacle within a radius of 30 m (0.016 NM) from UAS; this does not apply in the case of a flight within an Aerodrome Traffic Zone (ATZ) in coordination with the aerodrome's operator. An UAS must not be equipped with a pulsating or rocket engine; this does not apply if the rocket engine is used for take-off. The flight by an UAS shall be performed so that the safety of other aircraft, persons and property on the ground is not endangered and that the protection of the environment against noise and emissions from pollutants is ensured. The prohibition of endangering other aircraft does not apply to each other between remotely piloted aircraft models subject to the participating UAS pilots' prior agreement and adopting appropriate safety measures. The UAS pilot must observe the surroundings, obstacles, and air traffic and avoid them. If an emergency occurs during a flight, the UAS pilot must immediately safely terminate the flight. An UAS may not be used to perform commercial air transport. An unmanned aircraft shall not be used to spray chemicals or for dropping objects; this does not apply in the case of aerial work, which may be performed only based on a permit from the Transport Authority issued in accordance with a special regulation.

An UAS pilot is obliged to thoroughly acquaint himself/herself with actual conditions in accordance with:

(a) the meteorological situation at the place of flight,

(b) use of airspace at the time and place of the flight,

(c) the operating conditions of the UAS,

(d) the manufacturer's instructions for the safe operation of the UAS,

(e) the UAS airworthiness and performance limitations,

(f) the flight procedures and emergency procedures specified by the manufacturer.

It is prohibited to operate an UAS at night unless otherwise provided. A flight may not be conducted within specified horizontal boundaries, and vertical boundaries of restricted airspace activated restricted airspace, temporarily segregated airspace, and temporarily reserved airspace. Unmanned Aerial Vehicles Classes C0 to C4 and UAS with a maximum take-off mass 25 kg or more shall be equipped with a back-up radio communication and control system which, in the event of loss of signal or failure, shall make a safe forced landing or shut down the engine and set rudders to a predefined position.

2.3. Operation subcategory A3

UAS 'open' operations category is divided into three subcategories A1, A2 and A3, based on operational limitations, requirements for the remote pilot and technical requirements for UAS. For the purposes of this study, the A3 category is analysed. The UAS flight may be conducted:

(a) at a minimum distance of 50 m (0.027 NM) from third persons in such a way, they are not endangered by the operation (considering the propulsion and performance of the UAV).

(b) in meteorological conditions for flight in visibility, unless otherwise specified,

(c) maintaining direct visual contact with the UAS,

(d) at a horizontal distance not more than 1 000 m (0.54 NM) from the pilot at a distance,

(e) in an aerodrome control zone (CTR) without coordination with the appropriate air traffic control unit at a minimum distance 5.6 km (3 NM) from the aerodrome reference point (ARP) and up to a height not more than 30 m above ground level (AGL),

(f) in such a way that densely populated areas of cities, municipalities, zones or urban concentrations, gatherings of people in the open air, buildings, airport protection zones, protection zones of

aeronautical ground facilities or protected areas are not flown,

(g) provided that the pilot with an UAS (with a maximum take-off mass 20 kg or more) has insurance for the damage caused by the operation to third parties.

2.4. Operation category B

An UAS flight under the conditions of operation category B may be performed in accordance with the general flight conditions referred in 2.2. and:

(a) with the approval of the Transport Authority and the conditions specified for the operation of the UAS, unless otherwise provided at night; if the drone is equipped with adequate lighting; in controlled airspace, if the drone flight is coordinated with the air traffic control unit; at a distance less than 50 m from third persons; and fly UAS with a maximum take-off mass of more than 25 kg.

(b) provided that the operator of the UAS concludes and fulfils a contract of liability insurance for the damage caused by the UAS operation; keep a logbook or a document replacing it; holds a license to fly an unmanned aerial vehicle and a certificate of UAS registration.

(c) apply for flight permission 30 days before the estimated date of the flight. Attached to the application is also a risk analysis, prepared according to the procedure published on the Transport Authority website, which contains particular requirements (Transport authority, 2019).

3. Regulation (EU) 2019/947

Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft is a new regulation which Slovak Republic adopted from 1 January 2021 having regard to Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and the Council, and repealing Regulations (EC) No 216/2008 and (EC) No 552/2004 of the European Parliament.

3.1. Categories of UAS operations

UAS operations shall be performed in the 'open', 'specific' or 'certified' category defined as follows:

(a) UAS operations in the 'open' category shall not be subject to any prior operational authorisation, nor to an operational declaration by the UAS operator before the operation takes place;

(b) UAS operations in the 'specific' category shall require an operational authorisation issued by the competent authority or an authorisation received in accordance with conditions to be made by a UAS pilot;

(c) UAS operations in the 'certified' category shall require the certification of the UAS according to Delegated Regulation (EU) 2019/945 and the certification of the operator and, where applicable, the licensing of the remote pilot.

3.1.1. 'Open' category of UAS operations

Operations shall be classified as UAS operations in the 'open' category only where the following requirements are met:

(a) the UAS belongs to one of the classes set out in Delegated Regulation (EU) 2019/945 or is privately built or meets the conditions defined in Article 20;

(b) the unmanned aircraft has a maximum take-off mass of less than 25 kg;

(c) the remote pilot ensures that the unmanned aircraft are kept at a safe distance from people and that it is not flown over assemblies of people;

(d) the remote pilot keeps the unmanned aircraft in VLOS at all times except when flying in follow-me mode or when using an unmanned aircraft observer as specified;

(e) during flight, the unmanned aircraft is maintained within 120 metres from the closest point of the surface of the earth, except when overflying an obstacle, as specified;

(f) during flight, the unmanned aircraft does not carry dangerous goods and does not drop any material.

3.1.2. 'Specific' category of UAS operations

The competent authority shall specify whether the operational authorisation concerns:

(a) the approval of a single operation or more operations specified in time or location(s) or both. The operational authorisation shall include the precise associated list of mitigating measures;

(b) the approval of a 'light UAS operator certificate' (LUC), in accordance with part C of the Annex.

The UAS operator submits a declaration to the competent authority of the Member State of registration according to point UAS.SPEC.020 laid down in Part B of the Annex for an operation complying with a standard scenario as defined. The UAS operator shall not be required to obtain an operational authorisation in accordance with regulation.

An operational authorisation or a declaration shall not be required for:

(a) UAS operators are holding a LUC with appropriate privileges in accordance with point UAS.LUC.060 of the Annex;

(b) operations conducted in the framework of model aircraft clubs and associations that have received authorisation.

3.1.3. 'Certified' category of UAS operations

Operations shall be classified as UAS operations in the 'certified' category only where the following requirements are met the UAS is certified according to points (a), (b) and (c) of paragraph 1 of Article 40 of Delegated Regulation (EU) 2019/945; and the operation is conducted in any of the following conditions:

(a) over assemblies of people;

(b) involves the transport of people;

(c) involves the carriage of dangerous goods that may result in high risk for third parties in case of an accident.

Besides, UAS operations shall be classified as UAS operations in the 'certified' category where the competent authority, based on the risk assessment, considers that the risk of the operation cannot be adequately mitigated without the certification of the UAS and of the UAS operator and, where applicable, without the licensing of the remote pilot (Commission Implementing Regulation (EU) 2019/947).

3.2. Operation open subcategory A3

UAS operations in subcategory A3 shall comply with all of the following conditions:

(a) be conducted in an area where the remote pilot reasonably expects that no uninvolved person will be endangered within the range where the unmanned aircraft is flown during the entire time of the UAS operation;

(b) be conducted at a safe horizontal distance of at least 150 metres from residential, commercial, industrial or recreational areas;

(c) be performed by a remote pilot who has completed an online training course and passed an online theoretical knowledge examination as defined;

(d) be performed with an unmanned aircraft that has an MTOM, including payload, of less than 25 kg, in the case of a privately built UAS, or is marked as class C2 and is operated with active and updated direct remote identification and geo-awareness systems or; is marked as class C3 and is operated with active and updated direct remote identification and geo-awareness systems; or is marked as class C4.

3.3. Operation specific category

The UAS operator shall provide the competent authority with an operational risk assessment for the intended operation in accordance with general rules or submit a declaration when pointing UAS.SPEC.020 is applicable unless the operator holds a LUC with the appropriate privileges. The UAS operator shall regularly evaluate the adequacy of the mitigation measures taken and update them where necessary.

he UAS operator may submit an operational declaration of compliance with a standard scenario concerning operations of unmanned aircraft with:

(a) maximum characteristic dimension up to 3 metres in VLOS over;

(b) maximum characteristic dimension up to 1 metre in VLOS except over assemblies of people;

(c) maximum characteristic dimension up to 1 metre in BVLOS over sparsely populated areas;

(d) maximum characteristic dimension up to 3 metres in BVLOS

(e) performed below 120 metres from the earth's surface and in uncontrolled airspace (class F or G), or controlled airspace after coordination and individual flight authorisation in accordance with published procedures for the area of operation.

A declaration of UAS operators shall contain administrative information about the UAS operator, stating that the operation satisfies the operational requirement. The UAS operator's commitment to comply with the relevant mitigation measures required for the operation's safety, including the associated instructions for the operation, for the design of the unmanned aircraft and the competency of involved personnel.

Confirmation by the UAS operator that an appropriate insurance cover will be in place for every flight made under the declaration if required by Union or national law. Upon receipt of the declaration, the competent authority shall verify that the declaration contains all the elements and shall provide the UAS operator with a confirmation of receipt and completeness without undue delay. After receiving the confirmation of receipt and completeness, the UAS operator is entitled to start the operation.

UAS operators shall notify, without any delay, the competent authority of any change to the information contained in the operational declaration that they submitted. UAS operators holding a LUC with appropriate privileges are not required to submit the declaration (Commission Implementing Regulation (EU) 2019/945).

4. Conclusions

These new regulations are causing the most significant changes, especially for organisations that will perform aerial work with the UAS in the Specific category. These organisations need to transform their operations manuals and extend the aerial work system with a risk analysis. The situation is more straightforward when operating in the 'open ' category.

From 31 December 2020 to 1 January 2023, it is possible to fly UAS without a class Identification label in the 'open' category under the following conditions:

- UAS with less than 500 g MTOM cannot fly over people, and National Aviation Authority determines pilot competency;

- drones with less than 2 kg MTOM can fly 50 metres or more (horizontally) from people, and the pilot must undergo training equivalent to subcategory A2 (see the FAQ section on training);
- drones with less than 25 kg MTOM can fly in areas free from people, 150 metres or more away from properties, and the pilot must undergo training equivalent to subcategory A3 (see the FAQ section on training).

After 1 January 2023, it is also possible to fly UAS without class identification labels, however, only under the following subcategories of operation, for which operator shall comply fully with:

- Subcategory A1 when the drone's maximum take-off weight (MTOM) is less than 250 g; or
- Subcategory A3 when the drone's maximum take-off weight is less than 25 kg.

On the other hand, the new regulation also makes it easier for ordinary pilots to create aerial photographs commercially using UAS in the open category.

Currently, in the Slovak Republic conditions, the biggest problem is the non-compliance of national legislation with the new European rules. The authority is currently working intensively on this harmonisation of regulations, and we can expect significant changes in national regulations in the near future.

Further research will focus on in-depth scrutiny of implementation regulations and analyse implementation options for different UAS operators.

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