



CRNA GORA
AGENCIJA ZA CIVILNO VAZDUHOPLOVSTVO

Template of RPAS Operations Manual



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Foreword

This template manual has been produced to aid remotely piloted aircraft system (RPAS) operators in developing their own operations manuals. The structure of this manual contains the basic items that normally would be important to consider and/or describe when conducting flight operations. The purpose of the contents of this manual is also to support an operator in order to be in compliance with any legal and applicable requirements in Montenegro.

The Template Manual serves as guidance and assistance in the preparation of operations manual and contains the necessary procedures and forms. It is recommended to be used in a constructive way, and never as a basis for any misuse or justification for setting lower standards.

THIS TEMPLATE MANUAL DOES NOT HAVE OBLIGATORY CHARACTER.



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Introduction

This chapter should contain basic information about the manual and its purpose. It should contain basic information about the operator, including but not limited to:

- Name and address of the operator/organization
- Areas where operations are conducted
- Types of operations, and
- Types and numbers of RPAS used.

Revision status and list of effective pages

This chapter should contain information about the amendment process and revision status of the manual.

The revision status may include a list of effective pages or similar information. Each page should also contain document identification markings, e.g. name of the document and its revision status.

Example:

Revision status

Edition	Revision number	Revision date	Revision info
First edition	00	DD.MM.YYYY.	Initial issue

List of effective page

Revision Number	Date	Page number
00	DD.MM.YYYY.	1
00	DD.MM.YYYY.	2

Definitions and abbreviations

Detail all definitions or abbreviations used throughout the document - there is no need to further expand any definition or abbreviation used in the document.

Example:

Definitions

1. **Unmanned aircraft** is aircraft intended for flights without pilot in the aircraft, which is remotely controlled or programmed and autonomous;
2. **Flight within the visual line of sight** is an unmanned aircraft system, where the person operating the unmanned aircraft system is in constant visual contact with the unmanned aircraft without using optical or electronic aids, with the exemption of contact lenses or corrective glasses;
3. **Flight operations** are operations of unmanned aircraft system, irrelevant whether they are conducted for remuneration or not, where the unmanned aircraft is used for air services (i.e. air filming, aerial advertising, air oversight, fire protection, initiation of avalanches, scientific-investigation flights, flights for media needs, special events, air shows, competition flights, etc.);
4. **Pilot of unmanned aircraft system** is a person operating the unmanned aircraft system, considered to be the pilot-in-command (hereinafter referred to as the “pilot”);
5. **Operational mass of unmanned aircraft** is total mass of unmanned aircraft at the moment of take-off;
6. **Operator of unmanned aircraft system** is natural person or legal entity, or state authority which performs flight operations with unmanned aircraft;

...

...

Abbreviations

1. CAA – Civil Aviation Agency
2. UAS – Unmanned Aircraft System
3. GNSS – Global Navigation Satellite System

...

...

1 Duties and responsibilities of personnel included in operator activities

This chapter should contain information about the operator's/organization's personnel and the person in charge/nominated persons (if applicable).

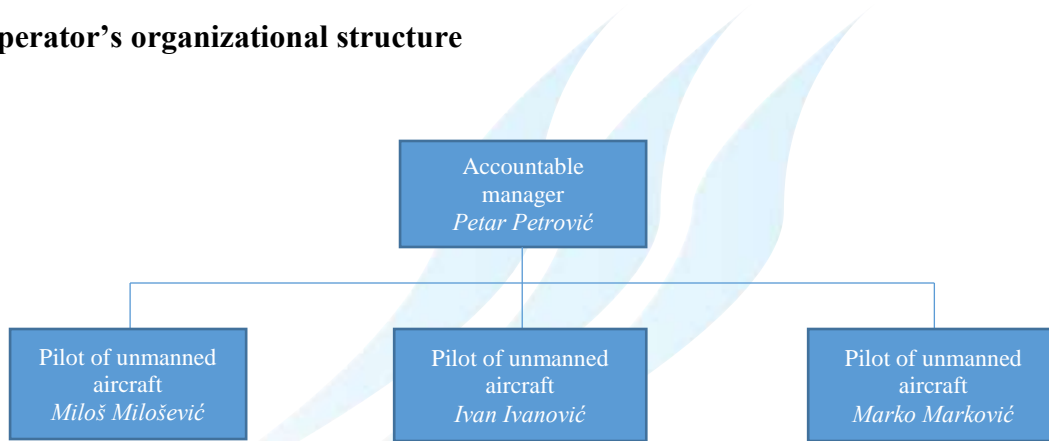
The duties and responsibilities of the key personnel should be described, with special emphasis on duties which are significant in terms of operational safety.

For large operators an organization chart may be used.

Scalable as appropriate, e.g. Accountable Manager, Operations Manager, Technical Manager, Chief Pilot, Other Pilots. These are not official posts in the sense of an organization applying for an Air Operator Certificate and the same person may be in charge for multiple functions and cover the relevant working positions. Each function must however be covered in brief and any internal audit/quality function must be fulfilled by a separate person, e.g. camera operator.

Example:

1.1 Operator's organizational structure



Position	Name and Surname	Telephone	E-mail	Fax
Accountable manager				
Pilot of unmanned aircraft				
Pilot of unmanned aircraft				
Pilot of unmanned aircraft				

*(provide details for all pilots of unmanned aircraft)

1.2 Accountable manager

Accountable manager is responsible:

- a) for conducting activities in accordance with provisions of operations manual;
- b) for establishing system for reporting occurrences significant for air traffic safety pursuant to regulation defining the manner of reporting such occurrences;
- c) for establishing system of maintaining and keeping flight records;
- d) for evaluating needs for conducting risk management activities and, if necessary, conduct those activities before the category C or D flight operations (specify what is applicable);
- e) for ensuring continuous compliance of operations manual with applicable regulations and provisions of flight manual or user manual (specify what is applicable);
- f) for making the operations manual available of personnel;
- g) for introducing all personnel with parts of operations manual related to their obligations.

1.3 Pilot of unmanned aircraft system

Pilot of unmanned aircraft system shall:

- a) be at least 18 years old;
- b) ensure that the flight of unmanned aircraft is performed during the day;
- c) verify serviceability of unmanned aircraft system before the flight;
- d) gather all the necessary information for planned flight and verify that meteorological and other conditions in flight area provide safe flight;
- e) ensure that all equipment or cargo on unmanned aircraft is promptly attached so it will not fall;
- f) ensure that unmanned aircraft safely clears of all obstacles on take-off and landing;
- g) ensure safe distance between unmanned aircraft and people, animals, facilities, vehicles, vessels, other aircraft, roads, railroads, water routes or high-voltage cables, of at least 30 metres during the flight;
- h) ensure that minimum distance between unmanned aircraft and gathered people is 150 metres;
- i) ensure that the flight of unmanned aircraft is within visual range of pilot and at the distance of at most 500 metres from the pilot;
- j) ensure that the flight of unmanned aircraft is conducted outside of controlled air space;
- k) ensure that the flight of unmanned aircraft is at the height of at most 150 metres above the ground level or sea level;
- l) ensure that during the flight no objects are thrown from unmanned aircraft;
- m) operate unmanned aircraft system in accordance with applicable regulations and provisions of flight manual or user manual;
- n) when conducting flight operations, the pilot shall have on-site the following documents:
 - flight manual or user manual for unmanned aircraft system;
 - original or certified copy of the approval for flight operations, in case the pilot conducts category D flight operations;
 - insurance contract, if stipulated;
 - operations manual;
 - evidence on competence for operating the system;

- pilot licence or statement on passed theory exam on knowledge of air regulations conducted by the Agency;
- evidence on medical fitness for operating unmanned aircraft system.

1.4 Person responsible for maintenance and continuing airworthiness (if applicable)

Person responsible for maintenance and continuing airworthiness is responsible:

- a) for creating a system of maintenance and continuing airworthiness of an unmanned aircraft system (the extent to which it is applicable to unmanned aircraft systems), and/or just an unmanned aircraft system maintenance, and/or determining the persons eligible for maintenance.



2 Flight operations

2.1 Areas of operation

Brief description of geographic scope and expected distance from people and structures, etc. Likely operating areas e.g. building sites, open countryside, roads etc.

2.2 Type of operation

Include details of the operations e.g. Visual Line of Sight (VLOS), day/night, weather, etc.

2.3 Flight team composition

Make up of the flight team depending on type of operation, complexity, type of aircraft, etc.

2.4 Operation of multiple types of UA

Any limitations considered appropriate to the numbers and types of unmanned aircraft that a pilot may operate if appropriate.

2.5 Qualifications requirements

Details of any qualifications, experience or training necessary for the pilot or support crew for the types of unmanned aircraft and the roles employed by the operator.

2.6 Operating site planning and assessment

Airspace operating environment considerations and procedures (e.g. Controlled Airspace), operations near other aircraft operations (local aerodromes or operating sites), operations near industrial sites or such activities as gas venting, high-intensity radio transmissions etc., obstructions (wires, masts, buildings etc.), extraordinary restrictions such as segregated airspace around prisons, habitation and recreational activities, public access, permission from landowner, likely operating site and alternative sites, weather considerations, etc.

2.7 Communications

Awareness and links with other users, aircraft operators and air traffic service providers.

2.8 Weather

This chapter should contain procedures and information on how to analyse weather information and its effects on the planned operations.

It should contain practical information on where information on current and forecasted weather can be found and how it should be interpreted. A key component should be the practical weather limits which indicate that the operations should be cancelled or delayed.

3 Standard operating procedures and emergency procedures

This chapter should contain practical instructions on how normal operations (pre-flight, take-off, in-flight, landing and post-flight checks/procedures) are planned and conducted. It should contain examples of different operational scenarios and how they are performed in practice.

This chapter also should contain procedures and instructions for emergency situations. It may contain emergency checklists or guidance for abnormal situations. Emergency procedures should include lost link, flyaway, fire (air vehicle and ground station), etc. Preventive measures must also be detailed.

Examples

Operation	Air filming
Class of flight operations area	I, II, III, IV
Category of flight operations	A, B, C
Specific necessary skills of pilot	Operator's training for operating type ABC123 ...
Specific necessary skills of other personnel involved in operations	Operator's familiarization with operation ...
Unmanned aircraft system type	ABC123
Standard equipment necessary for operation	8 motors Dual controller ...
Specific and additional equipment necessary for operation	Camera type DEF456 Parachute ...
Necessary competence of pilot	Evidence on competence for operating unmanned aircraft system ...
Necessary experience of pilot	20 hours operating system Knowledge of computer applications for configuration of unmanned aircraft system ...
Composition of the team for performing operations	Pilot + 2 support staff

Normal flight procedures	Pre-flight <ul style="list-style-type: none"> › Check location where operations are performed › Check meteorological conditions › Check aeronautical information › Coordination with air traffic control (if applicable) › Ensuring place for take-off and landing › Technical check of the system › ...
	Take-off <ul style="list-style-type: none"> › Observation of take-off place › Monitoring airspace where operations take place › Take-off power settings › Take-off › ...
	In flight <ul style="list-style-type: none"> › Power settings for flight › Use of flight command › Maintaining an effective review and keeping the aircraft within Visual Line of Sight (VLOS) at all times. › Flight data monitoring › Coordination with other personnel involved in operations › Monitoring airspace where operations take place › Observation of the area on the ground over which operations take place › Use of the filming equipment › ...
	Landing <ul style="list-style-type: none"> › Power settings for landing › Use of flight command › Flight data monitoring › Coordination with other personnel involved in operations › Monitoring airspace where operations take place › Observation of the area on the ground over which operations take place › Landing <u>(if the operator does not act in the manner specified he/she should describe the way in which he/she acts)</u>
	Post flight <ul style="list-style-type: none"> › Shutting down/making-safe the aircraft › Technical system check (operator should specify procedures that includes the technical system checks) ... <u>(if the operator does not act in the manner specified he/she should describe the way in which he/she acts)</u>

Records	<ul style="list-style-type: none"> › Pilot records the data requested in the form set out in Appendix 1 (Form checklist) › Pilot stores the records (in the cabinet office, computer ...)
Emergency procedures	<p>The procedure for engine failure or damage to the propeller on take-off and landing</p> <ul style="list-style-type: none"> › Maintain unmanned aircraft in balance and as soon as possible land an unmanned aircraft › Stop with the execution of rescheduling the mission (if applicable) › In case of an uncontrolled flight/fall activate parachute and stop the engine (disarm) › ... <p>The procedure for engine failure in flight</p> <ul style="list-style-type: none"> › Maintain unmanned aircraft in balance and as soon as possible land an unmanned aircraft › Stop with the execution of rescheduling the mission (if applicable) › In case of an uncontrolled flight/fall activate parachute and stop the engine (disarm) › ... <p>The procedure for the cancellation of radio communication</p> <ul style="list-style-type: none"> › Try to re-establish a connection with the moving of management place › ... <p>The procedure for the loss of visual contact with the aircraft</p> <ul style="list-style-type: none"> › Use the RTH (Return to Home) and as soon as possible to resume management › ... <p>The procedure for the sudden change in weather conditions</p> <ul style="list-style-type: none"> › Land as soon as possible › ... <p>Procedure for loss of control due to the moving center of gravity (the operator should describe the way in which treated)</p> <p>Procedure for loss of control due to loss of orientation (operator should describe the way the act)</p> <p>...</p>

4 Maintenance of unmanned aircraft system

This chapter should contain procedures and instructions on the airworthiness of the aircraft and any other equipment which have or may have an effect on the safety of operations.

This information should contain but is not limited to:

- Instructions for pre-flight inspection (before every operation)
- Periodic inspections (e.g. daily, weekly, monthly...)
- Inspections after abnormal situations, and
- Guidance for assessing when the system or part should be maintained or with-drawn from service.

The instructions and intervals should always respect the manufactures instructions and limits.

Maintenance of unmanned aircraft system is divided as follows:

- a) Maintenance of operating programs
 - replacement of engine software controller (ESC)
 - replacement of flight controller software
 - replacement software at receiver
 - replacement software at the control station
- b) Maintenance of mechanical assemblies
 - replacement engine (maximum power, acceptable propellers, the impact on the PID settings ...)
 - replacement power unit (if applicable)
 - test compounds, acceptance, mechanical tension compounds ...
 - replacement and maintenance of propellers (balancing, damage ...)
- c) Parachute (the condition of parachute, device to activate the parachute, batteries to activate the parachute ...)
- d) Maintenance of batteries - (handling batteries, storage batteries, the criteria for assessing the state of the battery (internal resistance, bloating, visible damage ...))
- e) Undercarriage of unmanned aircraft.

Operator (*name of operator*) will make any change to the system of unmanned aircraft that has an impact on the work of unmanned aircraft important functions / system and carry out an analysis of failures and their impact on the form set out in Appendix 3 of this Manual.

Maintenance of unmanned aircraft has to be defined in the unmanned aircraft maintenance program , which can be developed as a separate document or may be integral part of the Operations Manual.

Unmanned aircraft maintenance program must include a minimum:

- Statement of the unmanned aircraft system operator that an unmanned aircraft system will be held in accordance with the program, which is aligned with the manufacturer's recommendations and requirements CAA, meet the applicable requirements for its maintenance and continuing airworthiness;
- List of documentation and regulations according to which the program is developed;
- Name / title / address / contact operator, model name, serial number, identifier systems unmanned aircraft to which the program applies;
- Unmanned aircraft system configuration (built-in components and their characteristics, specifications, mass ...), number of installed components, together with the specified reference application for the existence of that equipment, its number and type (eg. Dual power supply or self-supply - application of the Regulation on conditions for operating unmanned aircraft systems and model aircraft (Application CAA));
- Planned maintenance schedule:
 - Pre-flight review
 - After-flight review
 - Routine checks (e.g. 5 hrs, 10 hrs, 25 hrs ... or daily, weekly, monthly, annual .. or 10 cycles / 20 cycles / 50 cycles ... or daily / 5hrs, weekly / 10hrs, monthly / 25hrs, annual / 50hrs ... or daily / 5hrs / 10 cycles, weekly / 10hrs / 25cycles, monthly / 25hrs / 50cycles, annual / 50hrs / 100 cycles)
 - Special checks (e.g. Checks related to the installed equipment and / or implemented modifications)
 - Extraordinary reviews (e.g. overload, damage, detected interference in the management ...)
- Elaborated the list of all views unmanned aircraft system, together with clearly defined intervals, scope and manner of execution of the examination, as well as acceptable values of the measured / measurable parameters.
- Clearly defined obligation to document the checks carried out, how and where (paper) will be performed to document reviews.
- Clearly defined policy towards the operator software, which will be used in the management system of unmanned aircraft, as well as the mode / selection criteria / installation / testing software.
- Status list system components unmanned aircraft with a limited life and / or defined intervals review of embedded components, together with the above mentioned requirements for installation (the existence of) the components, name and code parts (part number) and serial number (serial number) components (if applicable).
- Clearly defined intervals and criteria for calibration / calibration of individual devices / systems and acceptable ways, to be sizing / calibration performed (e.g. Calibration magnetometer on the aircraft, calibration UNIMER used to measure the value ...).
- Deviations from the manufacturer's recommendations (if applicable).
- The person / organization responsible (acceptable, given) to maintain a system of unmanned aircraft.

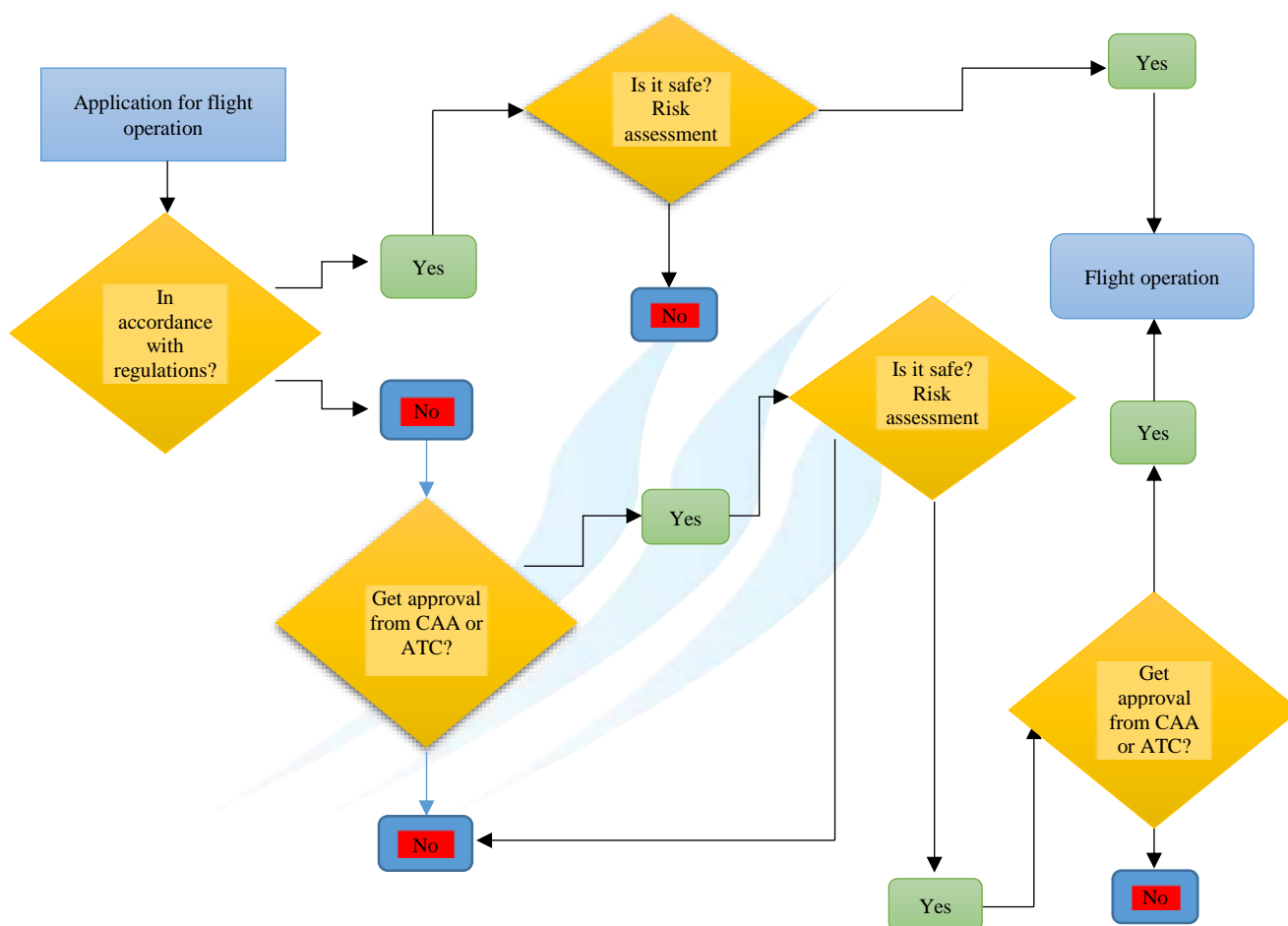
- Standard and method of maintenance i.e. the execution of repairs of unmanned aircraft systems
- In the absence of standards / criteria by the manufacturer of unmanned aircraft systems / equipment / components or the relevant aeronautical authorities, for its maintenance / repair / inspection / calibration / lifetime ..., the operator must provide / define the way in which it plans to do / spend.

Notes:

- The operations manual must clearly define how the operator, and in accordance with what, maintains a system of unmanned aircraft, i.e. how to create a system of maintenance and continuing airworthiness of its unmanned aircraft systems (to the extent, which is applicable to systems of unmanned aircraft) and define the person responsible for continuing airworthiness.
- Every system of unmanned aircraft must have a clearly defined system configuration of unmanned aircraft, which is proposed by the operator and which can be used (if applicable to the operators of unmanned aircraft system) - all components of these configurations must be listed in the Program.
- In the case that the operator wants to have a universal maintenance program for multiple systems of unmanned aircraft, it should be clearly specified in the Operations Manual and Program maintenance, and further in the Program maintenance of unmanned aircraft must be clearly defined / separated unmanned aircraft systems and above any differences in examinations.
- In the case there are multiple criteria which define / determine single review, it must be clearly stated that the review will be carried out / performed according to the first criteria which expires.

5 Flight operations limitations

Flowchart describes the process that determines whether the planned flight operations can be conducted. Upon submission of the request for flight operations (recording, photography ...) by the client the checklist set out in Appendix 1 of this Manual should be filled, and the risks and measures for mitigation and removal set out in Appendix 2 of this Manual shall be determined.



1. In accordance with regulation

Operator (*name of operator*) must establish the following:

- Category of flight operations;
- Flight during the day;
- Minimum distance between unmanned aircraft and people, animals, facilities, vehicles, vessels, other aircraft, roads, railroads, water routes or high-voltage cables, of 30 meters during the flight;
- flight is conducted outside of controlled air space;
- ...

2. Is it safe? Risk assessment

In order to get an estimate of whether the flight can be done in a way that does not pose a danger to life, health or property of people due to shock or loss of control of an unmanned aircraft system and does not threaten public order it is necessary to carry out the following:

- Collect the necessary aeronautical information for the area of flight operations;
- Weather conditions for the planned flight;
- Check the NOTAM;
- The likelihood that people move through the area in which the flight operations will be performed;
- Appropriate place for flight operations;
- Obstacles;
- Will the location be convenient for the operator of unmanned aircraft who maintains aircraft within the visual line of sight?
- The approval of the owner of the terrain;
- Check local limit (embassies, national parks...);
- ...

Carry out a risk assessment in the table in Appendix 2 of this Manual.

3. Get approval from CAA or ATC

Check that flight carried:

- within controlled airspace (Class G airspace)
 - if it is not performed within the uncontrolled airspace, the special use of the controlled airspace shall be requested from the ATC
- at distance less than 30 meters away from people, animals, buildings, vehicles, vessels
 - if the flight is conducted at distance less than 30 m from people, animals, buildings, vehicles, vessels the approval shall be obtained by the CAA
- at a distance of not less than 150 meters from a group of people
 - if the flight is conducted at distance less than 150 m from the group of people, the approval shall be obtained by the CAA
- ...

4. Is it safe?

See item 2.

5. Get approval from CAA or ATC?

See item 3.

6. Flight operations

After the hazard identification, risk assessment and if necessary established measures to reduce the risk to an acceptable level, unmanned aircraft system operator can start performing flight operations.

6 Reporting

Operator (*name of operator*) will provide report to the CAA (via address, phone number, e-mail) and the National commission for investigation of accident and serious incidents of aircraft, extraordinary events endangering safety of railroad traffic and maritime incidents and accidents (via address, phone number, e-mail) on all events associated with the safety that represent actual or potential hazard to aircraft, life, health or property of people in the field of performing flight operations, and at least on the following:

1. Unauthorized entry into controlled airspace,
2. Complete loss of control of unmanned aircraft and unmanned aircraft declining,
3. Collision of unmanned aircraft with people, obstacles, vehicles and other unmanned aircraft or other objects,
4. Dangerous approach to aircraft with crew, the people and objects at a distance of less than prescribed, and
5. Other hazardous situations that could cause any safety related event/occurrence.

Operator (*name of operator*) after learning of the event, must, within 72 hours, provide a report on the event in the form contained in Appendix 4 of this Manual.

7 Safety risk management

The risk is defined as: assessed predicted likelihood and severity of the consequence(s) or outcome(s) of a hazard.

Operator shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability) and control (in terms of mitigation) of risk to an acceptable level.

Operator shall also define those levels of management with authority to make decisions regarding safety risk tolerability.

Risk Assessment involves taking into account the probability and severity of any adverse consequences resulting from an identified hazard.

Example:

- a) Operator (*name of operator*) uses the following risk assessment method:

Risk severity	Risk probability				
	Extremely improbable (1)	Improbable (2)	Remote (3)	Occasional (4)	Frequent (5)
Negligible (E)	1E	2E	3E	4E	5E
Minor (D)	1D	2D	3D	4D	5D
Major (C)	1C	2C	3C	4C	5C
Hazardous (B)	1B	2B	3B	4B	5B
Catastrophic (A)	1A	2A	3A	4A	5A

Table 1

Legend:

	ACCEPTABLE RISK
	TOLERABLE RISK – Acceptable based on risk assessment and mitigation (if necessary). Required approval of the Accountable Manager
	UNACCEPTABLE RISK – Unacceptable under existing circumstances

The risk probability is classified as follows:

RISK PROBABILITY	VALUE
Extremely improbable	1
Improbable	2
Remote	3
Occasional	4
Frequent	5

Table 2

b) Risk severity effects is classified with regard to the possible consequence if a dangerous situation is achieved, according to the following:

Risk Severity	Value	Description
Catastrophic	A	Fatal accidents and the destruction of unmanned aircraft and/or property
Hazardous	B	The accident with serious injuries and extensive damage to autonomous aircraft and/or property
Major	C	An accident with injuries and/or damage to the unmanned aircraft and/or property
Minor	D	An accident with minor injuries and/or damage to the small unmanned aircraft and/or property
Negligible	E	An accident without injury and/or damage to the unmanned aircraft and/or property

Table 3

The risks classified as high risks (unacceptable) must be reduced to an acceptable level by implementing appropriate risk measures. The aim is to reduce the risk to develop or find methods to reduce exposure to a minimum. Risk reduction strategies include risk avoiding, optimizing or reducing the impact of risk.

8 Competence of pilot

For each new unmanned aircraft pilot, operator (*name of operator*) will provide a theoretical and practical knowledge check in the following manner:

1. Theoretical check:

- Description of the components of unmanned aircraft;
- Operating the unmanned aircraft system;
- Detailed explanation for use of frequencies;
- Check the applicable aviation regulations;
- Maintaining an unmanned aircraft;
- Development of risk assessment;
- ...

2. Practical check:

- Take-off;
- Performing exercise;
- Landing;
- Pre-flight and post-flight checks;
- ...

During flight operations, operator (*name of operator*) will use only those unmanned aircraft pilots who successfully pass the theoretical and practical check.

9 Types of records and deadlines for record keeping

Operator should establish a system of record-keeping that allows adequate storage and reliable traceability of all activities developed, covering at least:

- a) operator's organization;
- b) personnel training and competence verification;
- c) documentation of all management system key processes;
- d) maintenance records; and
- e) security management records.

Documentation shall be kept in paper (hard copy) and electronic form (the operator must define how to keep records). The documentation kept in paper (hard copy) form must be adequately protected from loss, unauthorized use, damage, alteration and theft. The records are kept in a special registry.

Users patterns are responsible for the protection, proper handling and storage prior to submission of such records to the responsible person.

For records that are kept in electronic form, one safety system records (backup) the data automatically to an external disk every 24 hours .

All records are kept for the period of two years from the date of creation of the document.

List:

APPENDIX	DESCRIPTION
1	Checklist form
2	Record of risk assessment
3	Occurrence report
4	Failure analysis
5	...

Appendix 1 – Checklist Form

Operator:				Date of flight:	14.09.2015.	
Type of unmanned aircraft:				Operational mass of unmanned aircraft:		
Time of flight operations						
Start:		End:		Total:		
18:00		18:30		00:30		
Task:	<i>Concert recording</i>	Location:	<i>Trg Slobode</i>	Categories of flight operations:	<i>D</i>	
Sketch of areas (if necessary)		Check:				
		Maps of area			√	
		Meteorological conditions			√	
		NOTAMs			√	
		Obstacles			√	
		Approval of the owners of the field			√	
		Flight within the visual line of sight			√	
		Does the flight is conducted within controlled airspace?			Yes	
		...				
Name and surname of pilot of unmanned aircraft		<i>Marko Marković</i>		Signature:		
<p>Remarks:</p> <p>Example:</p> <ol style="list-style-type: none"> 1. CAA's approval because the flight is over a group of people 2. ATC's approval because the flight is conducted within contolled airspace 3. ... 						

Appendix 2 – Record of risk assessment

1	Activity / operation / proces	<i>Experience of pilot of unmanned aircraft</i>						
	Risk	<i>Uncontrolled flight of unmanned aircraft</i>						
	Unsafe occurrence / end of consequences	Risk assessment with existing safety measures			Measures to reduce risk	Risk assessment after measures to reduce risk		
		Risk probability	Risk severity	Risk assessment		Risk probability	Risk severity	Risk assessment
Inadequate training and psychophysical ability of the operator / uncontrolled flight of unmanned aircraft	2 Negligible	B Hazardous	2B	Unmanned aircraft operator has extensive experience in the management of unmanned aircraft systems. The operator will declare in writing to the operator's psychophysical ability and system management skills..	1 Extremely improbable	B Hazardous	1B	

RISK ASSESSMENT SPECIFICATION

Risk severity	Risk probability				
	Extremely improbable (1)	Improbable (2)	Remote (3)	Occasional (4)	Frequent (5)
Negligible (E)	1E	2E	3E	4E	5E
Minor (D)	1D	2D	3D	4D	5D
Major (C)	1C	2C	3C	4C	5C
Hazardous (B)	1B	2B	3B	4B	5B
Catastrophic (A)	1A	2A	3A	4A	5A

Table 1

Legend:

	ACCEPTABLE REGION
	TOLERABLE REGION – Acceptable based on risk assessment and mitigation (if necessary). Required approval of the Accountable Manager
	UNACCEPTABLE REGION – Unacceptable under existing circumstances

Appendix 3 - Failure Mode and Effect Analysis (FMEA) of unmanned aircraft system

Failure Mode and Effect Analysis (FMEA) of unmanned aircraft system for risk category C and D flight operations					
Unmanned aircraft system configuration					
Identification mark:		Flight operation category:			
Manufacturer and model:		Aircraft type:			
Operator:		Address of the operator:			
Date and revision:		Operational mass:		kg	
Unmanned aircraft system components					
Battery	Manufacturer: Model:	Number of units: Battery voltage (S): Discharging current (C): Capacity:	Additional batteries: Battery voltage (S): Discharging current (C): Capacity:	Additional batteries: Battery voltage (S): Discharging current (C): Capacity:	
Receiver	Manufacturer: Model:	Number of units: Channel number: Frequency:	System Protocol Telemetry	Firmware:	
Air traffic controller	Manufacturer: Model:	Number of units: GNSS: Barometer:	Magnetometer: Ultrasound: Opt. sensor:	Voltage/Power sensor: OSD: Firmware:	
Engine	Manufacturer: Model: Mark:	Number of engines: KV: Power: When S is: Prop: Max power:	Propeller:	Manufacturer: Model:	Dimensions: Type:
Engine controller	Manufacturer: Model:	Maximum continuous current: Firmware: Ver.:	Propeller: (additional)	Manufacturer: Model:	Dimensions: Type:
Parachute	Manufacturer: Model: Mark: Type:	Number of units: Max. power: Automatic activation: Manual activation:	Safety valve	Manufacturer: Model:	Notes:
Failure Modes and Effects Analysis					
No.	Function/system	Failure description	Consequence	Prevention of consequences	
1	Voltage				
2	Signal receipt				
3	Artificial stabilisation and				

	flight management			
4	Propulsion system			
5	GNSS positioning			
6	Magnetic field sensor (magnetometer)			
<p>The applicant confirms that:</p> <ul style="list-style-type: none"> - the failure mode and effect analysis was conducted for stated unmanned aircraft system which presents that failure of individual component doesn't cause complete termination of functioning of individual system, - the consequences of individual failure were examined – in case the manufacturer documents doesn't contain prevention of consequences of individual failure, 				
Date:		Accountable manager within the operator:		Signature:

Appendix 4 – Mandatory Occurrence Report

Napomena: Ukoliko želite da zaštitite svoj identitet, zaokružite **POVJERLJIVO**
 Note: If you want to protect your identity, please highlight **CONFIDENTIAL**

Bijela polja popunite velikim štampanim slovima, označite sa "X" odgovarajuće kvadrate, nepotrebno precrtati
 Fill all the items in block capital letters, mark appropriate fields with "X", disregard inapplicable items

1. Vrsta događaja/Type of Occurrence

<input type="checkbox"/> Operacije vazduhoplova / aircraft operation occurrence	<input type="checkbox"/> Usluge u vazdušnoj plovidbi / ATM/ANS Occurrence	<input type="checkbox"/> Događaji sa vazduhoplovima koji nisu kompleksni / other than complex aircraft occurrence
<input type="checkbox"/> Održavanje i popravka vazduhoplova / maintenance occurrence	<input type="checkbox"/> Ugrožavanje na aerodromu i zemaljsko opsluživanje / airport and ground services occurrence	<input type="checkbox"/> Ometanje vazduhlova laserom / laser interference

2. Tip vazduhoplova / Aircraft Type

3. Registracija vazduhoplova / Aircraft Registration

4. Operator i vlasnik / Operator and Owner

5. Datum i vrijeme događaja / Date and Time

6. Mjesto događaja/ICAO kod aerodroma / Location of Occurrence/ aerodrome ICAO code

7. Broj leta / Flight Number

8. Polazi iz/ Departing from

9. Dolazi u/ Arriving to

10. Vrijeme sletanja / Landing Time

11. Tehnička knjiga vazd. br. / Technical Log Book No.

12. Faze leta / Flight Phase

<input type="checkbox"/> Vuča / Towing	<input type="checkbox"/> Polijetanje / Take off	<input type="checkbox"/> Krstarenje / Cruise	<input type="checkbox"/> Kruženje za slijetanje / Circling
<input type="checkbox"/> Parkiranje / Parking	<input type="checkbox"/> Početno penjanje (<1500ft)/ Initial climbing	<input type="checkbox"/> Poniranje / Descending	<input type="checkbox"/> Slijetanje / Landing
<input type="checkbox"/> Izguravanje / Pushback	<input type="checkbox"/> Penjanje / Climbing	<input type="checkbox"/> Čekanje / Holding	<input type="checkbox"/> Voženje posle slijetanja / Taxiing after landing
<input type="checkbox"/> Voženje prije polijetanja / Taxiing before take off	<input type="checkbox"/> Lebdenje / Hover	<input type="checkbox"/> Prilaženje (<1500ft)/ Approach	<input type="checkbox"/> Drugo / Other

13. Vrsta leta / Type of Flight

<input type="checkbox"/> Komercijalni – Redovni / Commercial - Scheduled	<input type="checkbox"/> Čarter / Charter	<input type="checkbox"/> Poslovni / Business	<input type="checkbox"/> Taksi / Taxi
<input type="checkbox"/> Privatni / Private	<input type="checkbox"/> Medicinski / Medical	<input type="checkbox"/> Rad iz vazduha / Aerial work	<input type="checkbox"/> Probni – tehnički / Test - Technical
<input type="checkbox"/> Obuka / Training	<input type="checkbox"/> Vlastite potrebe / Non commercial	<input type="checkbox"/> Prelet / Ferry	<input type="checkbox"/> Drugo / Other

14. Posljedice / Consequences

<input type="checkbox"/> Bez posljedica / No consequences	<input type="checkbox"/> Povratak na slijetanje / Return back for landing	<input type="checkbox"/> Prekinuto polijetanje / Rejected Take-off	<input type="checkbox"/> Slijetanje iz obazrivosti / Precautionary Landing
<input type="checkbox"/> Gašenje motora / Engine Failure	<input type="checkbox"/> Odložen let – Otkazan / Flight Delayed/Cancelled	<input type="checkbox"/> Skretanje / Runway Excursion	<input type="checkbox"/> Drugo / Other

15. Putnici, posada / Passengers, Crew

16. Pravila letenja / Flight Rules

17. Uslovi leta / Flight Conditions

18. Vidljivost / Visibility (m)

19. Vjetar / Wind

20. Padavine / Precipitation

____ / ____	<input type="checkbox"/> VFR <input type="checkbox"/> IFR	<input type="checkbox"/> VMC <input type="checkbox"/> IMC			
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21. Oblaci / Clouds

22. Temperatura / Temperature

23. Značajni vremenski uslovi / Significant Weather

23. Staza u upotrebi / Runway in use

24. FIR i klasa vazdušnog prostora/

25. Naziv ATS jedinice / ATS unit

26. Doprinos ATM-a / ATM contribution

27. Uticaj na ATM uslugu / <i>ATM effect</i>			
28. Upozorenja / <i>Alerts</i>			
TCAS: <input type="checkbox"/> Nema / <i>None</i> <input type="checkbox"/> TA <input type="checkbox"/> RA, sa instrukcijom	<input type="checkbox"/> GPWS	<input type="checkbox"/> MSAW	<input type="checkbox"/> STCA
29. Ugrožavanje leta laserom / <i>Laser attack</i>			
a) Lokacija izvora zračenja / <i>location of light source</i> : b) Okvirna udaljenost od izvora zračenja / <i>distance from the source of light source</i> : c) Boja lasera / <i>laser color</i> : <input type="checkbox"/> zelena/ <i>green</i> <input type="checkbox"/> crvena/ <i>red</i> <input type="checkbox"/> plava/ <i>blue</i> <input type="checkbox"/> ostalo/ <i>other</i>			
30. Opis događaja / <i>Brief description</i>			
31. Klasifikacija događaja / <i>Occurrence class</i> :		32. Klasifikacija rizika / <i>Risk classification</i> :	
33. Dodaci / <i>Attachments</i>			
<input type="checkbox"/> Skice / <i>Sketches</i>	<input type="checkbox"/> Izvještaji / <i>Reports</i>	<input type="checkbox"/> Slike / <i>Photographs</i>	<input type="checkbox"/> Drugo / <i>Other</i>
Detalji o podnosiocu prijave / <i>Report submitter details</i>			
Ime podnosioca / <i>Name of reporter</i>	Telefon / <i>Phone</i>	Datum podnošenja / <i>Date</i>	
Potpis podnosioca / <i>Signature of reporter</i> _____			

Voluntary Occurrence Report

Prijave o događajima od značaja za sigurnost vazdušnog saobraćaja dostavljaju se Kontakt licu za događaje od značaja za vazduhoplovnu sigurnost Agencije za civilno vazduhoplovstvo (adresa i e-mail dati su na kraju obrasca):

Occurrence Report forms are to be sent to the Contact person for Safety Occurrences of the Civil Aviation Agency (address and e-mail are given in the footer of this form):

Bijela polja popunite velikim štampanim slovima.

Fill all the items in block capital letters.

Mjesto, datum i vrijeme događaja/Location, Date and Time of the Occurrence

--

Opis događaja/Description of Occurrence

--

Uzrok događaja (prema mišljenju podnosioca)/Cause of the Occurrence (as per the opinion of the person denouncing)

--

Politika ACV je da pruži povratne informacije o rezultatima analize, ukoliko se zahtijevaju. Ukoliko ne želite povratne informacije, označite sa X bijelo polje. / It is CAA policy to provide a comprehensive closing response, if required. If you do not require the response, please tick the box.

Podaci su povjerljivi i namijenjeni isključivo za dodatna pitanja / Information is confidential and is intended solely for questions:

Ime i prezime / Name:	Adresa / Address:
Broj telefona / Phone number:	e-mail adresa / e-mail:

Note: All documents related to occurrence reporting you can find on the next link:

http://www.caa.me/index.php?strana=fiksna&id=20&menu_id=3