ConOps - Concept of Operations

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reference documents

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| --- | --- | --- |
| RD1 | JAR doc 06 SORA (package) | JARUS – Joint Authorities for Rulemaking on Unmanned Systems |
| RD2 | Law No. (4) of 2020 Regulating Unmanned Aircraft in the Emirate of Dubai | Emirate of Dubai |
| RD3 | EN 4709-001. Unmanned Aircraft Systems - Part 001: Product requirements and verification | ASD-STAN |
| RD4 | EN 4709-002. Unmanned Aircraft Systems - Part 002: Direct Remote Identification | ASD-STAN |
| RD5 | EN 4709-003. Unmanned Aircraft Systems - Part 003: Geo-awareness requirements | ASD-STAN |
| RD6 | EN 4709-004. Unmanned Aircraft Systems - Part 004: Lighting requirements. | ASD-STAN |
| RD7 | 4444- PROCEDURES FOR AIR NAVIGATION SERVICES, AIR TRAFFIC MANAGEMENT | ICAO |
| RD8 | ASTM F3411-19. Standard Specification for Remote ID and Tracking | ATSM |
| RD9 | SC Light UAS – Special Conditions for Light UAS | EASA |
| RD10 | ARP4671. Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment | SAE International / Eurocae |
| RD11 | DO-160, Environmental Conditions and Test Procedures for Airborne Equipment is a standard for the environmental testing of avionics hardware. | RTCA |

abbreviations

| **Acronym** | **Definition** |
| --- | --- |
| BVLOS | Beyond Visual Line of Sight |
| CC | Call Center |
| CTR | Controlled Traffic Region |
| ID | Identity Card |
| EASA | European Aviation Safety Agency |
| ERP | Emergency Response Plan |
| FTS | Flight Termination System |
| GPS | Global Positioning System |
| MHZ | Megahertz |
| ICAO | International Civil Aviation Organization |
| OM | Operations Manual |
| RTH | Return To Home |
| TWR | Control Tower |
| UAS | Unmanned Aerial System |
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DEFINITIONS

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| **Aeronautical Emergency** | Accidents or incidents occurring to aircraft in the course of air operations. |
| **Aviation accident** | Any occurrence in connection with the operation of an aircraft, in which:   * Any person suffers fatal or serious injury as a result of being in the aircraft, by direct contact with any part of the aircraft or by exposure to an engine jet. * The aircraft suffers structural damage that adversely affects structural strength or requires major repair. * The aircraft disappears. |
| **Cargo** | All goods on board an aircraft. |
| **Checklist** | Format for performing repetitive actions to be verified, to aid consistency and completeness in task performance. |
| **Crisis** | Difficult or complicated situation. |
| **Emergency** | Alarm or crisis situation that may involve risk, accident or incident of a serious nature or have public repercussions. |
| **Flight geography** | Geographically defined volume, contained within the Operating Volume, where the UAS flight is intended to be contained when performing the operation. |
| **Observer** | A person designated by the operator who, by visual observation of the remotely piloted aircraft (UAS), directly and without aids other than corrective lenses or sunglasses, assists the pilot in the safe conduct of the flight. |
| **Relatives of aircraft accident victims** | Their spouse or common-law partner, ascendants and descendants, by consanguinity or affinity, and relatives in collateral line up to the second degree, and in the absence of these, any person who can prove the existence of kinship of any degree, or any other personal relationship. |
| **Victim** | Any person, whether an occupant of an aircraft or not, who is involuntarily or directly involved in an aircraft accident. |
| **Victim assistance** | Set of actions and measures to be taken by the competent organisms and operators concerned to respond, as far as possible, and depending on the type of accident, to the circumstances and needs of the victims and their families. |

TABLE OF CONTENTS

[1. INTRODUCTION 9](#_Toc89019160)

[1.1. Purpose and scope of the document 9](#_Toc89019161)

[2. Operational relevant information 10](#_Toc89019162)

[2.1. Organization overview 10](#_Toc89019163)

[2.1.1. Structure of the organization and its management 10](#_Toc89019164)

[2.1.2. Responsibilities and duties of the UAS operator 10](#_Toc89019165)

[2.2. Safety 10](#_Toc89019166)

[2.3. Design and production 10](#_Toc89019167)

[2.3.1. Design and/or production organization 10](#_Toc89019168)

[2.3.2. Information on the manufacturer of the UAS 10](#_Toc89019169)

[2.3.3. Information on the production organization 10](#_Toc89019170)

[2.4. Training 10](#_Toc89019171)

[2.5. Maintenance 11](#_Toc89019172)

[2.6. Crew 11](#_Toc89019173)

[2.6.1. Responsibilities and duties of personnel 11](#_Toc89019174)

[2.6.2. Multi-crew coordination procedure 11](#_Toc89019175)

[2.6.3. Operation of different type of UAS 11](#_Toc89019176)

[2.6.4. Crew health 11](#_Toc89019177)

[2.7. UAS configuration management 11](#_Toc89019178)

[3. Operations 12](#_Toc89019179)

[3.1. Type of operations 12](#_Toc89019180)

[3.2. Normal operation strategy 12](#_Toc89019181)

[3.3. Standard Operating procedures 12](#_Toc89019182)

[3.4. Operational limits 12](#_Toc89019183)

[3.5. Emergency Response Plan (ERP) 12](#_Toc89019184)

[4. Technical relevant information 13](#_Toc89019185)

[4.1. UAS 13](#_Toc89019186)

[4.1.1. Airframe 13](#_Toc89019187)

[4.1.2. UA performance characteristics 13](#_Toc89019188)

[4.1.3. Propulsion system 14](#_Toc89019189)

[4.1.4. Flight control surfaces and actuators 14](#_Toc89019190)

[4.1.5. Sensors 14](#_Toc89019191)

[4.1.6. Payloads 14](#_Toc89019192)

[4.2. UAS control 14](#_Toc89019193)

[4.2.1. General 14](#_Toc89019194)

[4.2.2. Navigation 14](#_Toc89019195)

[4.2.3. Autopilot 15](#_Toc89019196)

[4.2.4. Flight control system 15](#_Toc89019197)

[4.2.5. Remote pilot station (RPS) 15](#_Toc89019198)

[4.2.6. Detect and avoid (DAA) system 15](#_Toc89019199)

[4.3. Containment 15](#_Toc89019200)

[4.4. Ground Support Equipment (GSE) 15](#_Toc89019201)

[4.5. Command and control C2 link 16](#_Toc89019202)

[4.6. Safety 16](#_Toc89019203)

LIST OF FIGURES

[Figure 1: Emergency activation process 14](#_Toc83900950)

LIST OF TABLES

[Table 1 Responsibilities and tasks 10](#_Toc83900951)

[Table 2: Data to be collected grouped by classes 12](#_Toc83900952)

[Table 3: Emergency phones 13](#_Toc83900953)

# INTRODUCTION

## Purpose and scope of the document

*[State here the purpose and scope of the document]*

# Operational relevant information

## Organization overview

*[How the organization is defined to support safe operations]*

### Structure of the organization and its management

*[Org. Chart]*

### Responsibilities and duties of the UAS operator

*[Roles and responsibilities of the UAS operator]*

The operator has the following responsibilities according to Dubai Law no. 4/2020 and …:

## Safety

*[Describe how safety is integrated in the organization, and the* ***safety management system*** *that is in place, if applicable]*

## Design and production

### Design and/or production organization

*[Description of the facilities of the manufacturing organization, even if it’s a third party]*

### Information on the manufacturer of the UAS

*[List of most relevant suppliers]*

### Information on the production organization

*[Just in case the operator is the manufacturer of the UAS]*

## Training

*[Reference to the OM Sec. 3.]*

## Maintenance

*[Reference to the Maintenance Manual (provided by manufacturer) and maintenance program within the operator’s organization]*

## Crew

### Responsibilities and duties of personnel

*[For people involved in the operation]*

### Multi-crew coordination procedure

*[How the previous coordinate with each other]*

### Operation of different type of UAS

[State the details for the use of more than one type of UAS under the same Concept of Operations. Fill in just if applicable]

### Crew health

*[Explain the procedures and policies taking care of crew health conditions]*

## UAS configuration management

*[Describe how the operator manages changes on the UAS configuration; procedures involved, logs, and roles and responsibilities associated.]*

# Operations

## Type of operations

*[Detailed description of the ConOps providing specific details on the type of operations (VLOS, BVLOS), population density to be overflown (sparsely populated, assemblies, away from people), type of airspace to be used (segregated area, fully integrated).*

*The operational volume, including the ground and air risk buffers, relevant charts/diagrams and any other information helpful to visualize the intended operations.*

*Describe the level of involvement (LoI) of the crew and any automated or autonomous systems during each phase of the flight.]*

## Normal operation strategy

*[Safety measures, technical or procedural measures, crew training, etc.]*

## Standard Operating procedures

*[Reference to the OM (sec. 4, 5 and 6)]*

## Operational limits

*[Specific operating limitations and conditions appropriate to the proposed operation: operating heights, horizontal distances, weather conditions, flight envelope, times of operations and any limitations for operating within the applicable class of airspace.]*

## Emergency Response Plan (ERP)

*[Reverence to the ERP Manual.]*

# Technical relevant information

*[Notice that this section could be substituted by reference to UAS User’s Manuals if they state all the required documentation]*

## UAS

### Airframe

*[Physical characteristics of the UA (mass, center-of-mass, dimensions, etc.) including photos, diagrams and schematics.*

* *Dimensions:* 
  + *fixed wing: wingspan, fuselage length, body diameter, etc.*
  + *Rotorcraft: length, width and height, propeller diameter, etc.*
* *Mass: empty mass, MTOM, etc.*
* *Center of gravity.*
* *Materials: main materials, new materials and combinations of materials.*
* *Load limits: capability of the airframe structure to withstand expected flight load limits.*
* *Sub-systems: hydraulic, environmental, parachute, brakes...]*

### UA performance characteristics

#### Performance of the UA within the flight envelope

*[Performance:*

* *Maximum altitude*
* *Maximum endurance*
* *Maximum range*
* *Maximum rate of climb*
* *Maximum rate of descent*
* *Maximum bank angle*
* *Turn rate limits*

*Airspeeds:*

* *Slowest speed attainable*
* *Stall speed*
* *Nominal cruise speed*
* *Max cruise speed*
* *Never exceed airspeed]*

#### Performance limitations due to environmental and meteorological conditions

*[List here relevant performance limitation, such as flight envelope and environmental conditions:*

* *Wind speed limitations*
* *Turbulence restrictions*
* *Rain, hail, snow, ash resistance or sensitivities.*
* *Minimum visibility conditions*
* *Outside air temperature (OAT) limits*
* *In-flight icing]*

### Propulsion system

*[Description of the propulsion system and its ability to provide reliable and sufficient power to take off, climb, and maintain flight at the expected mission altitudes. Describe the entire operation of the system of one of the two types: Fuel-powered propulsion systems or Electric-powered propulsion.]*

### Flight control surfaces and actuators

*[Design and operation of the flight control surfaces and servos/actuators, including a diagram showing the location of the control surfaces and actuators and any potential failure modes and the corresponding mitigations. How the system responds to a servo/actuator failure and how the remote pilot is alerted.]*

### Sensors

*[Describe sensors equipment on board.]*

### Payloads

*[Describe the payload equipment on board the UA, including all the payload configurations that significantly change the weight and balance, electrical loads, or flight dynamics.]*

## UAS control

### General

*[Avionics architecture, location of all air data sensors, antennas, radios, etc.]*

### Navigation

*[How UAS determines its location and navigates to its intended destination. How the remote pilot responds to instructions from USP/ATC. Procedures to test the altimeters, loss pf primary means of navigation, backup means of navigation.]*

### Autopilot

*[Autopilot developments, industry, standards and organization, and procedures to install it, testing and validation that was performed (software-in-the-loop and hardware-in-the-loop).]*

### Flight control system

*[Control surfaces responding to commands from flight control computer/autopilot. Description of the flight modes. Interface between auxiliary controls and the flight control computers.]*

### Remote pilot station (RPS)

*[Diagram of the RPS configuration. The accuracy on the determination of UAS position and transmission of critical parameters to ATC/USP. Critical commands safeguard. Programs on the ground control computer and how to ensure flight will not be adversely affected. Alerts that the system provides to the remote pilot.]*

### Detect and avoid (DAA) system

*[Description of the system, details of the qualification to the respective standard (if qualified) and the criteria to selecting the system (if not qualified). Description of the equipment installed and description of avoidance of adverse weather conditions. Description interface between the conflict avoidance system and the flight control computer.]*

## Containment

*[Description of the system to avoid specific areas or volumes or confinement in a given area or volume. The system information and its reliability.]*

## Ground Support Equipment (GSE)

*[Description of all the equipment on the ground: recovery systems, generators, power supplies. Backup emergency equipment. Transport of the UA on the ground.]*

## Command and control C2 link

*[Detailed diagram showing the system architecture of the C2 link and the description of the control links connecting the UA to the RPS and: spectrum used, type of signal processing link security, datalink margin and all relevant information of the system.]*

*[Procedure in case on a C2 link degradation and C2 link loss]*

## Safety

*[Procedures in case of loss of command capability or emergency where the system cannot be recovered.]*