

Operations manual / OM

for the operation of unmanned aircraft systems (UAS)

according to PDRA S-01

Issue 1 – Rev 0 dated 02.04.2024

**Note**

According to Regulation (EU) 2019/947 an application for an operational authorisation in the specific category must include an operations manual (OM), together with the associated specific operations risk assessment (SORA), or a PDRA table if applicable, and the evidences of compliance.

This document represents an example of an OM developed for a UAS operation under the predefined risk assessment S01 (PDRA S01), conducted by a UAS operator.

A UAS operator may use this OM, however, it is not possible to use this OM immediately, since it is required to be adapted for their needs.

This example is intended to serve as a structuring aid and to provide the UAS operator with ideas and inspiration for how proofs could be implemented when describing your operation. This template may be completed with procedures and documents required by national regulation.

The European Union Aviation Safety Agency (EASA) or national aviation authorities (NAAs) shall not be liable for any damages of any kind, arising from the use of this document.

No legal claim can be derived from the information given in this document.

The NAA where the UAS operator is registered is responsible to evaluate the documentation submitted by the applicant and, when satisfied, issue the operational authorisation. Such NAA keeps the final decision on the acceptability of the OM.

Unless explicitly stated otherwise, all references to legislation refer to the Implementing Regulations (EU) 2019/947 and (EU) 2019/945.

**How to read this document:**

Parts of the OM that an applicant has to modify as a minimum, are shown in yellow.

**(OSO#23\_IC1)** - Means in this context that the content in this subsection deals with the requirements of OSO Number 23, Integrity-Criterion No.1. This is for reference only and can be deleted.

# Operations manual

This operations manual contains all the relevant information for the UAS operation of:

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# Document Control

The contents of this document and all other applicable documents are subject to revision control and changes require prior approval of the competent authority.

|  |  |  |  |
| --- | --- | --- | --- |
| Revision Number | Revision Date | Name | Description of the Change |
| 0 | 1.1.2022 | Lisa Musterfrau | First impression of the creation of an OM.  Structuring in accordance with the template published on EASA website.  Adaptation to our own operation where necessary.  Insertion of the organisation chart of the operating company. |
| 1 | 2.1.2022 | Max Mustermann | Correction of various spelling errors.  Changes to the wording in Chapters 2, 4 and 7 |
| 2 | 5.1.2022 | Lisa Musterfrau | UAS 2 added. |
|  |  |  |  |

All changes to the last revision will be marked with a bar on the left side.

The following table identifies the persons responsible for the development and release of the revision of the operations manual handed in for authorisation.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Name | Date | Signature |
| Developed by | Lisa Musterfrau | 5.1.2022 | Lisa Musterfrau |
| Approved by | Max Mustermann (CEO) | 6.1.2022 | Max Mustermann |

**Other applicable documents**

|  |  |  |
| --- | --- | --- |
| Name | Revision Number | Description |
| OM D | - | Trainings manual, Part D was outsourced and is not under revision control |
|  |  | *further documents, if referenced in the OM* |
|  |  |  |
|  |  |  |

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# List of Abbreviations

|  |  |
| --- | --- |
| **Term** | **Explanation** |
| AAIB | Aircraft Accident Investigation Bureau |
| AC | Assurance Criterion |
| AGL | Altitude Above Ground Level |
| ALOS | Attitude Line of Sight |
| ARC | Air Risk Class |
| ASAP | as soon as possible |
| ATC | Air Traffic Control |
| ATM | Air Traffic Management |
| C3 | Command, Control and Communication |
| CD | Characteristic Dimension |
| CRM | Crew Resource Management |
| CV | Contingency Volume |
| DLOS | Detection Line of Sight |
| DVR | Design Verification Report |
| EASA | European Aviation Safety Agency |
| EMS | Emergency Medical Services |
| ERP | Emergency Response Plan |
| ESC | Electronic Speed Control |
| FG | Flight Geography |
| FH | Flight Hours |
| FOD | Foreign Object Damage |
| FTS | Flight Termination System |
| GNSS | Global Navigation Satellite System |
| GRB | Ground Risk Buffer |
| GS | Ground Speed |
| GV | Ground Visibility |
| HMI | Human-Machine Interface |
| IC | Integrity Criterion |
| ICAO | International Civil Aviation Organization |
| IMU | Inertial Measuring Unit |
| LTE | Long Term Evolution |
| MCC | Mult-Crew Coordination |
| METAR | Meteorological Aerodrome Report |
| N/A | Not Applicable |
| NAA | National Aviation Authority |
| NOTAM | Notice to Airmen |
| OSO | Operational Safety Objective |
| PIS | Public Interest Site |
| RTK | Real-Time Kinematic |
| STS | Standard Scenario |
| T/O | Take-Off |
| TC | Type Certificate |
| TMPR | Tactical Mitigation Performance Requirement |
| UA | Unmanned Aircraft |
| UAS | Unmanned Aircraft System |
| VLOS | Visual Line of Sight |

# General Part (Part A)

**(OSO#01)**

In this chapter, general aspects of the UAS operator are described.

## Opening Statement

This operations manual has been developed in accordance with the specifications and requirements of Regulation (EU) 2018/1139 and its implementing regulations. Among others, the Implementing Regulation (EU) 2019/947 and the Delegated Regulation (EU) 2019/945 were taken into account.

I declare that at any time the UAS operation will be conducted in accordance with the requirements and limitations described in this Operations Manual.

Moreover, I declare that all personnel involved in the operation shall:

* Be familiar with the contents of this manual.
* Follow the instructions and procedures from this manual.
* Comply with the laws, rules and procedures of the countries in which the operation is carried out.
* Always make the operation as safe as is practicably possible.
* Not take any unnecessary risks.
* Report safety risks and all incidents as per the UAS operator’s occurrence reporting policy.

We as a UAS Operator commit ourselves:

* To promote and execute safe operations.

To establish an operational culture that ensures safe operation and fosters a reporting system for safety-relevant issues.

* To provide adequate financial and human resources for this purpose.
* To ensure that all information in this manual complies with the applicable statutory rules and requirements.
* To implement and maintain a "Just Culture". No employee should suffer reprisals for reporting safety deficiencies, mishaps or violations that very likely would not have been discovered without their report.
* To comply with new or amended regulations published by the EU Commission, EASA, or the National Aviation Authority, even if such new or amended regulations conflict with these procedures. Changes to the regulatory framework affecting the content of this manual will be promptly incorporated into it and submitted to the National Aviation Authority for approval.

None of the foregoing shall prevent the UAS operator’s personnel from acting in good faith to the best of their knowledge and belief when this manual does not provide assistance or guidance.

We expect all staff to show initiative, decision-making ability and to have a professional work attitude.

Laudanum, 1.1.2024 Max Mustermann

Place, date, signature accountable manager

## Security and Privacy Statement

There are security measures in place to protect the loss, misuse and alteration of the information under our control. Only required employees have access to the information that is provided to us.

In addition, where necessary, sufficient procedures are in place to prevent the misuse or improper use of our systems or parts thereof.

Personal data collected in the course of the operation described in this Operations Manual shall be processed in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council of the 27th of April 2016 on the protection of natural persons with regard to the processing of personal data, on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation).

Personal data is collected and processed only to the extent strictly necessary for the operation described herein.

For further information regarding the processing of the data (for example, to correct incorrect or incomplete data) please contact our secretariat directly.

Every affected data subject has the right to lodge a complaint regarding the processing of his or her data with the Federal Commissioner for Data Protection and Freedom of Information at any time.

Laudanum, 1.1.2024 Max Mustermann

Place, date, signature accountable manager

## Environmental Statement

We as a company are committed to sustainable and future-oriented drone operations and pursue the goal of minimising the impact on the environment and wildlife.

To this end, our company will use all technical possibilities to increase efficiency as well as look for further innovative solutions.

The goal is to use less and "greener" energy in the long run and to cover the reduced energy demand with cleaner, more sustainable and regenerative energy.

The aim is to leave each flying site in a condition at least equal to that in which it was found.

All employees are encouraged to be aware of their surroundings at all times and to reduce any direct impact on people, the environment and wildlife through noise or emissions to an absolute minimum.

For further information regarding our environmental policy please contact our secretariat directly.

Laudanum, 1.1.2024 Max Mustermann

Place, date, signature accountable manager

## The Operating Organization

*Please describe briefly your Organisation. (Example below)*

Our company develops and distributes sensor products for the identification of metallic objects in the ground. These sensors are designed to be mounted on an UAS in order to be able to examine larger ground areas. To this end, we regularly carry out test flights to improve our product.

Our company was founded in 2018 and consists of a total of five permanent employees. All of these people are responsible for an assigned area.

As shown in the organisation chart, all positions essential to our flight operations are staffed. The tasks that these people perform are the foundation of our safe flight operations.

### Structure / Organisation Chart

*Please show how the operation is structured if multiple persons are involved. This should include at least all positions that hold responsibilities for your flight ops. Example below.*

Figure 1: Organisation Chart

The duties of the individual responsible roles are described below.

*Precise description of the duties and responsibilities of all relevant roles mentioned above.*

|  |  |
| --- | --- |
| **Role** | **Duties and Responsibilities** |
| Accountable Manager | *[…]* |
| Safety Manager | *[…]* |
| Flight Operations | *[…]* |
| *[…]* | *[…]* |

## Change Management

All changes to the organisational structure or processes related to the operation of the UAS must be discussed internally prior to implementation. In doing so, an assessment of the impact of these changes on the safety of the operation must be made. If risk factors can be identified during this assessment, they must be taken into account before the change is implemented. For this purpose, a concept that reduces the critical impacts on operations will be developed.

Changes in the organisational structure must be communicated with sufficient advance notice to all persons involved in the operation and, if necessary, be updated in the Operations Manual and any associated documentation.

All changes to the Operations Manual are subject to prior approval of the competent authority (NAA).

## Retention Periods

All important documents of the UAS operation are kept in digital or analogue form for at least three years, after the end of the UAS operation or for the personnel, three years after the person has ceased employment with the organisation or has changed position in the organisation. The records are protected against loss or alteration and are made available to authority for inspection.

These include, but are not limited to, the following:

* All authorisations issued by the authorities, including all flight authorisations for geographical zones or in controlled airspace.
* Records of flights carried out.
* Maintenance records, (e.g. technical logbook with records).
* Records and updates of all relevant qualifications, experience and / or training completed by maintenance personnel. **(OSO#03\_AC2)**, remote pilot, ground staff (if applicable) and any other personnel essential for ensuring the safety of the operation.
* Minutes of all meetings with regard to safety-relevant topics (flight safety, security, occurrence reports, investigations) as well as
* All documents considered important that enable the UAS operator's actions to be traced.

## Document Control

Each new employee is sent an up-to-date set of valid documents by e-mail to his or her work e-mail address or is given a set as a hard copy when inducted.

Afterwards, individual documents whose revision has changed are sent to each employee by e-mail.

It is the employee's responsibility to always work with the current valid version. A list of the current revision numbers of all documents can be viewed in the company office at any time or can be sent by e-mail from the office during business hours.

In addition, documentation lists are kept and updated. The current lists are available in the company office at all times and can be viewed or can be sent by e-mail during business hours.

The following documents need to be maintained and updated regularly:

* A list of personnel authorised to carry out maintenance work. A standard form can be found in the Annex under 8.2.1. **(OSO#03\_AC1c)**
* A list of all relevant personnel qualifications, experience and / or training. A standard form can be found in the Annex under 8.2.3. **(OSO#03\_AC2)**

This list has to be filled for each person involved in the UAS operations individually.

* A list of personnel authorised to carry out pre-flight and post-flight inspections. A standard form can be found in the Annex under 8.2.2. **(OSO#07\_AC2)**
* A list documenting the pre-flight and post-flight inspections carried out (flight logbook see 8.2.6). **(OSO#07\_AC1)**
* A list of all emergency response plan (ERP) training conducted. A standard form can be found in the Annex under 8.2.5 **(M3\_C2b)**
* A list of all remote pilots who meet the requirements to fly under this operations manual. A standard form can be found in the Annex under 8.2.4 **(OSO#08\_AC1)**

## Requirements and Qualifications for Personnel

All personnel involved within the scope of this Operations Manual must be able to read and understand it independently. The minimum qualification of the personnel involved in the operations are described in the following paragraphs.

*Include all the positions involved in the operation (Example below)*

### Pilot / Ground Station:

* Remote pilot, RPIC (Remote Pilot in Command)
  + at least remote pilot certificate A2 or STS (Standard Scenario) certificate.
  + successfully completed training in accordance with the training manual (Part D).
  + instruction in the ERP within the last twelve months.
  + has conducted UAS operations as a remote pilot with a UAS of the same configuration (for example, multi-copter/ fixed-wing aircraft) within the last ninety days.
* Remote pilot, co-pilot:
  + at least remote pilot certificate A2 or STS licence.
  + successfully completed training in accordance with the training manual (Part D).
  + instruction in the ERP within the last twelve months.
  + has conducted UAS operations as a remote pilot with a UAS of the same configuration (for example, multi-copter/ fixed-wing aircraft) within the last ninety days.
* Remote pilot under supervision (for example, for training purposes):
  + at least remote pilot certificate A2 or STS certificate.
  + successfully completed theoretical and practical training in accordance with the training manual (Part D).
  + Instruction in the ERP within the last twelve months.

### Maintenance Personnel

* Mechanic:
  + technical experience, including experience with UAS.
  + successfully completed training in accordance with the training manual (Part D).
  + instruction in the ERP within the last twelve months.

### Ground Staff

* Assistant:
  + Successfully completed training in accordance with the training manual (Part D).
  + Instruction in the ERP within the last twelve months.

### Training, Examination and Supervision Personnel

In case the UAS operator offers training, all training, examination and supervision personnel must have the following qualifications:

* Remote pilots:
  + At least as under 1.8.1.
  + At least one year experience in the current operation.
* Maintenance Personnel:
  + At least as under 1.8.2.
  + At least one year experience in the current operation.

## Crew Member is “fit for the operation”

**(OSO#17)**

Each crew member declares to the UAS operator prior to commencement of the operation that there are no conflicts with 1.9.1 (Preventive Health Care) or 1.9.2 (Flight Duty and Rest Periods) and that he / she can perform his / her duties and tasks during the UAS operation without restrictions (the crew member declares himself / herself "fit to operate"!).

If a conflict exists regarding either of the two points, the crew member should report "unfit to operate" to the Flight Operations Manager. This may be done in writing or by telephone.

The performance of his or her duties, including the limited or only partial assumption of further duties in the company, is no longer permitted thereafter.

### Preventive Health Care

**(OSO#17)**

Preventive health care is an important part of ensuring safe operations.

Everyone should try to keep as healthy and fit as possible. This applies in particular, but not exclusively, to the following:

* **Alcohol and other intoxicating liquids**

It is the company policy of the operating company to prohibit any work under the influence of alcohol or other intoxicating liquids. Any consumption of alcohol within eight hours before the start of operations is prohibited. The blood alcohol level must be 0.0 **‰** at the latest at the time when the operation preparation is started.

* **Narcotics**

Psychoactive substances such as narcotics can cause mood swings or perceptual disturbances in people. The same applies to sedatives and hypnotics.

It is not permitted to perform the tasks or activities described in this Operations Manual while under the influence of narcotics.

Any and all violations of this prohibition shall result in immediate suspension from all duties related to the operation described herein. The position or task within the company of the person concerned is irrelevant.

* **Drugs**

Psychoactive substances such as drugs can cause mood swings or perceptual disturbances in people. Examples include cannabis, cocaine, heroin, LSD, etc.

It is not permitted to perform the tasks or activities described in this Operations Manual while under the influence of drugs.

Any and all violations of this prohibition shall result in immediate suspension from all duties related to the operation described herein. The position or task within the company of the person concerned is irrelevant

* **Sleeping tablets**

It is not permitted to perform the tasks or activities described in this Operations Manual while under the influence of sleeping tablets.

* **Antidepressants**

It is not permitted to perform the tasks or activities described in this Operations Manual while under the influence of antidepressants.

* **Medical treatments**

Whenever a crew member is receiving medical treatment from a doctor, he / she should inform the doctor that he / she is carrying out safety-related activities in connection with the operation described here to ensure that he / she is not subject to any restrictions in this regard. Whenever there is any doubt about unrestricted fitness, the crew member should report "unfit to operate" to his / her employer.

* **Immunization**

Each crew member is responsible for ensuring that they have the required vaccinations. In case of suffering side effects after vaccination, the crew member should report ‘unfit to operate’ to his / her employer.

In the event of a severe reaction to the vaccine, it is imperative that a doctor is consulted.

* **Deep sea diving**

Due to the expected effects on the human body, deep sea diving is prohibited for all crew members for a period of 24 hours prior to the start of operational preparations. Shallow depth dives without the use of compressed air remain permitted.

* **Blood and bone marrow donations**

Blood or bone marrow donations must have been made at least 72 hours before the start of operational preparations.

* **Precautions regarding meals before and during operation**

No special precautions need to be taken. However, each crew member is encouraged to let us know in good time if they feel unwell after eating a meal.

* **Sleep and rest**

Individual rest periods, holidays or days off (for example, weekends) should be used for relaxation. Activities that conflict with this should be avoided.

* **Surgical operations**

After surgery, it is the responsibility of the crew member to check with his / her doctor whether he / she is fit enough to discharge his / her responsibilities. Whenever there is any doubt about full fitness, the crew member should report "unfit to operate" to his / her employer.

* **Smoking**

Smoking is forbidden during flight operations.

* **Vision aids**

Whenever a crew member is required to wear vision aids, he / she shall, if possible, carry a spare pair of spectacles / contact lenses with him / her during flight operations.

### Duty Hours and Rest Periods

**(OSO#17)**

The flight duty hours are maximum values, the rest periods listed in this section are minimum values. These applies to all crew members involved in the operation of a UAS within the scope of this operations manual. They may be further limited, but not extended, by company agreements or collective agreements.

#### Definition of Terms

* **Flight area**

In terms of flight duty hours and rest periods, each flight area is considered to be another flight area if the UAS cannot be moved without additional resources. The same applies to the ground station, should its relocation involve great effort.

* **Duty time**

A period of time that begins when a crew member reports for duty or commences duty and ends when the crew member is free from all duty obligations, including post-flight activities.

* **Flight time (block time)**

The period of time between the moment the UAS is able to move under its own propulsion until the moment the UAS is deprived of the ability to move by itself.

* **Rest time**

A continuous, uninterrupted and fixed period of time following or preceding duty during which the crew member is free from duty and standby duty.

#### Flight and Duty Times

* The **maximum duty time** / day for all crew members is: thirteen hours

The maximum duty time / day is reduced by one hour with each new flight area.

Example for three additional flight areas:

The maximum duty time / day = 13h - 3x1h = 10h

* The **maximum flight time (block time)** / day for all remote pilots is: Four hours

#### Rest Times

The minimum rest period between two duty periods is at least the same duration of the last duty period, but not less than eight hours.

In addition, each crew member shall have at least one full day off from duty or standby duty at least every seven days.

# Procedures (Part B)

(OSO#01, OSO#08, #11, #14, #21)

All procedures and checklists described in this chapter have been designed to the best of our knowledge and belief, taking into account all practical experience gained and the expected workloads for the crew and the RPIC. **(OSO#08, #11, #14, #21\_ACa, OSO#16\_AC1, OSO#23\_AC2)**

This was done with the aim of making them clear, understandable and applicable, while minimising the impact of human error. **(OSO#08, #11, #14, #21\_IC3)**

The RPIC has the authority to cancel or delay any or all flight operations, if he has to assume that:

* the safety of persons is threatened or
* property on the ground is threatened or
* other airspace users are put at risk or
* there is a violation of this authorisation or that the operation cannot comply with this OM or any applicable regulation.

The RPIC ensures that he:

* can keep the UA in VLOS and maintain a thorough visual overview of the surrounding airspace in order to avoid any risk of collision with manned or unmanned aircraft,
* can take manual control of the UAS at any time, even if it normally operates automatically, **(OSO#08, #11, #14, #21\_IC2)**
* only operates one UA at a time,
* does not operate from a moving vehicle and
* does not handover the control of the UA to another command unit while operating.

The suitability of the contingency and emergency procedures described in these chapters has been tested under safe conditions during test flights in the open category. All procedures have been found to be effective and suitable. **(OSO#08, #11, #14, #21\_ACb, OSO#16\_AC1b)**

## Multi-crew Coordination

**(OSO#16)**

When the RPIC cooperates with other personnel or involved persons are present in the operational volume, the RPIC shall conduct a safety briefing before each flight operation. During the briefing, care shall be taken to ensure that:

* The roles are clearly assigned.
* Everyone has understood their role (RPIC, assistant, etc. according to 1.7) and the associated tasks.

**(OSO#16\_IC1a)**

* The communication channels to be used (oral, radio, etc.) have been clearly identified, and
* clear and effective communication is ensured (no language barrier, use of the same terms and call outs, etc.);

**(OSO#16\_IC1b)**

The terms and call-outs are, where necessary, explicitly specified in the procedures.

## Flight Planning

**(OSO#08, #11, #14, #21\_IC1a)**

### Use of Up-to-date Materials

For flight planning, it is ensured that the most current maps, charts and any other data available is used. For all data that is only updated at long intervals, such as ICAO charts or satellite images, updates (for example NOTAM (Notice to Airmen)) or on-site inspections are also taken into account.

For the weather in particular, the meteorological data, used as the basis for planning, is documented and the planning is updated in the event of changes that need to be taken into account.

If a geocaging system or geofencing-system is available, the limits of the flight area as described in section 3 will be identified and uploaded to the UAS.

The remote pilot verifies that the conditions on site have not changed in regard to the assumed risk of operation (e.g. the area is really controlled ground and no uninvolved people are present).

### Geographical Zones

Geographical zones published by the member state where the flight takes place are taken into account in the planning and before conducting flight operation, compliance with the requirements has to be assured.

The RPIC will check the following website:

<https://dipul.de/homepage/en/information/geographical-zones/geographical-zones-in-europe/>

### Controlled Airspace

Within controlled airspace, operations are only allowed if a clearance by current air traffic control is available.

This must be carried by the RPIC and later archived. It must be possible to present it during on-site inspections or subsequent audits.

### Airport and Heliport Environment

In Flight areas that are within x.y km of an airfield operations may only be conducted if a written agreement has been made in accordance with the Appendix (see 8.1.2.1). *(Please refer to the local conditions and regulations for airport and heliport environment.)*

This agreement must be carried by the RPIC and later archived. It must be possible to present it during on-site inspections or subsequent audits.

### Automatic flight

In case all or a part of the flight is conducted automatically, the RPIC will plan the flight making sure the UA never exceeds the limits of the flight geography (both horizontal and vertical).

In case the UAS is equipped with a ‘return to home’ function, the RPIC will set the parameters of the function and the ‘home’ point such that the probability to endanger any person in the air or on the ground, during the automatic flight to the home point, is minimised.

The RPIC will then upload the data related to the flight to the UA.

## External Services and Systems

### Services

**(OSO#13)**

*List of the external services used for the UAS operations (for example RTK, LTE, etc.)).*

It is ensured that the level of performance for all external services is adequate for the planned operation and its safe execution. Should an external service require communication between the UAS operator and service provider, effective communication is ensured to support the provision of the service. The roles and responsibilities of both parties are clearly defined.

### Systems

**(OSO#08, #11, #14, #21\_IC1b)**

GNSS

To verify that the GNSS is not disturbed by foreseeable phenomena, a check is made before each flight operation to see whether disturbances are to be expected. The forecast must not be older than eight hours at the start of the operation.

A flight in the event of predicted restrictions or disruptions is not permitted.

Forecasts are available on the websites of Eurocontrol or the "Space Weather Prediction Center".

* <https://augur.eurocontrol.int/tool/>
* <https://www.swpc.noaa.gov/communities/global-positioning-system-gps-community-dashboard>

## Procedures for Obtaining and Evaluating Weather Conditions

**(OSO#08, #11, #14, #21\_IC1a, OSO#23\_IC2)**

The checking of the weather condition (temperature, wind, visibility, precipitation, etc.) takes place immediately before the start of the flight operation.

If available, the national drone weather provided by the state is used for data collection.

See website:

(e.g. for Germany) [www.dipul.de](http://www.dipul.de)

Alternatively, the nearest airfield with published METAR can be used for evaluation. In case the nearest station with published METAR data is disproportionately far away, the RPIC will assess the meteorological conditions using other reliable sources, if available, or weather measuring equipment.

The determined weather data is entered into the Flight Logbook or digitally archived by mail.

*e-mail address:* [*GZ@konischeKegel.de*](mailto:GZ@konischeKegel.de)

Format / layout of the e-mail:

* Subject line: MET, Flight date,
* In the e-mail: Location of operations and name of the RPIC
* Annex: Data (\*.jpg, \*.txt, …)

Before take-off:

* Check the visibility and cloud cover to ensure the VLOS requirement is fulfilled
* A close attention is paid to wind speed and direction to ensure that the data fall within the safe operating limits of the UA used.
* Observation of the local conditions such as wind, cloud cover, and any sudden weather changes that may not be reflected in the forecast.
* Based on the weather information and the on-site check, the RPIC makes the decision on whether it's safe to proceed with the UAS operation.
* If conditions are not favourable, the RPIC will delay or reschedule the flight.
* The weather conditions are documented in the Flight Logbook.

During the flight operation:

* The RPIC stays vigilant about adverse weather conditions that could pose safety risks (see procedure 2.7.2.1);
* The RPIC continuously monitor weather updates, as conditions may change rapidly.

## Procedures for TMPR (Tactical Mitigation Performance Requirement)

TMPR without technology or VLOS-Deconfliction scheme

The operation is conducted exclusively within visual range according to VLOS conditions. Therefore RPIC must apply the general principle of "See / Detect and Avoid" in order to reduce the risk of a collision in the airspace.

For early detection of collision hazards, the RPIC shall monitor the surrounding airspace at all times. Any crew member may point out to the RPIC another aircraft in the airspace if the RPIC has not yet detected it.

It is the responsibility of the RPIC to assess whether the detected aircraft (UAS or manned) already poses a hazard or may become a hazard if there is an indication that it may enter the area of operations. It is his responsibility to decide this in time and, if necessary, to refer to the appropriate procedures.

As a reminder, priority shall always be given to manned aviation.

See the Contingency Procedures:

2.7.2.5 Appearance of an Uninvolved UAS or

2.7.2.7 Appearance of a Manned Aircraft

## Occurrence Reporting

**(OSO#08, #11, #14, #21\_IC1a)**

### What must be reported?

All

* occurrences which endanger or which, if not corrected or addressed, would endanger an aircraft, its occupants, any other person, equipment or installation affecting aircraft operations
* other relevant safety-related information in that context

shall be reported according to Regulation (EU) 376/2014 within 72 hours of becoming aware of the occurrence, unless exceptional circumstances prevent this using the following website:

<https://aviationreporting.eu/>

In addition:

* Accidents or serious incidents.
* Damage to property.
* A serious or fatal injury.

have to be immediately reported according to Regulation (EU) 996/2010 to the AAIB (Aircraft Accident Investigation Bureau).

This can be done

* by telephone: +xxxxxxxxxxxx
* by FAX: +xxxxxxxxxxxx or
* via mail: xxxxxxxx@mail.com

### Who reports?

The RPIC is responsible for reporting and ensuring correct reporting. If the RPIC is unable to report the incident, another person immediately following in rank and involved in the operation must take over.

### What must be observed after reporting?

All occurrence reports should be stored and retained, as the significance of such reports may only become apparent at a later date.

The UAS operator should analyse those events that could have an impact on flight safety in order to identify safety hazards and, if necessary, take appropriate corrective or preventive action. It should forward the preliminary results of its analysis to the competent authority and, in the event that it identifies an actual or potential risk to aviation safety, also the final results of the analysis.

## Procedures Specifically for UAS 1

### Normal Procedures

**(OSO#08, #11, #14, #21\_IC1a)**

#### General

A minimum flight altitude of eight metres, which minimises the risk to people, animals and means of transport, will be respected.

The minimum flight altitude is not maintained only for take-off, landing or within the framework of contingency / emergency procedures if this is deemed to be necessary.

*Adapting the following procedures, consider manufacturer specific instructions/checklists.*

#### Pre-flight and Post-flight Inspection

**(OSO#07)**

Pre-flight and post-flight inspections of the UAS are only carried out by competent persons trained for the specific work. A list of currently qualified persons can be found in the company office for everyone to see.

The remote crew ensures that the UAS is in a safe condition and ready for safe operation in accordance with this Operations Manual. **(OSO#07\_IC)**

This condition is recorded in the flight logbook and confirmed by the signature of the responsible and authorised person. **(OSO#07\_AC1)**

##### Description of the Pre-flight Inspection

The Pre-flight inspection will always be carried out in a read and do style using a checklist.

The Person performing the check will therefore read each item from the checklist and then perform the check. This procedure can also be performed with two persons. One will therefore read the checklist and the other will perform the checks communicating the observation clearly (e.g. with the call out: “checked”).

Completion of the checklist with no open items is documented in the flight logbook with signature.

* Check list (see Annex 8.3.2)

##### Description of the Post-flight Inspection

The Post-flight inspection will always be carried out in a read and do style using a checklist.

The Person performing the check will therefore read each item from the checklist and then perform the check. This procedure can also be performed with two persons. One will therefore read the checklist and the other will perform the checks communicating the observation clearly (e.g. with the call out: “checked”).

Completion of the checklist with no open items is documented in the flight logbook with signature.

* Check list (see Annex 8.3.3)

#### Before Take-off

Action:

RPIC:

* Pre-flight inspection completed
* Check controlled ground established
* Check GNSS available (if necessary)
* Check T/O area clear (e.g. people, FOD or any obstacle)
* Call Out: CLEAR PROP!
* Arm motors *(please describe how)*
* Check for initialising
* Check for error-messages or any un-normal behaviour / sound

If so - disarm motors *(please describe how)* and abort procedure.

#### Take-off

Action:

RPIC:

* Check initial flight direction clear
* Check Airspace
* Call Out: ATTENTION: START!
* Commence take-off
* at safe altitude check if UAS response is normal (as expected),

If not 🡪 land (see 2.7.1.7) ASAP

#### Flight

Manual flying or automatic flight

Action:

RPIC:

* operate UAS
  + manual control or automatic flight
* monitor:
  + Flight parameters of the UAS (e.g. altitude, speed, battery, C2/3-link,…)
  + Correct automatic flight plan execution (if automatic flight is active)

In case of deviations 🡪 takeover manual control, see 2.7.1.6

* observe:
  + Weather changes
  + Ground area for presence of uninvolved persons and obstacles
  + Airspace

In case of conflict:

🡪 Appearance of an uninvolved UAS, see 2.7.2.5

🡪 Appearance of a manned aircraft, see 2.7.2.7

Ground staff (if present):

* observe:
  + Weather changes
  + Ground area for presence of uninvolved persons and obstacles
  + Airspace
  + Inform RPIC about changes if necessary

#### Takeover Manual Control

Whenever safe flight under automatic control is in doubt or if deemed necessary by the RPIC he shall take over manual control.

Action:

RPIC:

* Switch flight mode to manual control *(please describe how)*
* Check if manual control is established
* Call Out: I HAVE CONTROL!
* Return to safe altitude and distance

#### Land

Action:

RPIC:

* Check Final Approach path clear
* Check landing area clear
* Call Out: ATTENTION: LANDING!
* Commence landing
* As soon as the UAS is safe on ground disarm motors *(please describe how)*

🡪 Perform post-flight checklist (see 8.3.3)

### Contingency Procedures

**(OSO#08, #11, #14, #21\_IC1a)**

#### Procedure for Responding to Unexpected Adverse Weather Conditions

**(OSO#08, #11, #14, #21\_IC1a)**

If, despite conscientious flight preparation, an unexpected weather conditions occurs, the first priority is to ensure the safety of all persons involved.

It is the RPIC's responsibility not to start a flight operation / flight that is not yet in progress.

If a flight is already in progress, the RPIC shall abort the operation in the manner that appears to him at that moment to be the safest with the least risk to all persons concerned.

Action:

RPIC:

* Call Out: Adverse Weather!
* In automatic flight

🡪 Takeover manual control (see 2.7.1.6)

* 🡪 Land (see 2.7.1.7)

If weather conditions are so adverse that controlled flight is no longer possible.

🡪 Termination (see 2.7.3.1)

#### Unexpected Behaviour of the UAS within the Flight Geography

As soon as it is detected that the UAS is not behaving as expected, (e.g. deviation from the pre-programmed flight path in automatic mode)

Action:

RPIC:

* Call Out: Warning! Warning! Warning!
* In automatic flight

🡪 Takeover manual control (see 2.7.1.6)

* 🡪 Land (see 2.7.1.7)

If expectable behaviour during manual control cannot be restored

🡪 Termination (see 2.7.3.1)

Note: Flight operations can only be resumed once the cause of the fault has been identified and it has been ensured that it cannot occur again.

#### Contingency Manoeuvre Lateral

Should the UAS leave the flight geography laterally.

Action:

RPIC:

* in case of automatic flight

🡪 Takeover manual control (see 2.7.1.6)

* Stop the lateral movement of the UA
* Return UA into the flight geography

If the UAS cannot be returned to the flight geography or if it is foreseeable that it will leave the contingency volume

🡪 Termination (see 2.7.3.1)

#### Contingency Manoeuvre Vertical

Should the UAS leave the flight geography vertically.

Action:

RPIC:

* In case of automatic flight

🡪 Takeover manual control (see 2.7.1.6)

* Stop the vertical movement of the UA
* Return UA into the flight geography

If the UA cannot be returned to the flight geography or if it is foreseeable that it will leave the contingency volume

🡪 Termination (see 2.7.3.1)

#### Loss of Link

If C2 Link is lost.

Action:

RPIC

* Call Out: Link Loss!
* Check the signal and try to reconnect

If it is foreseeable that the UA will leave the contingency volume

🡪 Termination (see 2.7.3.1)

#### Appearance of an Uninvolved UAS

When an UAS uninvolved in the operation is detected that is threatening to fly into the operational volume or has already entered.

Action:

RPIC or Ground staff:

* Call Out: unknown UAS!

RPIC:

* Initiate the landing of the UA

🡪 Land (see 2.7.1.7)

Note: The operation can only be resumed when it has been ensured that the simultaneous operation of several UAS does not occur again.

#### Appearance of a Manned Aircraft

A manned aircraft is observed that is threatening to fly into the operational volume or has already entered.

Action:

RPIC or Ground staff:

* Call Out: unknown aircraft!

RPIC:

* Initiate the landing of the UA

🡪 Land (see 2.7.1.7)

* Report in accordance to ERP template (see 8.3.1)

Note: The operation can only be resumed after it has been ensured that the conflict will not occur again.

#### Loss of Controlled Ground

Uninvolved persons have entered the area designated to be controlled ground.

Action:

RPIC or Ground staff:

* Call Out: uninvolved Persons in the Area!

RPIC:

* Initiate the landing of the UA

🡪 Land (see 2.7.1.7)

Note: The operation can only be resumed after it has been ensured that the conflict will not occur again.

### Emergency Procedures

**(OSO#08, #11, #14, #21\_IC1a)**

#### Termination of the Flight

When the UA is about to leave the contingency volume or whenever deemed necessary by the RPIC:

Action:

**RPIC:**

* Press "Kill Switch"
* Call Out: Crash! Crash! Crash!
* **Note the last position and direction of the UA**

Ground staff **(if present):**

* Take cover
* If necessary, loudly warn other people

**Call Out: Duck and cover!**

* **Note the last position and direction of the UA**

Termination procedure successful?

Yes:

🡪 Crash (see 2.7.3.3)

NO:

🡪 Fly Away (see 2.7.3.2)

#### Fly Away

Action:

RPIC:

* Call Out: Fly Away! Fly Away! Fly Away!
* Initiation of **ERP** (see 8.3.1)

(Immediately report to ATC or ATM)

* Re-attempt 🡪Termination (see 2.7.3.1)

(This can be done permanently in parallel with the ERP, as long as the execution of the ERP is not slowed down or delayed.)

#### Crash

After impact:

*Action:*

RPIC:

* Call Out: Crash! Crash! Crash!
* Initiation of **ERP** (see 8.3.1)

# Flight Areas (Part C)

In this chapter operational limitations as well as all volumes and areas needed for the safe operation of the UAS are defined.

## General Operational Limitations

The operational limits listed here are fixed limits and must not be exceeded under any circumstances. The listed limits are derived from the environmental conditions and technical limits (Part T).

Safe operation can be guaranteed at all times by adhering to the specified operational limits.

This is ensured by the operating limits defined in this OM not exceeding or contradicting those defined by the UAS manufacturer (see 6).

### Environmental Conditions

**(OSO#23\_IC1)**

#### Light Conditions

The operation only takes place during the day with suitable light conditions in the time between:

* 30 minutes before sunrise until
* 30 minutes after sunset.

#### Wind

Maximum wind speed ≤ 5 m/s

(*please adjust as needed, this value shall not exceed the maximum wind speed defined in the UAS manufacturers instructions)*.

#### Visibility

All flights take place under conditions that allow safe Visual Line of Sight (VLOS) operations. It is the responsibility of the RPIC to keep the UA in VLOS at all times.

The maximum possible VLOS distance between the remote pilot and the UAS results from the smaller value of Attitude Line Of Sight (ALOS) and Detection Line Of Sight (DLOS) and is determined before the flight.

Attitude Line Of Sight:

ALOS = 327 \* CD [m] + 20 m

Detection Line Of Sight:

DLOS = 0.3 \* GV [m]

(The maximum ground visibility (GVmax) to be applied is 5000 m.)

Flights beyond the VLOS distance may not be operated.

#### Temperature

The ambient temperature at ground level is between -10°C and +40°C.

(*please adjust as needed, these value shall not exceed the min/max temperature defined in the UAS manufacturers instructions)*.

#### Adverse Weather Conditions

Flights in hail, ice/icing conditions, and precipitation as well as all weather conditions that are contrary to safe operation are prohibited.

### Technical Operational Limitations

* Maximum take-off mass during operation: 25 kg
* Maximum speed during operation: 5 m/s (GS - Groundspeed)
* Maximum pitch angle: 30 degrees
* Maximum roll angle: 30 degrees

(*please adjust as needed, these value shall not exceed the maximum values defined in the UAS manufacturers instructions)*.

## Flight Area 1

### Description

The following flight area is a generic one in country.

In order to conduct flight operations in a certain area, the following conditions apply beyond the general operating limits.

The maximum flight altitude (HFG) is 120 m AGL (above ground level) at all times and may only be exceeded within a horizontal distance of 50 m from an artificial obstacle taller than 105 metres. The maximum height of the UAS operation may then be increased up to 15 m above the height of the obstacle at the request of the entity responsible for the obstacle.

The adjacent area is calculated from the CV as follows

SAV = 120 s \* operating speed [m/s] = 120 s \* 5 m/s = 600 m (values from 3.1.2)

#### Ground risk:

The UAS may only be operated such that the operating volume (FG and CV) and the ground risk buffer as a whole are classified as a Controlled Ground.

Flight operations may not commence until it is certain that the area is "Controlled Ground" (see also 3.2.4.1).

The Flight Geography (FG) must be selected in such a way that the values for CV and GRB calculated in 3.2.3 can be maintained at all times without the GRB leaving the Controlled Ground area (see graphical representation in 3.2.1).

#### Air risk:

Flight operations may only be conducted in an airspace, with a low air risk, with a maximum final risk class of ARC-b.

In addition, it must be ensured at all times that the operating volume (FG and CV) is laid out in such a way, that the air risk mitigations (see 3.2.4.3) can be fully met.

Compliance with these criteria is checked on a daily basis using an ICAO 1:500,000 map.

### Documentation

For each flight location to be flown, a kml file must be created with the values for CV, GRB listed here.

The flight locations are recorded in the Flight-Log.

The flight location and the unique name of the kml file have to be entered in the field “flight area”.

All data (kml file and Flight-Log) must be available for an audit at any time.

### Calculation of CV / GRB

Detailed calculation and justification of the values for contingency volumes and ground risk buffer.

The nomenclature is based on JARUS Annex A (A5) How to present a flight area.

#### Input values used for the calculation of CV/GRB

UAS characteristics:

* Type: Rotorcraft with parachute
* Type of altimetry: Barometric
* Maximum speed : 5.0 m/s
* Maximum wind speed allowed : 5.0 m/s
* Characteristic Dimension: < 3.0 m
* Maximum pitch angle : 30.0 °
* Parachute opening time : 2.0 s
* Descent rate with parachute : 2.0 m/s

The following parameters were used:

* Height of flight geography : 120.0 m
* Horizontal contingency volume manoeuvre: stopping
* Vertical contingency manoeuvre: kinetic into potential energy
* Ground risk buffer manoeuvre: Parachute

Assumptions

* GPS inaccuracy : 3.0 m
* Position holding error : 3.0 m
* Map error : 1.0 m
* Reaction time : 1.0 s
* Altitude error (barometric) : 1.0 m

#### Calculation contingency volume

Lateral:

(stopping the UAS with maximum pitch)

Vertical***:***

(kinetic to potential energy)

#### Calculation ground risk buffer with parachute:

(time parachute to open)

#### Results of the CV/GRB calculation

* Horizontal contingency volume : 14.2 m
* Vertical contingency volume : 125.8 m
* Ground risk buffer calculation : 324.4 m
* Height of flight geography : 120.0 m

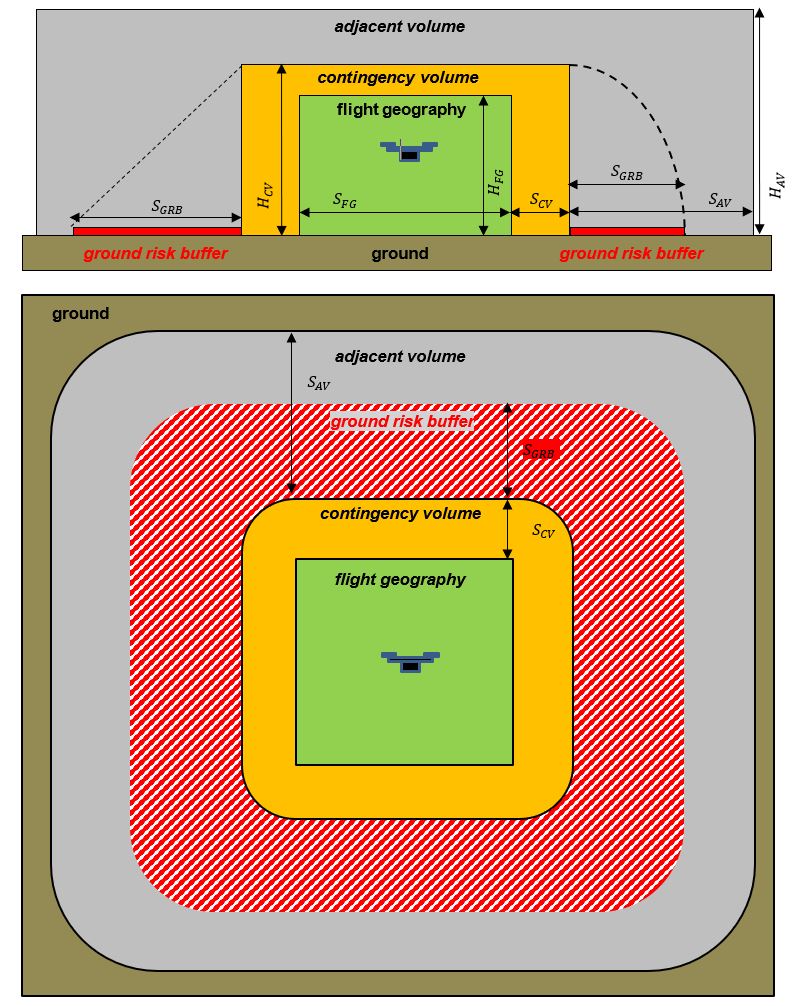


Figure 2: Simplified presentation of flight geography, contingency volume and ground risk buffer

### Specific Procedures of the Flight Area

#### Controlled Ground

Before flight operations can commence, "controlled ground" must be established, and this must also be ensured for the entire duration of the flight.

Only after it can be assumed with certainty that there are no uninvolved persons in the area the area can be declared "Controlled Ground".

This is achieved by cordoning-off the Ground Risk Area with barriers, signs, guards or similar means.

If, at a later point in time, an uninvolved person enters or is about to enter the "Controlled Ground" despite the fact that it has been cordoned off, the area can no longer be considered "Controlled Ground".

In this case, any flight operation that has already begun must be aborted as quickly as possible.

#### M1 Mitigation

* Not necessary as unused

#### ARC-Mitigation

In case:

* The flight area is located within controlled airspace:
  + To fly within controlled airspace, a clearance by air traffic control is required.
  + The air traffic control clearance must be obtained in advance and provide separation to manned traffic.
  + This allows the initial ARC-d to be mitigated to a level of ARC-b.
* The flight area is within airport or heliport environment or is less than 300 m from a Public Interest Site (PIS):
  + The danger from manned air traffic can be reduced by an agreement with the airfield or the PIS. This is done written form.
  + A form for this can be found in the appendix (see 8.1.2.1). "Arrangement for Temporary Operation of Unmanned Aircraft Systems (UAS) in Airfield Vicinity (Uncontrolled Airspace)".
  + This procedure can mitigate the initial ARC-c to a level of ARC-b.
* The flight area is in urban area:
  + By limiting the flight altitude in urban areas to the maximum according to the "open category".

FG <= 120 m (approx. 400ft),

CV < 150 m (approx. 500ft),

and operating exclusively in visual flight conditions within the VLOS distance.

* + This procedure can mitigate the initial ARC-c to a level of ARC-b.

#### Information to Third Parties

In case third parties are affected by the operation or by establishing the controlled ground area, all necessary information will be provided in advance to all persons concerned and relevant authorisations will be obtained if needed.

### Emergency Response Plan (ERP) - Local Information

Instructions and completion aids for the ERP template (see 8.3.1)

Air traffic controllers possibly affected (ATM)

* Bremen +49(0)1234 xxxxxxx
* Langen +49(0)1234 xxxxxxx
* München +49(0)1234 xxxxxxx

Nearest emergency services:

* Fire/Police/EMS 112

## Flight Area 2

### Description

The following flight area is a generic one in country.

In order to conduct flight operations in a certain area, the following conditions apply beyond the general operating limits.

The maximum flight altitude (HFG) is 30 m AGL (above ground level) at all times.

The adjacent area is calculated from the CV as follows

SAV = 120 s \* operating speed [m/s] = 120 s \* 5 m/s = 600 m (values from 3.1.2)

#### Ground risk:

The UAS may only be operated such that the operating volume (FG and CV) and the ground risk buffer as a whole are classified as a Controlled Ground.

Flight operations may not commence until it is certain that the area is "Controlled Ground" (see also 3.2.4.1).

The Flight Geography (FG) must be selected in such a way that the values for CV and GRB calculated in 3.2.3 can be maintained at all times without the GRB leaving the Controlled Ground area (see graphical representation in 3.2.1).

#### Air risk:

Flight operations may only be conducted in an airspace, with a low air risk, with a maximum final risk class of ARC-b.

In addition, it must be ensured at all times that the operating volume (FG and CV) are

Compliance with these criteria is checked on a daily basis using an ICAO 1:500,000 map.

### Documentation

For each flight location to be flown, a kml file must be created with the values for CV, GRB listed here.

The flight locations are recorded in the Flight-Log.

The flight location and the unique name of the kml file have to be entered in the field “flight area”.

All data (kml file and Flight-Log) must be available for an audit at any time.

### Calculation of CV / GRB

Detailed calculation and justification of the values for contingency volumes and ground risk buffer.

The nomenclature is based on JARUS Annex A (A5) How to present a flight area.

#### Input values used for the calculation of CV/GRB

UAS characteristics:

* Type: Rotorcraft with parachute
* Type of altimetry: Barometric
* Maximum speed : 5.0 m/s
* Maximum wind speed allowed : 5.0 m/s
* Characteristic Dimension: < 3.0 m
* Maximum pitch angle : 30.0 °
* Parachute opening time : 2.0 s
* Descent rate with parachute : 2.0 m/s

The following parameters have been used:

* Height of flight geography : 30.0 m
* Horizontal contingency volume Manoeuvre: stopping
* Vertical contingency manoeuvre: kinetic into potential energy
* Ground risk buffer manoeuvre: Parachute

Assumptions

* GPS inaccuracy : 3.0 m
* Position holding error : 3.0 m
* Map error : 1.0 m
* Reaction time : 1.0 s
* Altitude error (barometric) : 1.0 m

#### Calculation Contingency Volume

Lateral:

(stopping the UAS with maximum pitch)

Vertical***:***

(kinetic to potential energy)

#### Calculation Ground Risk Buffer with parachute:

(time parachute to open)

#### Results of the CV/GRB calculation

* Horizontal contingency volume : 14.2 m
* Vertical contingency volume : 35.8 m
* Ground risk buffer calculation : 99.4 m
* Height of flight geography : 30.0 m

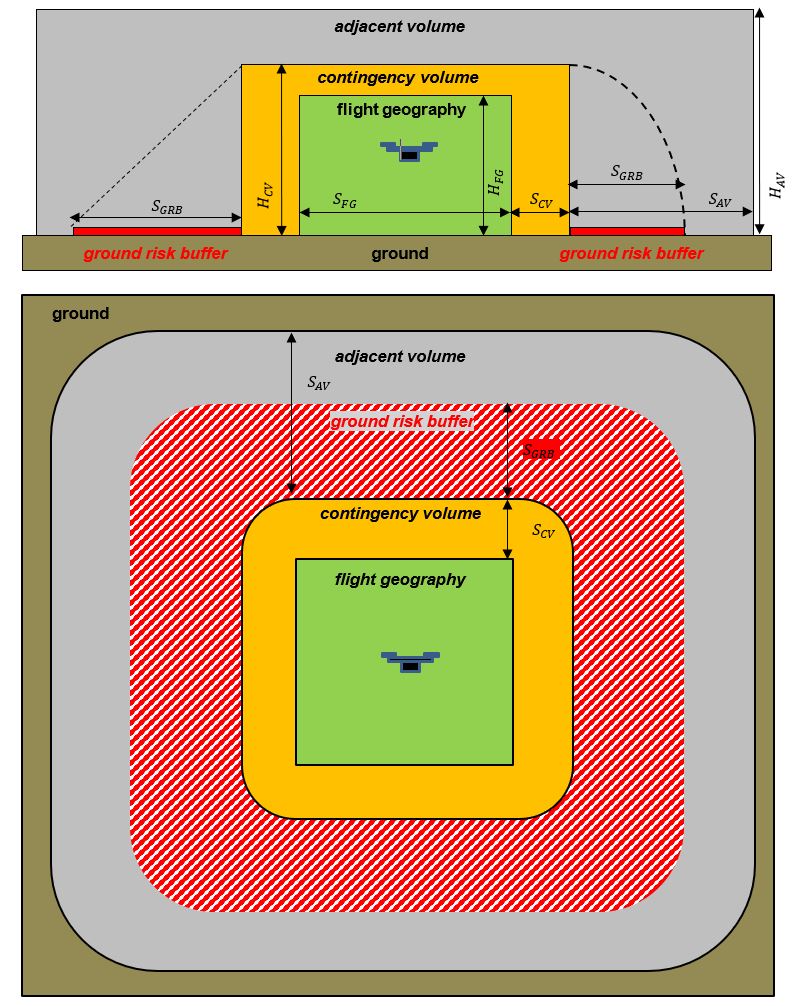


Figure 3: Simplified presentation of flight geography, contingency volume and ground risk buffer

### Specific Procedures of the Flight Area

#### Controlled Ground

Before flight operations can commence, "controlled ground" must be established and this must also be ensured for the entire duration of the flight.

Only after it can be assumed with certainty that there are no uninvolved persons in the area the area can be declared "controlled ground".

This is achieved by cordoning-off the ground risk area with barriers, signs, guards or similar means.

If, at a later point in time, an uninvolved person enters or is about to enter the "controlled ground" despite the fact that it has been cordoned off, the area can no longer be considered "controlled ground".

In this case, any flight operation that has already begun must be aborted as quickly as possible.

#### M1 Mitigation

* Not necessary as unused

#### ARC-Mitigation

In case:

* The flight area is located within controlled airspace:
  + To fly within controlled airspace, a clearance by air traffic control is required.
  + The air traffic control clearance must be obtained in advance and provide separation to manned traffic.
  + This allows the initial ARC-d to be mitigated to a level of ARC-b.
* The flight area is within airport or heliport environment or is less than 300 m from a Public Interest Site (PIS):
  + The danger from manned air traffic can be reduced by an agreement with the airfield or the PIS. This is done written form.
  + A form for this can be found in the appendix (see 8.1.2.1). "Arrangement for Temporary Operation of Unmanned Aircraft Systems (UAS) in Airfield Vicinity (Uncontrolled Airspace)".
  + This procedure can mitigate the initial ARC-c to a level of ARC-b.
* The flight area is in urban area:
  + By limiting the flight altitude in urban areas to the maximum according to the "open category".

FG <= 120 m (approx. 400ft),

CV < 150 m (approx. 500ft),

and operating exclusively in visual flight conditions within the VLOS distance.

* + This procedure can mitigate the initial ARC-c to a level of ARC-b.

#### Information to Third Parties

In case third parties are affected by the operation or by establishing the controlled ground area, all necessary information will be provided in advance to all persons concerned.

### Emergency Response Plan (ERP) - Local Information

Instructions and completion aids for the ERP template (see 8.3.1)

Air traffic controllers possibly affected (ATM)

* Bremen +49(0)1234 xxxxxxx
* Langen +49(0)1234 xxxxxxx
* München +49(0)1234 xxxxxxx

Nearest emergency services:

* Fire/Police/EMS 112

## Flight Area 3

(Please adapt to your needs. As generic flight area or as a specific flight area – this can be done for example with the maptool on <https://maptool-dipul.dfs.de> “export as DOCX file”)

# Training (Part D)

**(OSO#01,** OSO#08, #11, #14, #21, **OSO#09, #15, #22, OSO#16)**

Training of all personnel takes place in accordance with our training manual (OM(D)). The training manual complies with all the requirements of Implementing Regulation (EU) 2019/947 and is regularly updated. It includes, but is not limited to, the following topics:

* Applicable laws and regulations for UAS operation in the EU and national special requirements (e.g. Implementing Regulation (EU) 2019/947, etc.)
* Airspace structures
* Airmanship and aviation safety
* Human performance capacity
* Weather
* Navigation and maps
* UAS used
* Procedures and
* ERP **(M3)**
* Product inspection **(OSO#07)**
* Weather measurement **(OSO#23\_IC3)**
* MCC (Multi-crew Cooperation) **(OSO#16)**
* CRM (Crew Resource Management) training **(OSO#16)**

Name of the training manual: OM\_D\_rev01.pdf

The training manual can be found in the company office for everyone to see.

# Emergency Response Plan (Part E)

**(M3 – Medium)**

**E**mergency **R**esponse **P**lan (**ERP**)

## General

Even though our primary goal is safe UAS operation, accidents and incidents may still occur. It does not matter who is responsible. The first priority is to minimise the effects. In particular, if people have been harmed or could be harmed by the consequences of an emergency, the following applies:

**People First, Then Property!**

In addition, the general principles shall apply to all persons involved in the operation:

* **stay calm and get an overview**
* **ensure your own protection**
* **secure the accident site**
* **remove people from the danger zone**
* **report emergency**
* **give first aid if necessary**

Each person does what he or she can without putting himself or herself in danger.

## Creation of the Emergency Response Plan

All procedures and check lists described in this chapter have been designed to the best of our knowledge and belief, taking into account all practical experience gained. **(M3\_AC1a)**

The objective is to make these procedures clear, understandable and applicable, and at the same time minimise the impact of human error.

The ERP was tested for its suitability with the participation of all office holders, as described in the training manual, by means of a detailed "table-top exercise" and considered to be good. **(M3\_AC1b)**acceptable.

In the process, the ERP was checked to ensure that it **(M3\_IC)**

1. is appropriate for the situation
2. limits the consequential effects
3. contains definitions that allow the identification of emergencies
4. is practically feasible and
5. clearly identifies the responsibilities of all parties involved.

## ERP template

The ERP template is generally used for ease of use and to facilitate action by the people involved on site in case of an emergency.

Three pages for printing can be found in the Annex (see 8.3.1)

This document is to be completed and signed by the Emergency Response Manager (RPIC) before the operation. For documentation purposes, the ERP template is photographed before the start of operation and sent to the company office by e-mail.

The e-mail address of the company office is: [GZ@konischeKegel.de](mailto:GZ@konischeKegel.de)

Format / layout of the e-mail:

* Subject line: ERP, flight date,
* In the e-mail: Location of operations and name of the RPIC
* Annex: Data (\*.jpg)

## Preparation and briefing:

Before the flight operations, the ERP template is shown to all involved persons and, in the event of questions, the individual topics are dealt with. Only when all questions about the ERP have been clarified, the operation can be started.

The ERP distinguishes between two types of emergencies.

1. **Emergencies where the effects on the ground after a crash must be limited.**

In order to be able to react appropriately and promptly to these emergencies, the following is recorded in the ERP template prior to the start of the operation:

* 1. The nearest location of first aid materials ("first aid kit", etc.).
  2. The nearest location of fire extinguishing equipment (fire extinguishers, etc.).
  3. The telephone numbers for further emergency services, in case the emergency cannot be brought under control using own resources.

1. **Emergencies requiring notification to an ATM provider or airfield / airport.**

In order to be able to react appropriately and promptly to these emergencies, the following is recorded in the ERP template prior to the operation:

* 1. The telephone numbers of any airfields / airports affected. For airfields / airports with control zones, the direct extension number of the tower controllers.
  2. The telephone number of the nearest ATM provider.

Location-specific information or telephone numbers can be taken from 3.x.5 onwards in Part C of the Annex.

## Reporting procedures and obligations after an emergency

**(OSO#08, #11, #14, #21\_IC1a8)**

Any triggering of the ERP should be processed in the best possible way to improve the safety of the UAS operation.

All persons involved in an emergency should write down their recollections of the incident as soon as possible and provide them to the responsible person for occurrence reporting. The sooner this is done, the better / more accurate the recollections will be. This should be done independently to get as many uninfluenced perspectives and perceptions as possible. The data collected in this way should be supplemented with the journey log, the meteorological data at the time of the incident and any other data that might help to classify the incident.

See also 2.6 Occurrence Reporting.

# Technical part of UAS (Part T)

In this section, all necessary details of the UAS used are described in detail or are referenced to the respective manufacturer’s instructions.

## UAS 1 [Model/Type]

### Description

The UAS 1 is a class C5 unmanned aircraft system.

Technical details are provided in the manufacturer's instructions (see Annex 8.4).

## UAS 2 [Model/Type]

### Description

The UAS is a multi-rotor manufactured by Manufacturer.

It is designed as a fully symmetrical cross with 4 rotors. The characteristic dimension of the UAS is less than 3 m, measured from rotor tip to rotor tip and has a maximum take off mass of less than 25 kg.

|  |  |
| --- | --- |
| Nominal voltage of the accumulator | 22.2 V |
| Capacity of the accumulator | 5000 mAh |
| Maximum take-off mass | 12.5 kg |
| Empty mass | 9 kg |
| Characteristic Dimension (CD) | 1,5 m |
| Other …. |  |

### Image / Graphic

Figure 4: UAS 1 in Configuration XY

Figure 4 shows UAS 1 in the configuration xy standing on the ground ready for operation.

### C3 Link

**(OSO#06)**

*(Please describe the used C3-Link.)*

All the C3 links used meet the requirements in terms of performance, quality, RF spectrum and environmental conditions in order to safely perform the planned operation at all times. **(OSO#06\_ICa)**

All C3 links used provide sufficient information for the pilot to monitor at all times whether operational requirements are being met. **(OSO#06\_ICb)**

### Parachute (M2)

*If installed:*

* *Detailed description of the system*
* *Evidence for adequate functionality*

### TMPR

* No technical solution for TMPR is used. VLOS operation only.

### Containment

**(SORA Step 9)**

Leaving the operating volume can be prevented at any time by transmitting the command to switch off all four motors via the regular C3 Link or using the flight termination system (FTS). This can be done, for example, within the framework of the procedure "Termination of the Flight" (see 2.7.3.1).

No probable failure of the UAS or any external system can cause the UAS to leave the operating volume.

#### System

A representation of the technical system architecture showing the high level schematics of the UAS is provided in Figure 5: Schematic representation of the airborne system.

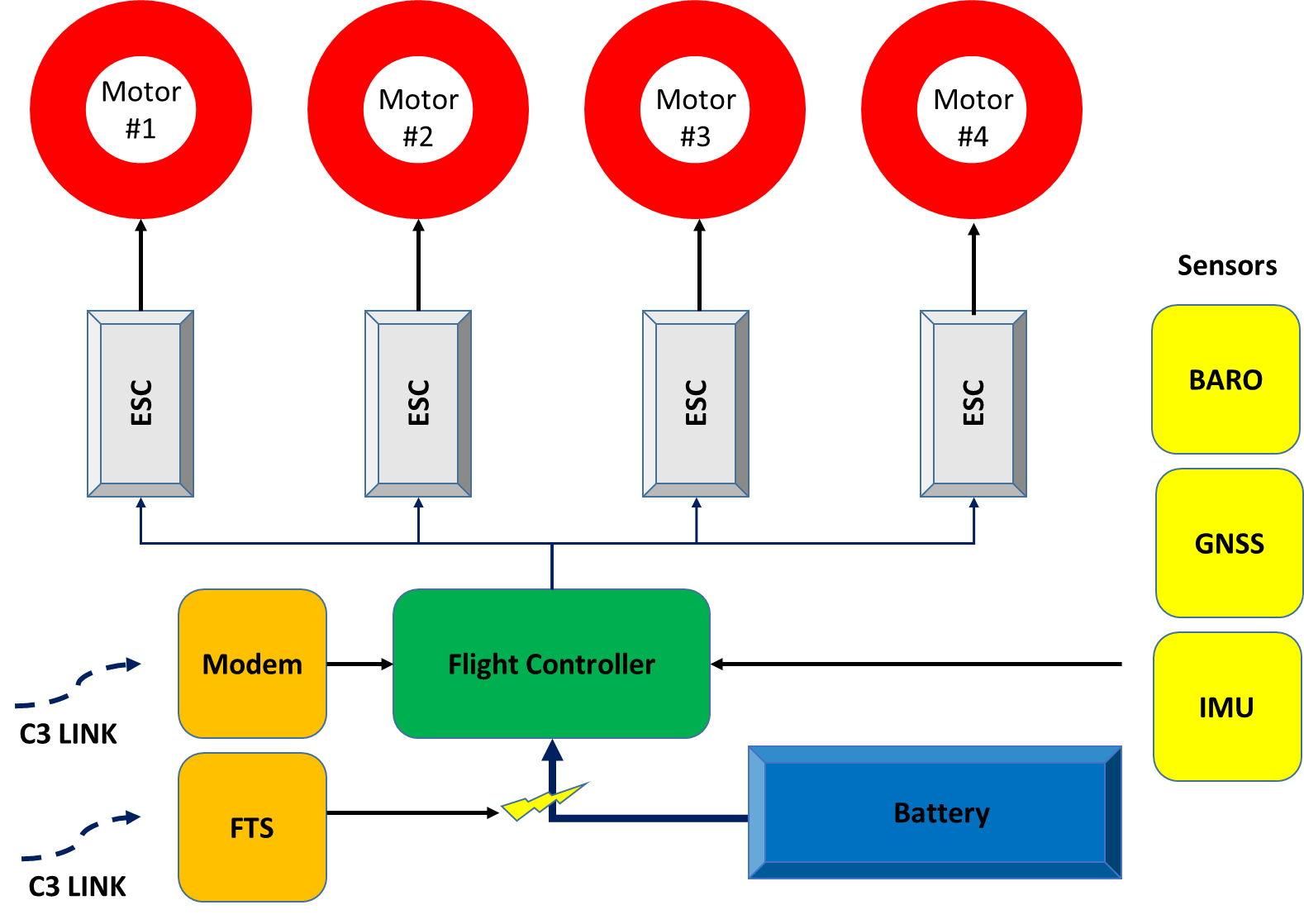


Figure 5: Schematic representation of the airborne system

#### Enhanced Containment

**(SORA Step 9 Enhanced Containment)**

As shown graphically in Figure 5, two completely independent systems can be used for flight termination to prevent the leaving of the operating volume.

1. The main system used for regular control of the UAS and
2. The flight termination system with a separate C3 link with the sole task of acting as a fallback in the event of the failure of the main system.

Both systems can be activated independently of each other by the remote pilot.

By using commercially available system solutions, a failure probability of the individual systems of 1x10-2/flight hour is assumed.

-Reference to the systems-

Since two independent systems are used here, the total probability of failure is calculated as follows:

1x10-2\*1x10-2=1x10-4

Since leaving the operating volume is only possible through the simultaneous failure / breakdown of both systems, the requirement is fulfilled.

If the UAS is in danger of leaving the operating volume, the RPIC initiates the flight termination in according to procedure Flight Termination (see 2.7.3.1).

We thus assure that all the requirements for "enhanced containment" are fully met at all times.

### Human-Machine Interface - HMI

**(OSO#20)**

*Please describe the HMI used.*

The objectives of the UAS human-machine interfaces are to:

* Present data and information clearly and concisely.
* Avoid confusion.
* Prevent disproportionate fatigue.
* Minimise errors by the crew.

All human-machine interfaces have been tested during flights under safe conditions in the open category. Analysis of the test flights, taking into account human factors, has shown that all human-machine interfaces are adequate and suitable for the planned operation.

### Payload

*Please describe the payload used and how to operate it. If training to operate the payload is required, please provide information in Part D.*

# Maintenance (Part M)

**(OSO#01, OSO#03)**

## General

Maintenance ensures that the UAS is in a safe operating condition at all times and that a hazard due to wear and tear, signs of use or ageing of the technology can be excluded.

The UAS is regularly maintained according to the maintenance instructions (see 8.4) **(OSO#03\_ICa, OSO#03\_AC1a)**. The maintenance intervals laid out by the manufacturer are to be considered as a maximum. All maintenance will therefore be scheduled in advance in a way that a positive time margin remains to these maximum values. All maintenance is carried out only by competent persons trained for the specific work. A list of currently qualified and authorised persons can be found in the company office. **(OSO#03\_ICb)**

All maintenance may only be carried out in accordance with the maintenance instructions described herein. **(OSO#03\_ICc)**

All maintenance carried out on the UAS is recorded in the technical logbook (see 8.2.6), together with the name of the person carrying out the maintenance. **(OSO#03\_AC1b)**

## Software Updates

After each software update, test flights must first be carried out in an area comparable with the subcategory A3 of the open category. All important functions and capabilities must be checked.

These flights with the results are documented in the technical logbook.

## Maintenance UAS 1 [Model/Type]

Please describe the maintenance instructions or refer to the chapter of the C5-UAS manufacturer manual where they are listed.

Please state how often or when certain maintenance task are scheduled.

## Maintenance UAS 2 [Model/Type]

Please describe the maintenance instructions or refer to the chapter of the UAS manufacturer manual where they are listed.

Please state how often or when certain maintenance task are scheduled.

# Annex

## Evidence

### Organisational

#### Organisational Operating Certificate

* Not applicable

#### Maintenance Program / Organisation Certificate

* Not applicable

### Operational

#### Operational Agreements

##### Generic template for an operating agreement with an airport or heliport.

The template to be printed out is on the next page. (Note:

**Arrangement for Temporary Operation of Unmanned Aircraft Systems (UAS)**

Between airfield and UAS operator (as follows):

Airport:

Airport name/ICAO code: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of flight ops controller: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone number of flight ops control: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

UAS operator

Name of UAS operator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address of UAS operator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of authorized representative: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone number for communication with the remote pilot: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period of planned flight operations:

from: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (date, time)

until: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (date, time)

1. Fifteen minutes before the start of the flight operations, flight ops control must be contacted by telephone to coordinate the time of take-off.

Flight ops control may postpone the scheduled time of take-off (in particular for traffic reasons) and, if necessary, change or revoke authorisations already issued in writing in advance.

1. Immediately before the start of the flight, flight ops control must be contacted to coordinate the exact time of take-off.

Flight ops control may postpone the planned time of take-off (in particular for traffic reasons) and, if necessary, change or revoke authorisations that have already been issued in advance.

1. The permanent telephone availability of the remote pilot must be ensured. This can also be assured indirectly by a second person answering the call if this person is in direct contact with the remote pilot.
2. The end of flight operation is to be reported immediately to flight ops control.
3. At the request of flight ops control, e.g. due to a manned aircraft ready for take-off or approaching, flight operations must be suspended.

The resumption of flight operations requires the express consent of flight ops control.

1. The remote pilot shall permanently observe the airspace. Flight operations will be suspended immediately when a manned aircraft threatens to enter the UAS operating volume.

Resumption of flight operations requires explicit approval by flight ops control.

1. Emergency notification chain: In the event of an emergency (triggering of the ERP, e.g., due to fly-away or crash of the UAS), it is the responsibility of the remote pilot or a second person who is in direct contact with the remote pilot to declare the emergency condition and immediately inform flight ops control by telephone. At a minimum, the following information shall be provided::

(a) Who is reporting

b) Where did the emergency occur?

c) What happened: nature of the emergency

d) Is the UAS still in the air? (e.g., fly-away).

e) What is the maximum risk area?

f) Is personal injury suspected?

Airfield:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Place, date, signature of authorized representative

UAS Operator:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Place, date, signature of authorized representative

#### M1

* Not applicable (operation over controlled ground)

#### Flight Tests

Evidence of flight tests for contingency and emergency procedures

**(OSO#08, #11, #14, #21)**

Documentation of the flight tests carried out in an area comparable with the subcategory A3 of the open category.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Flight Tests | Type | Number | Result |
| 01.04.2022 | 2.7.3 | Simulated | 3 | 3/3 successful |
| 01.04.2022 | 2.7.2 | Real | 5 | 5/5 successful |
| *to be completed* |  |  |  |  |
|  |  |  |  |  |

#### Performance of External Services and Systems

* Not applicable (no external services or systems are required)

### Technical

#### Design (DVR, TC)

* Not applicable

#### M2

* N/A

#### Manufacturer Competence

* Not applicable

## Printed Forms

### List of Maintenance Personnel

**(OSO#03\_AC1c)**

The template to be printed out can be found on the next page.

**Maintenance Personnel:**

The following persons are authorised to carry out maintenance work:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type of Authorisation | Authorised since (date) | Authorized until (date) |
| Peter Flieger | all maintenance on UAS 1 | 01.01.2022 | 01.01.2024 |
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### List of Personal authorised to conduct Pre-flight and Post-flight Inspections

**(OSO#07\_AC2)**

The template to be printed out can be found on the next page.

**Personnel authorised to conduct Pre-flight and Post-flight Inspections:**

The following persons are authorised to carry out pre-flight and post-flight inspections:

|  |  |  |
| --- | --- | --- |
| Name | Authorized since  (date) | Authorized until  (date) |
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### List of the Training / Experience Level of Personnel

**(OSO#03\_AC2)**

The template to be printed out can be found on the next page.

**Qualifications, Experience and Training of the Personnel**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Function:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Qualification / Experience and Training  (For example, study, licence(s), certificates, successfully completed training, etc.) | Date of completion | Date of expiration |
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### List of authorised remote pilots

The template to be printed out can be found on the next page.

**List of authorised remote pilots**

The following persons are authorised to fly within the scope of this operations manual:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | UAS Model | authorised since (date) | authorised until (date) |
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### List of Training on the Emergency Response Plan (ERP)

**(M3\_C2b)**

The template to be printed out can be found on the next page.

**List of Training on the Emergency Response Plan (ERP)**

The following persons have participated in the emergency response plan training:

|  |  |  |
| --- | --- | --- |
| Name | Date of the Training | Name / signature of a person authorised to provide training |
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### UAS Operator Flight Logbook

The template to be printed out can be found on the next two pages.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | | 3 | | 4 | | 5 | 6 | 7 |
| date  (dd.mm.yyyy) | **take-off** | | **landing** | | **flight time** | | **total time**  (hh:mm) | **take-offs/ landings**  (number) | **RPIC**  (name) |
| flight area  (name) | time  (hh:mm) | Flight area  (name) | time  (hh:mm) | **“UAS 1”**  (hh:mm) | **“UAS 2”**  (hh:mm) |
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| 8 | 9 | 10 | 11 | | 12 |
| Pre-flight check  (performed by/ signature) | **Post-flight check**  (performed by/ signature) | **tech-log entry**  (yes / no) | **Weather**  (wind, temperature, etc) | | **remarks** |
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| --- | | | | I certify that the entries in this log are true | |
| (signature): | |

### Technical Logbook

**(OSO#03\_AC1b, OSO#07\_AC1)**

The template to be printed out can be found on the next page.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Technical Logbook**  UAS name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_serial no.: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Page: \_\_\_\_\_\_ | | | | | |
| Date:  \_\_\_\_\_\_\_\_\_\_\_ (dd.mm.yyyy) | Regular maintenance?  yes  no | | | Flight cycles: \_\_\_\_\_\_ | Total FH: \_\_\_\_\_\_\_\_\_  (hh:mm) |
| Defect / occurrence  (description) |  | Maintenance action taken  (description) |  | | |
| Maintained by | Name / Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Observed | Name / Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Released by: | Name / Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |

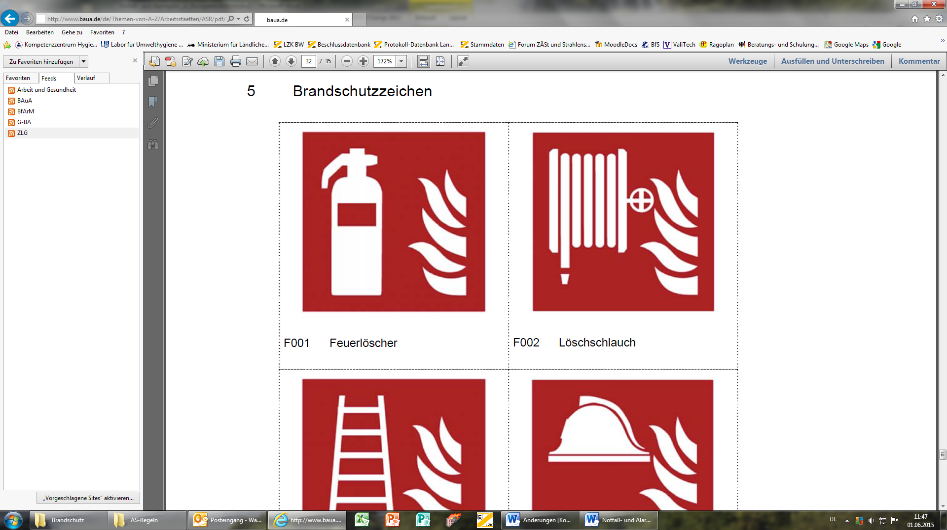
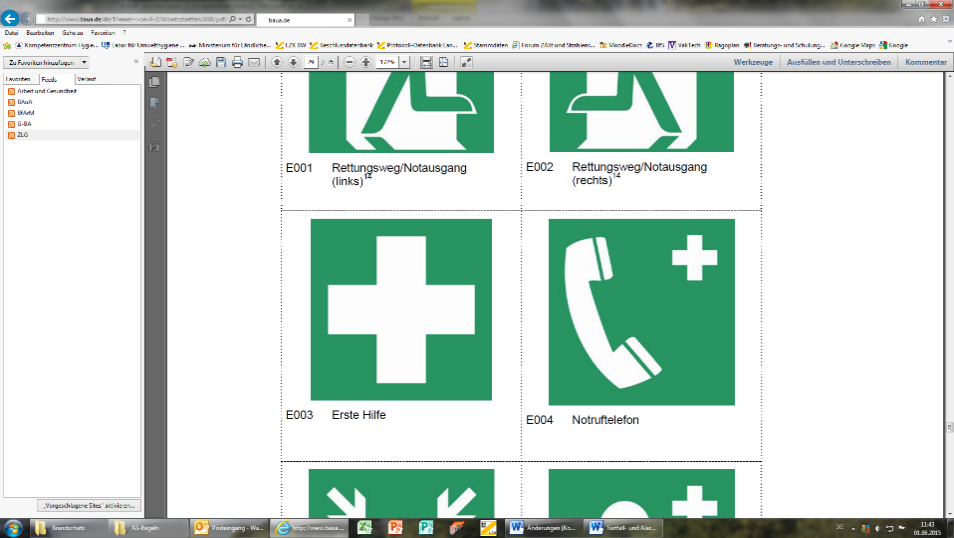
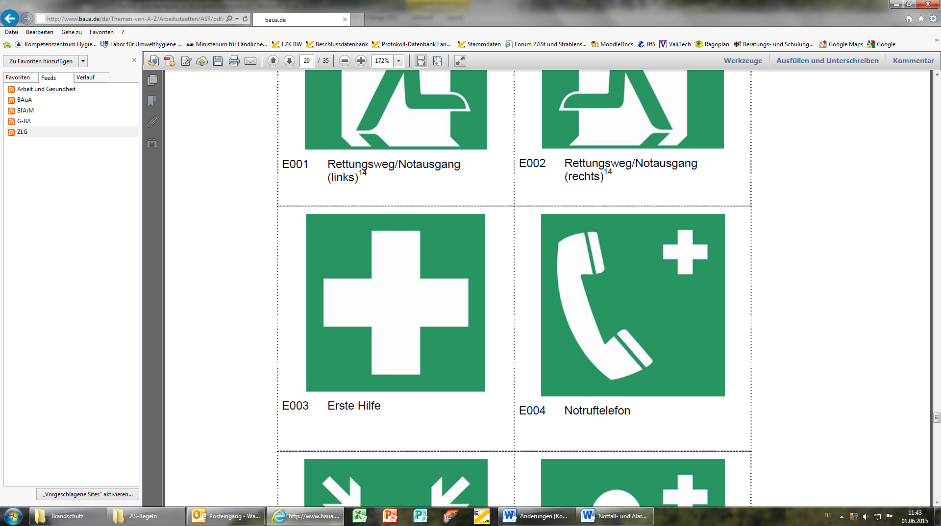
## Check Lists

### ERP Template

The template to be printed out can be found on the next three pages.

**Emergency Response Plan**

For every flight operation, high-visibility jackets for all persons involved, a first-aid kit in accordance with DIN 13157 and a fire extinguisher in accordance with DIN EN 3 shall always be available.

* Location of the high-visibility jackets: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Location of the first aid kit: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **** Location of the fire extinguisher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Emergency Response Plan in the Event of a UAS Crash | |
|  | **ALWAYS**   * **stay calm** * **rescue people before objects** |
|  | 1. **GET AN OVERVIEW**    * Wear high visibility jackets    * Get to the scene of the accident as quickly as possible    * Secure the scene of the accident    * Ensure own protection |
|  | 1. **Protect people:**    * Rescue people from the danger zone    * Keep a safe distance from the scene of the accident    * Ensure own protection |
|  | 1. **If necessary: MAKE AN EMERGENCY CALL Tel.: 112**  * Who is reporting? * Where did it happen? * What has happened? * How many people are injured? * Wait for any questions! |
|  | 1. **If necessary: EXTINGUISH FIRE**  * Do not put yourself in danger * Fight fire (fire extinguisher or fire blanket) * Take special care with rechargeable batteries! Explosion hazard! * Brief the arriving fire service |
|  | 1. **If necessary: PROVIDE FIRST AID**  * Check injured people for signs of life * Resuscitate in the event of circulatory arrest * Staunch any bleeding * Place injured people in the recovery position * Brief the rescue service |
|  | 1. **REPORT AN ACCIDENT** 2. Telefon-Zeichen Immediately report the accident to the Federal Bureau of Aircraft Accident Investigation, among others, in the event of:    * Accidents or serious incidents    * Damage to property    * A severe or fatal injury |
| Emergency Response Plan in the Event of a UAS "Fly Away"  The UAS continues to fly despite termination having been initiated | |
| * Name and telephone number of the nearest ATM provider:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   For operation near an airfield / airport:   * Name and telephone number of the airfield / airport (Tower): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | **ALWAYS**   * **stay calm** * **Rescue people before objects** |
| Signal, Wifi, Icon, Computer, Telephone, Wi-fi | 1. **IN CASE OF C2 LINK LOSS**  * Repeat the connection attempt several times * Change the position of the remote control or antenna on the ground (if possible) |
| Telefon-Zeichen | 1. **INFORM airports / airfields in the vicinity**  * Report the fly-away to the above-named tower   + Who is reporting?   + Where did it happen?   + What has happened?   + Size, configuration and cruise speed of the UAS   + Last known direction of flight   + Estimated maximum possible flight time   + Estimated maximum achievable flight altitude   + Wait for any questions! |
| Telefon-Zeichen | 1. **INFORM THE ATM PROVIDER**  * Telephone report of the fly-away to the above-named ATM provider   + Who is reporting?   + Where did it happen?   + What has happened?   + Size and configuration of the UAS   + Last known direction of flight   + Estimated maximum possible flight time and distance   + Estimated maximum achievable flight altitude   + Wait for any questions! |
| Telefon-Zeichen | * **INFORM THE POLICE Tel.: 112** * Telephone report of the fly-away and warning about a possible crash   + Who is reporting?   + Where did it happen?   + What has happened?   + Wait for any questions! |

Place, Date, Signature (RPIC): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instruction Sheet for Occurrence Reporting**

**What must be reported?**

All

* occurrences which endanger or which, if not corrected or addressed, would endanger an aircraft, its occupants, any other person, equipment or installation affecting aircraft operations
* other relevant safety-related information in that context

shall be reported according to Regulation (EU) 376/2014 within 72 hours of becoming aware of the occurrence, unless exceptional circumstances prevent this using the following website:

<https://aviationreporting.eu/>

In addition:

* Accidents or serious incidents.
* Damage to property.
* A serious or fatal injury.

have to be immediately reported according to Regulation (EU) 996/2010 to the AAIB (Aircraft Accident Investigation Bureau).

This can be done

* by telephone: +xxxxxxxxxxxx
* by FAX: +xxxxxxxxxxxx or
* via mail: xxxxxxxx@mail.com

**Who reports?**

The RPIC is responsible for reporting and ensuring correct reporting. If the RPIC is unable to report the incident, another person immediately following in rank and involved in the operation must take over.

**What must be observed after reporting?**

All occurrence reports should be stored and retained, as the significance of such reports may only become apparent at a later date.

The UAS operator should analyse those events that could have an impact on flight safety in order to identify safety hazards and, if necessary, take appropriate corrective or preventive action. It should forward the preliminary results of its analysis to the competent authority and, in the event that it identifies an actual or potential risk to aviation safety, also the final results of the analysis.

### Pre-flight Inspection - Check List

The template to be printed out can be found on the next page.

|  |  |
| --- | --- |
| **Pre-flight checklist:**  Note:   * All items have to be checked before any flight operation * Completion of this list has to be signed in the flight logbook | |
| Equipment / crew | |
|  | personnel fit to operate / fit to fly |
|  | equipment complete |
|  | documents available (e.g. Operational Authorisation, insurance, pilot certificate, etc.) |
|  |  |
| Flight planning | |
|  | Geographical Zones (e.g. current status, flight authorisation available, etc.) |
|  | weather / Kp-Index |
|  | mission planning completed (e.g. Home point set) |
|  | briefing of all involved persons completed |
|  |  |
| UAS | |
|  | No open defects in technical logbook. |
|  | fully assembled |
|  | correct configuration |
|  | general impression (e.g. no visible damage) |
|  | all motors turn easily and freely |
|  | batteries charged |
|  | correct flight plan loaded (if applicable) |
|  | Radio Communication (if applicable) |
|  |  |
| T/O Area | |
|  | flat area |
|  | wind direction |
|  | no obstacles in departure or arrival area |
|  |  |

### Post-flight Inspection - Check List

The template to be printed out can be found on the next page.

|  |  |
| --- | --- |
| **Post-flight checklist:**  Note:   * All items have to be checked after any flight operation * Completion of this list has to be signed in the flight logbook | |
| UAS | |
|  | UAS secured |
|  | batteries disconnected |
|  | general impression (e.g. no visible damage) |
|  |  |
| Documentation | |
|  | flight times logged in the flight logbook |
|  | defects or occurrences (e.g. hard landing, damage) entry in the technical logbook |
|  |  |

## Manuals

### Manufacturer’s Instructions for UAS 1

*Include manual of UAS 1*

### Maintenance manual for UAS 1

*Include maintenance manual of the manufacturer if applicable and referenced*