GUIDE FOR COORDINATING AERONAUTICAL SAFETY STUDIES WITH THE AIR NAVIGATION SERVICE PROVIDER ENAIRE

This guide explains how to coordinate the Aeronautical Safety Study (EAS in Spanish) of an RPAS Operator[1] with the air navigation service provider ENAIRE, the criteria that the company (ENAIRE) applies in its analysis of these studies based on the SORA Methodology, from the international group JARUS, and the strategies that operators can follow to improve the times and results in this mandatory step (Royal Decree 1036/2017 Art 24.3) prior to AESA's authorisation to operate in **controlled airspace**[2].

There are three questions that an RPAS Operator should ask before initiating the coordination of an EAS, as reflected in the three sections into which this guide is subdivided:

1. Prepare an original EAS or opt into a standard scenario?
2. How to opt into a standard scenario?
3. How to prepare an original EASoutside the standard scenarios?

In addition to the above, this Guide explains how ENAIRE provides evidence of the coordination conducted:

4. EVIDENCE of Coordination

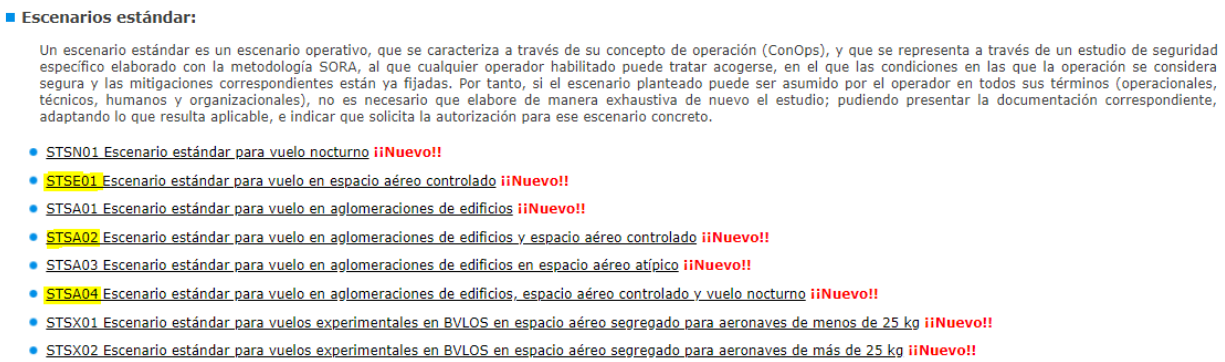
[1] **Law Enforcement Agencies (LEA)** and other subjects of **Article 3 of RD 1036/2017** are also considered here since, although they do not need authorisation from AESA, **they are required to coordinate with the ANSP affected by their RPAS operations**.

[2] The proof or demonstration that an EAS has been coordinated with ENAIRE is the **EVIDENCE of Coordination** that ENAIRE issues **for a specific Operator and EAS**

1. Prepare an original EAS or opt into a standard scenario?

This is the first question that the RPAS Operator must ask.

AESA has published half a dozen standard scenarios, some of which (three currently) consider operations in controlled airspace under highly specific conditions in its CONOPS[3].



Escenarios estándar:

Un escenario estándar es un escenario operativo, que se caracteriza a través de su concepto de operación (ConOps), y que se representa a través de un estudio de seguridad específico elaborado con la metodología SORA, al que cualquier operador habilitado puede tratar acogerse, en el que las condiciones en las que la operación se considera segura y las mitigaciones correspondientes están ya fijadas. Por tanto, si el escenario planteado puede ser asumido por el operador en todos sus términos (operacionales, técnicos, humanos y organizacionales), no es necesario que elabore de manera exhaustiva de nuevo el estudio; pudiendo presentar la documentación correspondiente, adaptando lo que resulta aplicable, e indicar que solicita la autorización para ese escenario concreto.

- STSN01 Escenario estándar para vuelo nocturno **¡¡Nuevo!!**
- STSE01 Escenario estándar para vuelo en espacio aéreo controlado **¡¡Nuevo!!**
- STSA01 Escenario estándar para vuelo en aglomeraciones de edificios **¡¡Nuevo!!**
- STSA02 Escenario estándar para vuelo en aglomeraciones de edificios y espacio aéreo controlado **¡¡Nuevo!!**
- STSA03 Escenario estándar para vuelo en aglomeraciones de edificios en espacio aéreo atípico **¡¡Nuevo!!**
- STSA04 Escenario estándar para vuelo en aglomeraciones de edificios, espacio aéreo controlado y vuelo nocturno **¡¡Nuevo!!**
- STSX01 Escenario estándar para vuelos experimentales en BVLOS en espacio aéreo segregado para aeronaves de menos de 25 kg **¡¡Nuevo!!**
- STSX02 Escenario estándar para vuelos experimentales en BVLOS en espacio aéreo segregado para aeronaves de más de 25 kg **¡¡Nuevo!!**

Opting into a standard scenario means that the RPAS Operator **will only** operate under the conditions specified in the CONOPS of that scenario and will **always** comply with the mitigation measures described therein. This entails a series of restrictions on the operations that the RPAS Operator can carry out, since **the authorisation that it will ultimately receive from AESA will be to operate within the CONOPS of the EAS presented** and no other. In return, the RPAS Operator receives two (2) important advantages:

i. The Aeronautical Safety Study (EAS) is practically completed, done. The RPAS Operator will not have to carry out a new risk analysis (because it is already attached as an ANNEX to each standard scenario) or implement risk mitigation measures in addition to those already listed in

[3] CONOPS, or Concept of Operations, is a fundamental part of an EAS and defines the conditions under which an RPAS Operator will conduct its operations. For example, if they can take place in controlled airspace, over congested areas of cities, over persons, inside an airport environment, etc.

the standard scenario. It is simply a question of opting into this standard scenario and adapting it to specific conditions (see how in point 2 of this Guide).

ii. As it is a scenario that is already well known to ENAIRE, the review of an EAS from an RPAS Operator who opts into a standard scenario is much faster, as is the Coordination, with generally no more than 2 or 3 iterations (emails between ENAIRE and the RPAS Operator) being required for the RPAS Operator to receive the Evidence of Coordination. Presumably, it will also be easier for AESA to oversee an EAS that it itself has prepared and published than one that has never before been published and has been written from scratch by the Operator.

However, the RPAS Operator sometimes intends to conduct operations whose CONOPS is not within the conditions described in the CONOPS of any of the standard scenarios published by AESA for operating in controlled airspace, either because the RPAS Operator has a very specific flight area (as in the case of local police forces, for example), or because it wishes to operate in an unforeseen scenario (as is the case with so-called "airport environments"). In this situation, having ruled out the possibility of limiting its operations to the CONOPS of one of the standard scenarios, the RPAS Operator must conduct its own Aeronautical Safety Study (EAS) and the corresponding risk analysis for the CONOPS of its operations (see point 3 in this Guide).

This will require not only more effort and work on the part of the RPAS Operator, but will also require a more in-depth analysis, and not merely a review, by ENAIRE's safety analysts, who will have to carry out their own risk analysis for that CONOPS and compare it with that of the operator, before then informing said operator of the relevant mitigation measures to take and the corrections that must be made to the EAS. This obviously takes more time and communication, meaning the RPAS Operator will usually have to wait longer to obtain the Evidence of Coordination from ENAIRE. In return, the RPAS Operator knows that, since the CONOPS of its EAS is tailor-made for its operations, the subsequent authorisation from AESA will cover its commercial activities perfectly.

2. How to opt into a standard scenario?

Opting into a standard scenario is almost as easy as declaring it from the beginning. Specifically, the Purpose of each standard scenario published by AESA contains a **Purpose** paragraph, such that:

> **1. OBJETO**
>
> El presente documento describe el escenario estándar (STS) definido por la Agencia Estatal de Seguridad Aérea, incluidas las condiciones, limitaciones y medidas de mitigación para la reducción del riesgo que ha de satisfacer el operador de RPAS para el ejercicio de ese tipo de operaciones.
>
> Un escenario estándar es un escenario operativo, que se caracteriza a través de su concepto de operación (ConOps), y que se representa a través de un estudio de seguridad específico elaborado con la metodología SORA, al que cualquier operador habilitado, puede tratar de acogerse, y en el que las condiciones en las que la operación se considera segura y las mitigaciones correspondientes están ya fijadas.
>
> Cualquier desviación de lo indicado en este documento supondrá el no cumplimiento con este escenario operacional.

where the RPAS Operator can simply replace the third-person sentence in the singular with one in the first person, declaring its **willingness as the RPAS Operator authorised with "Name X" to opt into this "STSx-X" scenario**. This simple way of "opting into" a standard scenario is the one that applies to the **customisation or particularisation of the rest of the document** in the chosen standard scenario: wherever the scenario refers to the operator using phrases such as "the operator states", the "operator commits", "the operator shall", or where reference is made to **the operator's own documentation** such as "the Operator's Operations Manual", the RPAS Operator will enter its **authorised operator name and specific references to its own internal documentation**. Thus, although the Operator is opting into a standard scenario, the final result will be an EAS that is unique to the RPAS Operator, on the basis of which ENAIRE will be able to issue EVIDENCE of Coordination that is also unique to that Operator.

The customisation or adaptation of the standard scenario also affects other very specific areas of any standard scenario that the operator decides to opt into, specifically:

A. In the operational requirements and procedures, to describe aircraft performances, flight geography, containment areas or safety margins according to the **SORA semantic model**, the RPAS Operator can choose to describe them in the EAS itself or to write the reference where they may be found, such as a reference to the Operations Manual where this information and all its definitions are contained.

> El operador debe tener en cuenta, de acuerdo al modelo semántico de SORA y los objetivos de contención, las distancias de seguridad tanto en tierra como en aire para minimizar el riesgo, asociadas al tipo de operación (normal y situaciones anormales y de emergencia). El modelo semántico es el modelo utilizado en SORA que correlaciona las fases de operación, los procedimientos y los volúmenes operativos.
>
> Por tanto, el operador, debe describir, de acuerdo a la operación pretendida, performance de la aeronave y demás aspectos relacionados, la **geografía del vuelo, área de contención** y los **márgenes de seguridad** (Ver Apéndice S). Cuando las operaciones transcurran en aglomeraciones de edificios las distancias horizontales se establecerán de acuerdo a lo establecidos en los requisitos al efecto en este apartado. Del mismo modo, debe plantearse el volumen operacional de manera que se mantengan las distancias adecuadas para cumplir los objetivos de contención según el volumen de espacio aéreo donde se pretenda realizar la operación.

B. In the "Operating procedures" (point 3.2 of the standard scenarios), following the sentence "include the instructions for completing and **filing the Flight Plan for air traffic services (FPL)**,"

3.2. Procedimientos operacionales

El Operador debe tener descrito este tipo de operación en su Manual de Operaciones, según el Apéndice E, y detallar los procedimientos normales, anormales y de emergencia particulares de este escenario, así como incluir las instrucciones para la cumplimentación y presentación del Plan de Vuelo para los servicios de tránsito aéreo (FPL), el uso de la fraseología estándar en las comunicaciones y los métodos de coordinación. A efectos de ajustarse al CONOPS del presente escenario estándar, el Manual de Operaciones ha de incluir la definición de "entorno aeroportuario" facilitada en el Apéndice S. Así como los procedimientos e instrucciones a seguir durante la preparación del vuelo para verificar que el perfil de vuelo a ejecutar se realizará, en todo momento, fuera del entorno aeroportuario (volumen alrededor de la infraestructura aeronáutica). También se deben incluir los procedimientos e instrucciones para cumplir las condiciones de vuelo en zona de aglomeraciones de edificios en ciudades, pueblos o lugares habitados.

the **"call sign"** chosen by the RPAS Operator must be specified and shall comply with the following criteria:

The call sign (called ARCID in the forms for filing the flight plan) must have **a maximum of 7 characters,** the first **3 to 6** of which will be letters of the English alphabet **designating the RPAS operator,** and the last **1 to 2** of which will be a numerical figure between 1 and 99 **to designate the flight number**.

Warning: the RPAS Operator will choose the call sign according to the above criteria, without prejudice to the possibility of using a different **call sign** or **telephony identifier/designator** that is easier to pronounce and does not have the limitations of the one specified in ITEM 7 of a Flight Plan or FPL message, but that shall represent the name of the RPAS Operator just the same and will be followed by the flight number (see criteria in **ICAO Doc. 8585**).

Examples (fictitious):

Name of the RPAS Operator	Call sign (3 to 7 characters)	Telephony Identifier/ Call Sign *
Argonauts, S.L.	ARGON75	ARGONAUTA 75
Municipal Police of Madrid	PMMAD16	MUNICIPAL 16

Media Drones, S.A.	MEDIA2	MEDIA 2
Cos de Mossos d'Esquadra	CME33	MOSSO 33
Francisco Sánchez López	FRSAL2	FRANSAL 2

* Pursuant to **Article 45.5 of Royal Decree 1180/2018**: "When making initial contact with air traffic service units, call signs for remotely piloted aircraft must include the word **"Unmanned"**, and the flight plan shall expressly state that it is a remotely piloted aircraft (RPA)". E.g., "Argonauta 75 unmanned request clearance".

Following the sentence "[...] the use of standard phraseology in communications [...]," add "**in the language** "and specify whether the RPAS Operator is authorised to communicate in "**Spanish**", in "**English**" or equally in "**Spanish or English, at the request of the controller**".

This way, when the RPAS Operator obtains authorisation from AESA to fly in controlled airspace, it will do so for a given CONOPS (the one specified in its EAS), with a **call sign reserved for it** and in the **language chosen** or designated in the EAS.

This customisation of the operational scenario, which is reviewed by ENAIRE's safety specialists before the EVIDENCE of Coordination is provided, helps to make the RPAS Operator's EAS consistent with the operator's other documentation. It also complies with the requirement that **the Operator read, review and adapt a document, the one for the standard scenario to which it claims to be opting into**, which is practically identical to the document published by AESA on its website.

3. How to prepare an original EAS[4] outside the standard scenarios?

In cases where the operations intended by the RPAS Operator do not conform to the CONOPS of any standard scenario published by AESA, for example, for police security and surveillance operations or for operations within an airport environment (currently there is no standard scenario published by AESA that includes operations in an airport environment[5]), a new and **original** Aeronautical Safety Study (EAS), including a risk analysis that is based on a particular CONOPS, whether generic or specific, must be conducted[6].

The structure and methodology to follow when preparing this original EAS is given in AESA Appendix S "Guide to the Content of the Aeronautical Safety Study", but operators must keep in mind that this Appendix S is limited to presenting the minimum contents and does not go into details, meaning it is a guide, not an example of an EAS per se. As a result, operators should not simply reproduce or "copy" the contents of Appendix S in an EAS.

When it comes to an original EAS, each RPAS Operator prepares and develops its Aeronautical Safety Studies (EAS) in its own way, which is perfectly understandable if we considered that, despite following the same risk analysis methodology (SORA[7]), the drafting of an EAS is a creative process where **the RPAS Operator demonstrates or aims to demonstrate to the competent authorities (ATSP and AESA) the safety of its operations for the CONOPS within which it intends to carry them out**.

However, ENAIRE's Safety Division has noticed that RPAS Operators, which work in professional sectors rarely linked to aviation, not only need to know how to structure and prepare an Aeronautical Safety

[4] Original refers to an EAS whose CONOPS does not correspond to any standard AESA scenario.
[5] For the purposes of this Guide, "airport environment" is as defined in Appendix S of AESA.
[6] A generic EAS considers operations for any date or location as long as these operations are limited to the CONOPS of the EAS (the standard scenarios, for example, are all generic). A specific EAS, on the other hand, considers an operation for a highly specific and delimited location and/or date.
[7] Edition 2.0 of the SORA risk analysis methodology, from the JARUS group, of which AESA is a part, must always be used.

Study (EAS), but also some guidelines on how the air navigation service provider (ANSP) is going to assess the mitigation measures that the RPAS Operator proposes to reduce the risk of its operations.

The intention of Section 3 of this document "Guidelines for Coordinating Aeronautical Safety Studies (EAS) with the air navigation services supplier (ANSP) ENAIRE" is to offer RPAS Operators guidelines on how ENAIRE's operational safety specialists analyse and evaluate each EAS received, and the technical criteria that are followed to attain the effective coordination of an original EAS (an EAS that does not correspond to a standard scenario).

3.1. Three-layer analysis: Legal, Operational Safety and Tactical-Operational Coordination

Royal Decree 1036/2017 assigns the ATSP or ANSP that provide ATS services in Spain the task of **coordinating the air risks identified in the EAS with the RPAS Operator.** This means that the air navigation service provider agrees with the RPAS Operator on the risks associated with its operations in controlled airspace and on the measures to be taken by the latter to mitigate those risks. This agreement or coordination between the two is embodied in an **EVIDENCE OF COORDINATION issued by the ANSP to the RPAS Operator,** which, as stipulated in **Article 24.3 of Royal Decree 1036/2017,** must be incorporated into AESA's authorisation procedure (Article 40 of Royal Decree 1036/2017) in order to operate in controlled airspace.

ENAIRE analyses any original Aeronautical Safety Study submitted by an RPAS Operator on three levels:

- **Legal level:** by verifying that the intended operations, described in the CONOPS, are allowed by the applicable law (Royal Decree 1036/2017), that the Operator is aware of the limitations of its operations and the requirements of the Rules of the Air that are applicable to its RPAS operations.

- **Operational Safety Level, or ARC:** by examining the **air risk analysis** conducted by the RPAS Operator as part of its EAS and evaluating the mitigation measures it proposes to minimise the possibility of causing damage to third parties in the air.

- **Tactical-operational level:** by verifying that the Operator knows the environment in which it intends to operate (controlled airspace, airport environment, etc.), as well as the tools it must use **and the organisations or entities with which it will have to coordinate tactically or pre-tactically** (once AESA's authorisation is received) so that RPAS operations benefit from the required safety and can be carried out with no major risks.

3.2. What is checked in an EAS? Some key points

In light of the three levels described above, **the safety specialists and analysts** in ENAIRE's Operational Safety Division **check** at least these points:

1. (Legal) The applicant for the coordination of the EAS is an **RPAS Operator authorised by AESA**, whether the RPAS Operator itself requests the coordination or entrusts the coordination to a third party (manager) authorised by it.

2. (Legal) (Operational Safety) The **CONOPS** of the EAS presented is **clearly defined** and is within the limits of Spanish law for operating an RPAS. For the CONOPS to be clearly defined, **it must include at least**:

    i. **Mode of operation**: VLOS, EVLOS or BVLOS

    ii. **Maximum altitude (AGL)** of RPAS operations (never higher than 120 m AGL, obviously, but it can be lower if this smaller value is still valid for the activity or business of the RPAS Operator). The maximum altitude of the operations is directly proportional to the risk of damage to third parties, both on land (GRC, impact energy) and in the air (ARC, probability of encountering manned aircraft). It should be limited as much as possible.

iii. **Class of** controlled **airspace**[8] where the RPAS operations will take place, **specifying whether the airport environment is included or not** (this airport environment is defined in Appendix S)

iv. **Type of area** where the operations will be conducted: **rural or urban** areas (over congested areas), specifying also whether the RPAS will fly over **open-air assemblies of persons.**

v. **Flight schedule:** daytime (from sunrise to sunset), night-time or both.

vi. **MTOM of the RPA** that will be used in the RPAS operations (obviously, legally it will not be able to exceed 25 or 10 kg, depending on the area to be overflown, but a lower value can be set that covers all the Operator's aircraft and further reduces the risk resulting from the analysis). The mass of the RPA or drone is directly proportional to the risk of damage to third parties, both on land (GRC, impact energy) and in the air (ARC, damage to manned aircraft). It should be limited as much as possible.

vii. **Location** of the operations.

If the operation is always limited to a specific location or flight zone (e.g. CTR Asturias, ATZ Barcelona), the EAS will include an analysis of the area and evaluate the risks and all the factors specific to the location (orography, air traffic density, nearby airports, flight procedures in the area of operation, etc.).

For a generic EAS whose CONOPS does not specify the location of the operation, but which is intended for operations INSIDE an airport environment, the EAS must include in its ANNEXES an assessment of the threats and risk factors for, at least, two Spanish airport environments, one a medium-low traffic density airport (e.g. LEAS, LEVT), and another a medium-high density airport (LEAL, LEBL).

[8] The airspace class of any CTR or ATZ in Spain can be found in Section 17 of the aerodrome data in AIP AD_2. Classes A, B, C, D and E are considered controlled airspace. Classes F and G are uncontrolled airspace.

Other data that the Operator can provide and that improve the specification of the CONOPS, while also facilitating the subsequent risk analysis, are:

viii. **Purpose or nature of the operations**: whether shooting video or photos, monitoring infrastructure or measuring some parameter.

ix. **Type of RPA aircraft:** fixed or rotary wing or other.

x. **Average duration** of each operation and their daily **frequency**. E.g., the operations involve checking high-voltage towers with 3 take-offs every hour and lasting 10 minutes each.

xi. Any other information contained in **Annex A of the SORA methodology.**

If the RPAS Operator cannot or does not wish to specify these optional points within its CONOPS, ENAIRE's safety analyst will assume that they are undetermined (generic) and will always use the highest risk scenario of all those possible. E.g., If the RPA type is not specified, the analyst will assume that the operations could be carried out with any RPA type, fixed or rotary wing, with the corresponding differences in terms of the manoeuvring speed and capacity that exist between them in the SORA semantic model.

3. (Legal) The RPAS Operator knows the **obligations (and rights)** it has **as a user/operator** of the class of controlled airspace where it is going to operate (see ENR 1_4 of the AIP), including the filing of a **Flight Plan or FPL message**, for which it has already selected a **Call Sign** and a **language for communicating** with ATC (see **point 2.B** in this Guide).

4. (Legal) In its EAS, the RPAS Operator complies with or declares to be in compliance with the **technical and personnel requirements** for operating an RPAS in **controlled airspace** (VHF aeronautical band communications equipment and radio operator qualification).

5. (Operational Safety) The RPAS Operator **has correctly identified the air risk class (ARC)** of its operations.

6. (Operational Safety) The RPAS Operator **has set up strategic risk mitigation measures**[9]that effectively reduce the ARC. This is an optional step in SORA (Step # 5) but absolutely recommended when the initial ARC is high (ARC-c or ARC-d). This is where the RPAS Operator's desire and creativity to make its operations safe come into play. **SORA Annex C** contains several examples, and **ANNEX I** of this Guide provides an entire series of strategic mitigation measures (**MME** in Spanish), such as:

    i. **Reduction or confinement of the volume in which operations will take place (MME8)**, with the altitude AGL as an essential parameter, which may be limited via software (flight controller). E.g., An RPAS Operator that maintains high-voltage towers and knows that it does not need to exceed 50 m AGL to perform this activity, can incorporate this maximum altitude or height into the CONOPS for its operations and set it as an important strategic mitigation measure. In addition, it can enhance (provide robustness, that is, guarantee and integrity) this measure by pre-setting all its equipment (flight software) at this operational level or volume.

    ii. Reducing the **exposure time and adapting to a schedule** with lower air traffic density (**MME10** and **MME11)**. E.g., An RPAS operator involved in filming that intends to take aerial shots for films will hardly be able to choose the moment (the light) needed or required by the film director, while an RPAS Operator whose activity consists of inspecting roof HVAC units will undoubtedly be able to schedule its operations in order to minimise the risk of colliding with other aircraft, as specified to it by the ANSP ATS service.

    iii. Reporting the RPAS operation to all other users of the airspace via **NOTAM (MME14)**, which inform other aeronautical users - whether of manned or unmanned aircraft - and the closest ATC controller of the hours and volume of airspace where the operations will take place.

[9] Strategic: given sufficiently far in advance, from hours to years. As opposed to "Tactical," which take place at that very moment or on very short notice. This thus involves strategic decisions and tactical decisions, strategic mitigations and tactical mitigations. With regard to RPAS operations, the strategic aspect is within the purview of the RPAS Operator, while the tactical aspect is within the pilot's purview.

Of course, the RPAS Operator may resort to other strategic mitigating measures that it deems relevant to demonstrate to the ANSP the effective reduction of the initial ARC and the resulting ARC. As noted in SORA Annex C, "*The size and complexity of the Strategic Mitigation reduction depends entirely on what the operator is trying to do, and where/when they want to do it*".

7. (Operational Safety) The **reduced or residual ARC** attained by the RPAS Operator through the aforementioned strategic mitigation measures and evidenced in its EAS matches ENAIRE's evaluation based on its experience as a manager of the airspace where the operations will take place (**agreed/coordinated final ARC**).

8. (Operational Safety) To demonstrate that it can operate safely within the final ARC that it has agreed with the ANSP, the RPAS Operator implements a series of **tactical measures**[10] to mitigate **the risk** of all its RPAS operations, which the ANSP will examine in light of **SORA Annex D**, of ENAIRE's current systems and of the equipment (transponder, FLARM, ADS-B, TCAS, etc.) that the Operator claims to have in its RPAS. **ANNEX I** to this Guide provides an entire series of tactical mitigation measures (**MMT** in Spanish). E.g., A **mode S transponder** installed on the RPA is regarded as a very important tactical risk mitigation measure because ENAIRE's systems and its ATC will undoubtedly be able to locate (radar coverage) the position and altitude of the RPA aircraft. Having an **ADS-B IN system** is a measure that provides less mitigation, since ENAIRE's ATC units do not have the appropriate means for displaying it to the controller, meaning it would only be useful to the RPAS Operator's situational awareness of commercial traffic (which usually carries ADS-B OUT on board).

9. (Operational Safety) The RPAS Operator has an **Emergency Response Plan (ERP)** which lays out as the **first measure,** in the event that the operator loses situational awareness or visual contact with the aircraft (whether operating in VLOS or BVLOS), to immediately report this event to the ATC unit affected by the RPAS operation.

[10] Strategic: given sufficiently far in advance, from hours to years. As opposed to "Tactical," which take place at that very moment or on very short notice. We are thus speaking about strategic decisions and tactical decisions, about strategic mitigations and tactical mitigations. With regard to RPAS operations, the strategic aspect is within the purview of the RPAS Operator, while the tactical aspect is within the pilot's purview.

10. (Pre-tactical and Tactical Coordination)[11] The RPAS Operator has a **clear and standardised procedure** in which it identifies **with whom it must pre-tactically coordinate each RPAS operation** that it is preparing to conduct, identifying the **organisations and entities (including ENAIRE) that will be affected** by its operations and have available or know the **proper channels for communicating** with each of these actors **for the full scope of its CONOPS**.

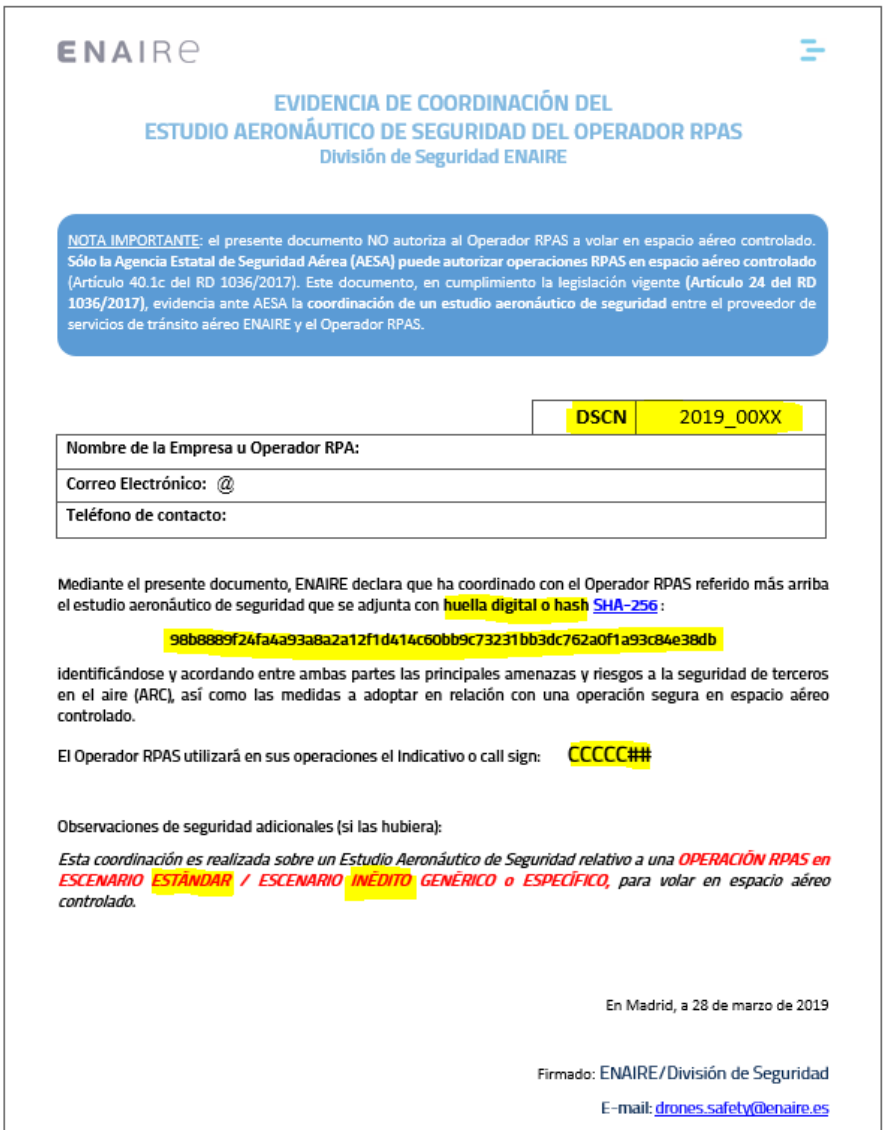
Naturally, the coordination of an original Aeronautical Safety Study (EAS) will require continuous and repeated communications between the RPAS Operator and the ANSP (ENAIRE). This, together with the longer time it takes to analyse the EAS, is the reason why the coordination period for an original EAS takes considerably longer than that associated with coordinating the EAS of a standard scenario, a consideration that the RPAS Operator must also assess before deciding.

[11] Pre-Tactical and Tactical Coordination at ENAIRE is fundamental and necessary for any RPAS operation. In addition to the strategic coordination of the EAS, the diagram in **ANNEX II to this Guide** describes the subsequent pre-tactical and tactical coordination. Note that **ENAIRE's ATC will need two things to authorise or give tactical "clearance"** to an RPAS operation: The **Flight Plan** or FPL and the **COOP Reference** (Dept. for the Operational Coordination of Airspace cop@enaire.es). If the Operator has not previously coordinated with COOP (pre-tactical coordination) or has not filed a Flight Plan as per the guide published by ENAIRE for this purpose, the operation will not be authorised by ATC.

4. EVIDENCE of Coordination

The EVIDENCE of Coordination is a **unique document that ENAIRE issues to the RPAS Operator** stating that it agrees with the air risks (ARC) considered in the EAS by the operator and the mitigating measures adopted by the operator to carry out its operations.

The EVIDENCE is a numbered document (by way of an encrypted hash or cryptographic code) that is eventually coordinated between the RPAS Operator and ENAIRE.



ENAIRE

EVIDENCIA DE COORDINACIÓN DEL
ESTUDIO AERONÁUTICO DE SEGURIDAD DEL OPERADOR RPAS
División de Seguridad ENAIRE

NOTA IMPORTANTE: el presente documento NO autoriza al Operador RPAS a volar en espacio aéreo controlado. **Sólo la Agencia Estatal de Seguridad Aérea (AESA) puede autorizar operaciones RPAS en espacio aéreo controlado** (Artículo 40.1c del RD 1036/2017). Este documento, en cumplimiento la legislación vigente **(Artículo 24 del RD 1036/2017)**, evidencia ante AESA la **coordinación de un estudio aeronáutico de seguridad** entre el proveedor de servicios de tránsito aéreo ENAIRE y el Operador RPAS.

DSCN	2019_00XX
Nombre de la Empresa u Operador RPA:	
Correo Electrónico: @	
Teléfono de contacto:	

Mediante el presente documento, ENAIRE declara que ha coordinado con el Operador RPAS referido más arriba el estudio aeronáutico de seguridad que se adjunta con **huella digital o hash** SHA-256 :

98b8889f24fa4a93a8a2a12f1d414c60bb9c73231bb3dc762a0f1a93c84e38db

identificándose y acordando entre ambas partes las principales amenazas y riesgos a la seguridad de terceros en el aire (ARC), así como las medidas a adoptar en relación con una operación segura en espacio aéreo controlado.

El Operador RPAS utilizará en sus operaciones el Indicativo o call sign: CCCCC##

Observaciones de seguridad adicionales (si las hubiera):

Esta coordinación es realizada sobre un Estudio Aeronáutico de Seguridad relativo a una OPERACIÓN RPAS en ESCENARIO ESTÁNDAR / ESCENARIO INÉDITO GENÉRICO o ESPECÍFICO, para volar en espacio aéreo controlado.

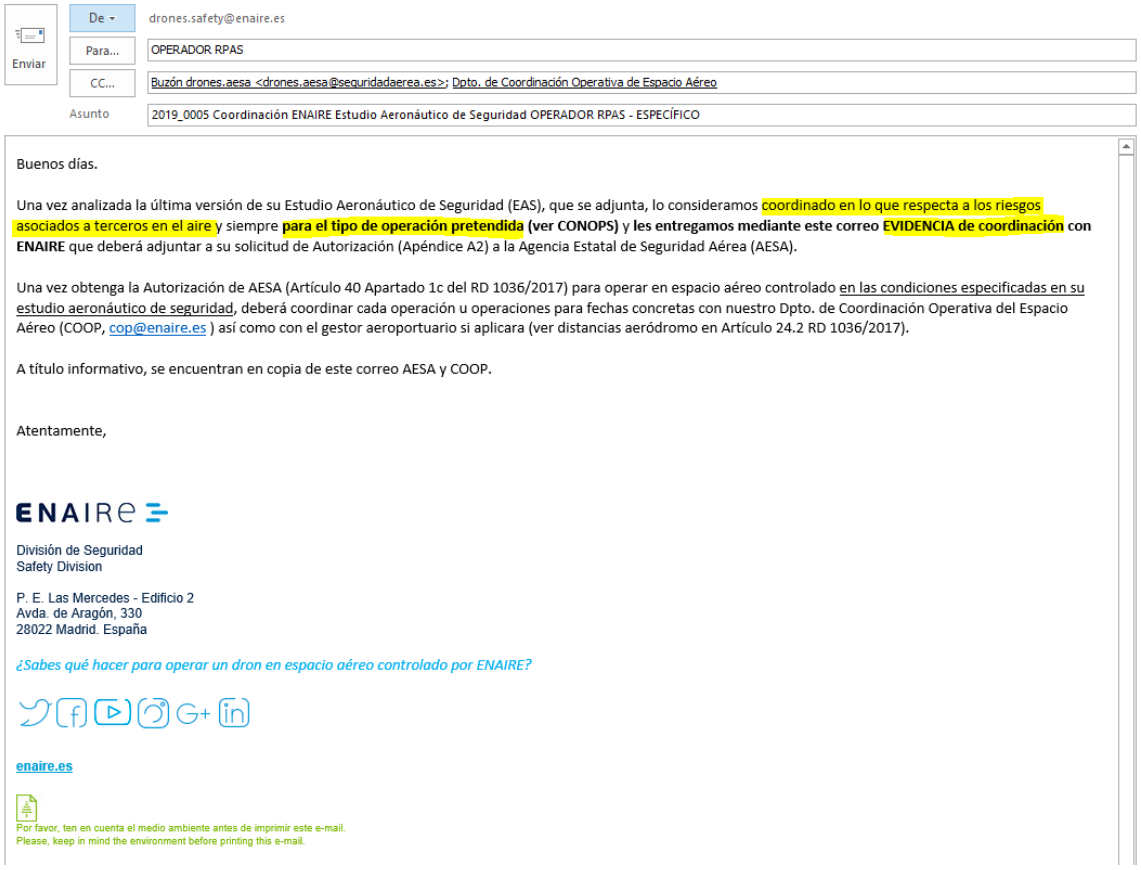
En Madrid, a 28 de marzo de 2019

Firmado: ENAIRE/División de Seguridad

E-mail: drones.safety@enaire.es

The EVIDENCE of Coordination that ENAIRE delivers to the RPAS Operator **by email** from drones.safety@enaire.es is characterised by a **unique DSCN number,** a **digital fingerprint or hash that is** unequivocally **linked to the exact file of the EAS that has been coordinated with ENAIRE**, a **call sign unique to the RPAS Operator** and the acknowledgement - for AESA - of whether the EAS corresponds to a **standard scenario** or to an **original EAS** with a specific CONOPS **(whether generic or specific**[12]).

[12] Recall that the difference is that a **specific** EAS identifies a place or location for the operations (or even a date) while a **generic** EAS does not specify this information and is valid for any point in controlled Spanish airspace and for any date.



Enviar

De drones.safety@enaire.es

Para... OPERADOR RPAS

CC... Buzón drones.aesa <drones.aesa@seguridadaerea.es>; Dpto. de Coordinación Operativa de Espacio Aéreo

Asunto 2019_0005 Coordinación ENAIRE Estudio Aeronáutico de Seguridad OPERADOR RPAS - ESPECÍFICO

Buenos días.

Una vez analizada la última versión de su Estudio Aeronáutico de Seguridad (EAS), que se adjunta, lo consideramos coordinado en lo que respecta a los riesgos asociados a terceros en el aire y siempre **para el tipo de operación pretendida (ver CONOPS)** y **les entregamos mediante este correo EVIDENCIA de coordinación con ENAIRE** que deberá adjuntar a su solicitud de Autorización (Apéndice A2) a la Agencia Estatal de Seguridad Aérea (AESA).

Una vez obtenga la Autorización de AESA (Artículo 40 Apartado 1c del RD 1036/2017) para operar en espacio aéreo controlado en las condiciones especificadas en su estudio aeronáutico de seguridad, deberá coordinar cada operación u operaciones para fechas concretas con nuestro Dpto. de Coordinación Operativa del Espacio Aéreo (COOP, cop@enaire.es) así como con el gestor aeroportuario si aplicara (ver distancias aeródromo en Artículo 24.2 RD 1036/2017).

A título informativo, se encuentran en copia de este correo AESA y COOP.

Atentamente,

ENAIRE

División de Seguridad
Safety Division

P. E. Las Mercedes - Edificio 2
Avda. de Aragón, 330
28022 Madrid. España

¿Sabes qué hacer para operar un dron en espacio aéreo controlado por ENAIRE?

enaire.es

Por favor, ten en cuenta el medio ambiente antes de imprimir este e-mail.
Please, keep in mind the environment before printing this e-mail.

ANNEX I

MITIGATION MEASURES PROPOSED BY ENAIRE

Although it is easier to prepare and coordinate a specific EAS than a generic one, most RPAS Operators choose generic EAS that provide maximum coverage for their operations within the CONOPS of the EAS. Standard scenarios are a type of generic EAS.

Strategic or Tactical Mitigation Measure	Statement of the MEASURE
MME1	Aeronautical safety study, carried out for this purpose by the operator and **coordinated with the air traffic service provider** designated for the airspace in question, to verify the safety of the operation.
MME2	Pilots must be qualified as a **radio operators** with **adequate knowledge of the language** in order to communicate with airspace controllers, and have the means to communicate by radio with controllers on the aeronautical band. An attitude of active listening shall be maintained for the duration of the operation.
MME3	**Alternative system for communicating** with ATC or AFIS (mobile phone)
MME4	Arrangements made to **coordinate with managers** of airport infrastructure managers, including heliports.
MME5	The generation of a **Flight Plan (FPL)** for air traffic services with **a specific** Call Sign **for the RPAS Operator**.
MME6	Have **authorisation from air traffic control** (ATC) or be in communication with AFIS to carry out the RPAS operation.
MME7	Altitude limited to **400 ft AGL** (Royal Decree 1036/2017) instead of the 500 ft specified in the SORA
MME8	Operational restriction and definition of the **volume of operation enforced by geo-caging/software**, specifically for height **AGL** and, whenever possible, sheltered from obstacles or orography.
MME9	Operational restriction in congested areas of cities or towns consisting of **operating no more than 15 m above the tallest building within a radius of 150 m of the aircraft.** The **pilot** will be within **25 m from the aircraft** horizontally
MME10	Operational restriction in terms of **exposure time**.
MME11	Operational restriction in terms of **the time selected** for the operation at the discretion of ATC/AFIS

MME12	Graphical analysis of the **flight procedures** associated with the take-off and landing operations at the airport(s) involved, including missed approaches and engine failure on take-off. For RPAS operations in an airport environment, include this analysis in the pre-tactical request for the operation (COP).
MME13	Analysis of **time slots** with the lowest air traffic density in the area of operations
MME14	Publication of the operation in a **NOTAM**, **ATIS, DATIS** or another means of aeronautical notification
MME15	Prior analysis of VHF coverage in the area of operations
MME16	**Capture** system

MMT1	"See and Avoid": **VLOS**
MMT2	Verification of **NOTAM** published in the operations area
MMT3	An **active listening** attitude will be maintained for the duration of the operation and, unless otherwise agreed in pre-tactical, clearance will be requested from ATC/AFIS to start the operation.
MMT4	The Operator has an **Emergency Plan** whose main measure **is to notify ATC or AFIS by radio in the event of a "fly-away".**
MMT5	**Immediate landing** by communication from the **ATS service**
MMT6	**Barometric** GPS assistance to calculate the **altitude AGL** of the RPA.
MMT7	Active use of ATC or AFIS control: request **collision avoidance guidance** or traffic information on manned aircraft in the vicinity.
MMT8	Use of **geo-caging/geo-fencing**
MMT9	Verification that the **planetary K-index** is < 4 Aborting the operation if not.

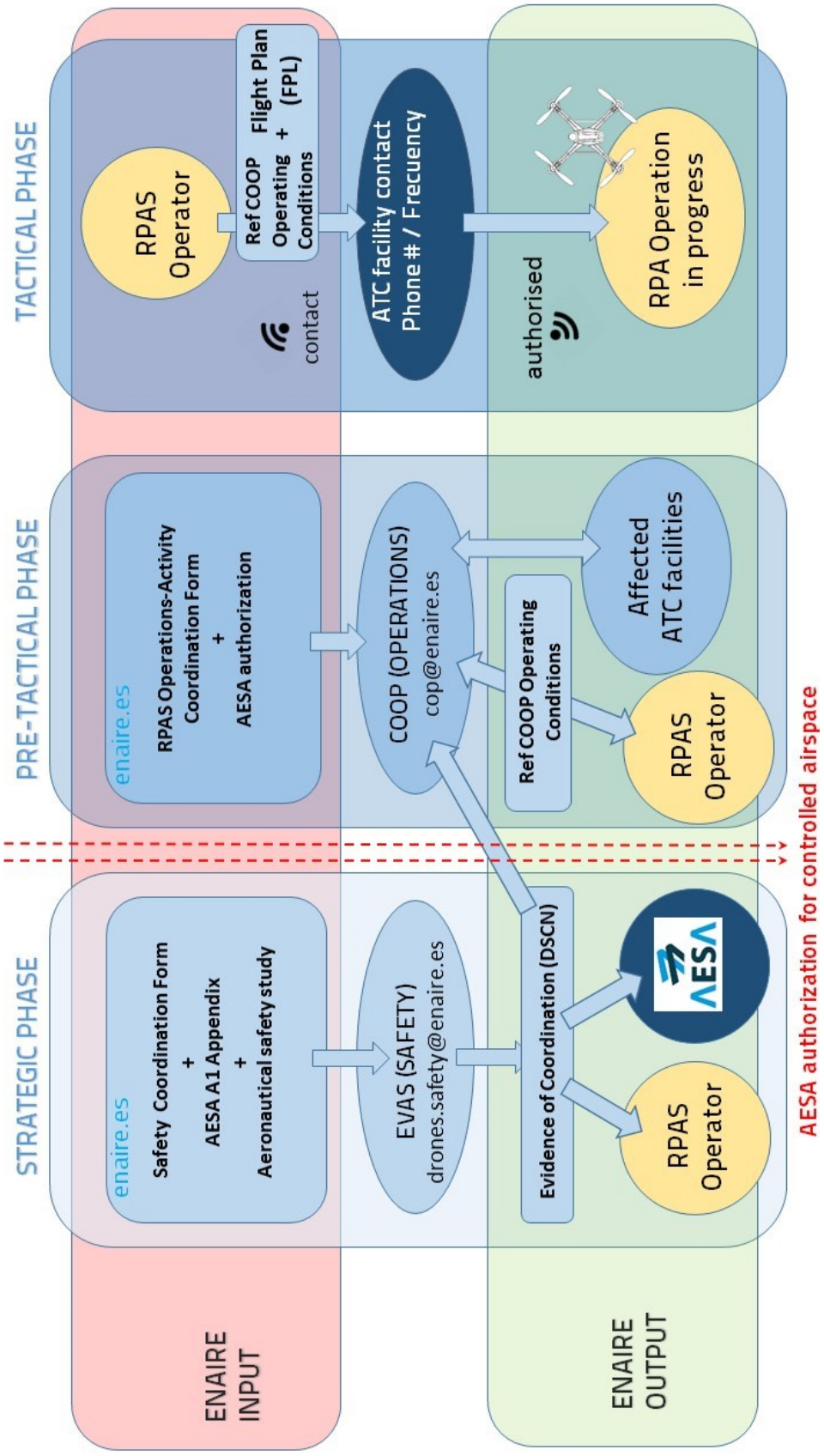
MMT10	Situational awareness of the surroundings: Through a dedicated **observer** or geo-referenced **equipment/software** (such as ADS-B IN)
MMT11	Use of **a Mode S transponder**

Legend

Grey	Mitigation measure already established in Royal Decree 1036/2017 or Royal Decree 552/2014 (included in Royal Decree 1180/2018 currently in force) and therefore mandatory.
Green	Mitigation measure that the RPAS Operator can use as needed and depending on its own resources to reduce the ARC (MME) or to increase the required robustness at the tactical level or TMPR (MMT). The intensity of the green shows the highest (dark green) or lowest (light green) risk mitigation resulting from the implementation of the measure.

ANNEX II

COORDINATION PHASE WITH ENAIRE


TACTICAL PHASE
PRE-TACTICAL PHASE
STRATEGIC PHASE
ENAIRE INPUT
ENAIRE OUTPUT
RPAS Operator
Ref COOP Operating Conditions
Flight Plan (FPL)
contact
ATC facility contact
Phone # / Frecuency
authorised
RPA Operation in progress
enaire.es
RPAS Operations-Activity Coordination Form
+
AESA authorization
COOP (OPERATIONS)
cop@enaire.es
Affected ATC facilities
Ref COOP Operating Conditions
RPAS Operator
enaire.es
Safety Coordination Form
+
AESA A1 Appendix
+
Aeronautical safety study
EVAS (SAFETY)
drones.safety@enaire.es
Evidence of Coordination (DSCN)
AESA
RPAS Operator
AESA authorization for controlled airspace