CATALOGUE OF STRATEGIC AND TACTICAL MITIGATIONS FOR UAS OPERATIONS IN GENERAL UAS GEOGRAPHICAL ZONES FOR SAFETY REASONS IN CONTROLLED AIRSPACE

This document provides a catalogue of measures to mitigate the air risk of operations that take place in general UAS geographical zonesfor safety reasons in controlled airspace under the responsibility of ENAIRE. These mitigations are always in addition to those intrinsic to the operational category that defines the intended flight ("open" or "specific" category).

The mitigation measures to be applied must be coordinated with ENAIRE through an Operational Risk Assessment and Mitigation (ORAM), which also includes the intended concept of operation (ConOps), the semantic model(s) of the activity, the specific coordination actions of each operation and specific procedures in the event of abnormal and emergency situations.

ENAIRE may require other mitigations not covered by this document when justified by the unique nature of the operations and characteristics of the environment.

CODE	TYPE OF MITIGATION	MITIGATION MEASURE	SCOPE OF APPLICATION		OBSERVATIONS
			Operational category	CONOPS	
MAE01	Strategic	Have an appropriate communications device capable of supporting two-way communications with aeronautical stations and on the frequencies indicated to meet the requirements applicable to the airspace in question.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 43.6.a RD UAS 517/2024 At the discretion of the ATS provider and/or the aerodrome or heliport manager. As determined in the pre-tactical coordination.
MAE02	Strategic	Have a theoretical training certificate as a radio operator issued by the National Aviation Safety Agency (AESA) and a practical training certificate as a radio operator issued by an examiner authorised by AESA; or Have the knowledge necessary to obtain a radio operator certification, accredited by means of a rating annotated on a pilot licence or certification issued by an approved training organisation (ATO) or an ultra-light school in accordance with Article 33 (1) (e) of Royal Decree 1036/2017 (*Valid until 25/06/2026)	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 34.1.a RD UAS 517/2024 First transitional provision of Royal Decree UAS 517/2024 (*Valid until 25/06/2026). If the air band radio and/or alternative means of communication was required by the ATS provider or the aerodrome or heliport manager.

MAE03	Strategic	Certify proper knowledge of the language or languages used in aeronautical communications, which will be considered accredited when remote pilots are holders of a valid language proficiency certificate that accredits at least their operational level (level 4) in accordance with Order FOM/1146/2019 of 13 November, supplementing the scheme applicable to aeronautical personnel in the field of linguistic proficiency.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 34.1.b RD UAS 517/2024 If the air band radio and/or alternative means of communication was required by the ATS provider or the aerodrome or heliport manager.
MAE04	Strategic	Prior coordination of the language to use in aeronautical communications between the operator and the air traffic service.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	This shall be considered especially when foreign operators are going to operate in Spain (English or Spanish).

MAE05	Strategic	Have an alternative means of communication with ATS (mobile phone).	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	At the discretion of the ATS provider and/or the aerodrome or heliport manager. As determined in the pre-tactical coordination.
MAE06	Strategic	Have the express coordination or affirmative response of the ATS provider and the aerodromes or heliports in question. The operation will be carried out subject to the conditions and limitations set out in this coordination.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 42.2.b RD UAS 517/2024 The justification will be the document "Operational Risk Assessment and Mitigation (ORAM) for UAS operations in general UAS geographical zones for safety reasons in controlled airspace and flight information zone (FIZ)" or similar.

MAE07	Strategic	File a flight plan for air traffic services (FPL). The flight plan shall expressly state that it is an unmanned aircraft system (UAS).	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 42.3 RD UAS 517/2024 At the discretion of the ATS provider. As determined in the pre-tactical coordination.
MAE08	Strategic	When engaged in autonomous operations, the flight plan shall expressly state that it is an unmanned autonomous aircraft.	-Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	
MAE09	Strategic	Coordination with the manager of the aerodrome, including heliports, if intending to operate inside general UAS geographical zones for safety reasons in the vicinity of aerodromes and heliports, or civil or military heliports, as established in Article 41 of RD UAS 517/2024	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	Art. 41.3 RD UAS 517/2024

MAE10	Strategic	Have procedures for consulting and analysing the different departure and arrival procedures in the AIP for the airport in question based on its possible operational configurations (runway in use), including missed approaches and takeoffs with an engine failure. Operations must be carried out by personnel who have the necessary skills to comply with the query and interpretation mitigations of the FLIGHT PROCEDURES.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	At the discretion of the ATS providers. The remote pilot training defined by EASA does not include familiarisation with the AIP and the interpretation of aeronautical charts, which is why the proper implementation of this measure must be demonstrated as an annex in the Operational risk assessment and mitigation.
MAE11	Strategic	Operational restriction in terms of exposure time. (use as little time as possible).	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	

MAE12	Strategic	Prior coordination, in the Operational Risk Assessment and Mitigation, of the ARCID code and call sign to use in the operations.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	The justification will be the document "Operational Risk Assessment and Mitigation (ORAM) for UAS operations in general UAS geographical zones for safety reasons in controlled airspace and flight information zone (FIZ)" or similar. Specified in the operational coordination procedure.
MAE13	Strategic	Analysis of time slots with the lowest air traffic density in the planned area of operations.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	To be evaluated by the aerodrome or heliport manager when coordinated with said manager (MAE09) according to its procedures

MAE14	Strategic	When a tethered unmanned aircraft is used, it will be located in zones that do not hinder the operations of other airspace users, and its location will always be coordinated with the affected ATS unit beforehand. Operations with tethered unmanned aircraft inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports must be carried out during periods of low activity.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	The aerodrome or heliport manager will evaluate the "low-activity periods" when coordinating with said manager as per its procedures Necessary flight procedure assessment mitigation
MAE15	Strategic	When flying over 120 m above an obstacle, a maximum horizontal distance from the pilot to the obstacle must be defined in order to maintain situational awareness.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	

MAE16	Strategic	Establish additional horizontal and vertical safety zones.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside safety distances of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	It may be required by ATSP during the pre-tactical coordination, depending on the specific place of operations, and in a justified manner.
MAE17	Strategic	Perform the UAS operation at the most appropriate time, as determined by the ATS unit concerned.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	At the pre-tactical and tactical level.

MAE18	Strategic	At the discretion of the ATS provider, the operation will be published in a NOTAM, ATIS, DATIS or other means of aeronautical dissemination when the UAS operations are determined to pose a potential risk to manned aviation operations.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	At the discretion of the ATSP.
MAE19	Strategic	The operation will be published in a NOTAM	- STS-ES-02 - STS-ES-02NE	- Inside and outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when the altitude of the flight is in excess of 60 metres	

MAE20	Strategic	Have procedures for checking activities and warnings for airspace users (NOTAM) in the planned operations area. Operations must be carried out by personnel who have the necessary skills to comply with the query and interpretation mitigations of the NOTAM, ATIS and DATIS. As applicable, the ENAIRE DRONES application and INSIGNIA and ICARO XXI platforms may be used, and specifically the "BOL" Bulletins feature of the latter, with all the information of interest with regard to an aerodrome or operations zone.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports	The remote pilot training defined by EASA does not include familiarisation with the AIP and the interpretation of aeronautical charts, which is why it must be demonstrated in the "Operational risk assessment and mitigation (ORAM)" or similar (check Drones ENAIRE/ICARO XXI/check ATIS frequencies in AIP).
MAE21	Strategic	Regardless of the maximum height allowed in the operational category or in the approved CONOPS, the ATSP may require a lower maximum operating height	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	

MAE22	Strategic	Have at least one flashing green light to ensure the visibility of the unmanned aircraft at night	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	UAS.SPEC.050.1.l It will be required for night flights.
MAE23	Strategic	Have anti-collision or navigation lights, as long as they do not create confusion for other users.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	Art. 43.6.a. RD UAS 517/2024. May be required by the ATSP. As determined in the pre-tactical coordination.

MAE24	Strategic	Have a transponder or other identification system (e.g., ADS-b "out") for air traffic services.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	Art.43.6.a RD UAS 517/2024 May be required by the ATSP. As determined in the pre-tactical coordination.

MAT01	Tactical	Check of activities and warnings for airspace users (NOTAM, ATIS/DATIS, etc.) in the area where the UAS operations will take place. As appropriate, the following may be used: the ENAIRE DRONES application, INSIGNIA and ICARO XXI platforms, and specifically the "BOL" Bulletins feature of the latter, with all the information of interest with regard to an aerodrome or operations zone.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	The remote pilot training defined by EASA does not include familiarisation with the AIP and the interpretation of aeronautical charts, which is why it must be demonstrated in the "Operational risk assessment and mitigation (ORAM)" or similar (check ATIS frequencies in AIP). Otherwise, the specific frequency of the ATIS must be indicated by the ATSP during the tactical coordination.

MAT02	Tactical	Monitor the relevant aeronautical frequency or, failing that, be able to communicate via mobile phone (suitable sound volume and with coverage).	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	If the air band radio was required by the ATS provider or the aerodrome or heliport manager.
MAT03	Tactical	Contact the ATS unit in advance as specified by the ATSP, as per the coordination procedure, to verify the viability of the operation.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	

MAT04	Tactical	Have prior authorisation from air traffic control (ATC) or be in communication with Aerodrome Flight Information Service (AFIS) personnel. When making initial contact with air traffic service units, call signs for remotely piloted aircraft must include the word "Unmanned".	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	Art. 42.3 RD UAS 517/2024
MAT05	Tactical	When making initial contact with air traffic service units when engaged in autonomous operations, call signs for unmanned autonomous aircraft must include the words "unmanned autonomous".	-Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	
MAT06	Tactical	Report the completion of the operation to the air traffic service (ATS) unit.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	

MAT07	Tactical	The availability and implementation by the UAS operator of specific procedures for abnormal and emergency situations, with the main measure being radio/telephone notification to the ATS unit in case of loss of UAS control (fly-away).	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	
MAT08	Tactical	Prior analysis of VHF coverage in the planned operations area, as well as of the telephone network coverage if this method is used, either as the main communications system, or as the alternative system if the main system fails. Before starting the operation, the operator must be ready to make a radio test and/or a call if deemed appropriate by the ATS unit.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	If the air band radio and/or alternative means of communication was required by the ATS provider or the aerodrome or heliport manager.
MAT09	Tactical	For tethered unmanned aircraft, when the location of the unmanned aircraft flight takes place in the standard flight paths of manned aircraft, steps shall be taken to ensure that the operation can be suspended by landing the unmanned aircraft sufficiently far in advance of a manned aircraft flying over said location.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	The operator shall indicate in the technical characteristics of the UAS the recovery times for the tethered unmanned aircraft.

MAT10	Tactical	Request collision avoidance guidance or traffic information on manned aircraft in the vicinity.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when the operation is of a specific category under operational authorisation - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	
MAT11	Tactical	Immediate landing by communication from the ATS service or traffic information from AFIS.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 - STS-ES-02NE - STS-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	
MAT12	Tactical	When a tethered unmanned aircraft is used, the cable and tether system will be monitored for faults. If the containment system breaks, actions will be taken as per the abnormal and emergency procedures, which will contain as the main measure landing the aircraft and notifying the ATS unit by radio/telephone.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 - STS-ES-02 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	

MAT13	Tactical	If the pilot "does not have a visual picture of the environment", they must rely on airspace observers and/or other means to prevent an unexpected encounter with a manned aircraft.	- Open category - STS-ES-01 - STS-ES-01NE - STS-01 -Specific category under operational authorisation	- Outside general UAS geographical zones for safety reasons in the vicinity of airports and heliports when one or more of the conditions of article 42.2.a is not met: • VLOS • H < 60 metres - Inside general UAS geographical zones for safety reasons in the vicinity of airports and heliports.	Especially in urban environments, where it is more difficult to observe other airspace users (subcategory A1 and A2, STS-ES-01 and STS-01).