Agencia Estatal
de Seguridad Aérea

UAS OPERATORS' SAFETY ASSESSMENT METHODOLOGY

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AESA AGENCIA ESTATAL DE SEGURIDAD AÉREA

INDEX

1. INTRODUCTION

This annex is part of the Non-Commercial and Airworks Safety Assessment Methodology, whose results are analyzed in the Non-Commercial and Airworks Safety Assessment Committee.

In particular, this annex also includes the Unmanned Aircraft System operators` (from this point forward, UAS) safety assessment methodology.

2. AIM AND SCOPE

2.1. Methodology Aim

The aims of this methodology are:

- ✓ To establish numerical indicators which allow to determine and measure parameters, values and evolutions related to safety based on the operator activity supervision results, and on the occurrences and incidents occurred during their activities, and on the sanctioning proceedings issued.
- ✓ To establish numerical indicators which allow to measure the risk associated with the complexity of the organizations, just as the risks associated with their approved activities, the training given, and the complexity of the air space coordination required.
- ✓ To obtain a periodic snapshot/picture of the operational safety status/level within each operator's activities, including its evolution over time.
- ✓ To ascertain the trends in the operational safety sector, as well as to identify areas and stakeholders where a well-oriented supervision activity could promote improvements in operational safety.
- ✓ To prioritise and plan AESA's actions based on the risk assessment performed based on the methodology results.
- ✓ To present the analysis results in a graphical, simple, and intuitive manner that enables to make informed decisions for the Safety Committee.

2.2. Scope

The European Regulation related to UAS utilization applies to all unmanned aircrafts regardless of their mass or intended use, whether for professional or recreational purposes. UAS operations are performed according to three operational categories based on the operational risk: 'open', 'specific' and 'certified'.

- The 'open' category includes low risk UAS operations, and they require neither AESA operational authorization nor UAS operator statement before the beginning of the operation.
- The 'specific' category includes medium risk UAS operations, and they require AESA operational authorization before starting the operation applying mitigation means identified

in the operational risk assessment, except when the operation is performed under a standard scene ('STS') – in that case an UAS operator responsible statement will be enough - or when the UAS operator have a light UAS operator certificate (LUA" with the appropriate privileges.

Operations under one of those two published standard scenes will be carried out with UAS that meet the following requirements:

- Standard scene 1 ('STS-01'): VLOS operations over a controlled terrestrial zone in an urban environment with C5 type UAS.

- Standard scene 2 ('STS-02'): BVLOS operations over a controlled terrestrial area in a scarcely populated environment with C6 type UAS.

- The 'certified' category includes high risk UAS operations carried out with UAS whose peculiar dimension is 3 meters and above, operated over people massive meetings and designed and used to transport people and dangerous goods which can put third parties at risk in the event of an accident. Also, it includes UAS operations in which AESA, based on a risk assessment, considers that the operation risk cannot be properly mitigated without the UAS certification and the UAS operator certification and, if applicable, without getting a distance pilot license.

  Operations under the 'certified' category, to ensure a proper safety level require a certified UAS; the remote pilot, if applicable, has a license; and the UAS operator has an air operator certificate «AOC» issued by AESA.

Diagrama de las categorías operacionales de UAS.

The current methodology will apply to the scope of "specific" category UAS operators subject to a statement (if they operate under standard scene) and/or subject to an authorization (if they operate under non-standard scene). Therefore, the current methodology will not apply to UAS "open" and "certified" categories.

3. INDICATORS DEFINITION

Indicators are safety parameters based on data used to observe and assess the operational safety in a particular field and/or on a particular supplier. The aim of the indicators will be to show where a profound analysis is needed, in order to know whether there is a safety problem, and whether it is necessary to take corrective or mitigative actions.

In this methodology, the indicators can be gathered into two big groups:

- **Technical Indicators**: They are indicators based on results or lagging indicators and they come of the UAS operators' activity. They look for measuring the operator safety risk based on the result of the supervision over the operator; risk associated with their activities and coordinations with other entities; occurrences in which they have been involved; complaints and sanctions over the operator; regulation ignorance level based on requests and modifications required; just like any other information related to their activity that the Agency have.

  Within these indicators can be distinguished four fields:

  ✓ Operational: Risk associated with UAS real operations. This risk is quantified through characteristics of the controlled air space coordination required and their operation at urban environment.

  ✓ Regulatory Control: Result of the supervision over the operator either in the field of operation or in the field of training, just like the regulation ignorance level shown based on the requests and modifications required.

  ✓ Occurrences: Risk associated with operational safety occurrences suffered by the operators.

  ✓ Infraction: Sanctioning proceedings solved over the UAS operators and motivated by their operation and nonfulfillment administrative resolutions associated with inspecting actions.

- **Organizational Indicators**: They are indicators which look for measuring the risk associated with operator organization based on its complexity, type of activities and operational requirements that can potentially develop from its statement or authorization, characteristics and UAS fleet composition, the number of training teaches internally or to third parties, the dedication and managers' turnover, the occurrence reporting culture and any other information related to the organization the Agency have.

  Whitin these indicators can be distinguished five fields:

  ✓ Activities: Risk associated with the activity type and operational requirements that can potentially develop from its statement or authorization.

  ✓ Fleets: Risk associated with the UAS fleet types used in the activities, considering their fleet size, their impact energy and the organization fleet heterogeneity.

  ✓ Training: The number of trainings teaches internally or to third parties.

- ✓ Managers: Risk associated with the operator's managers' turnover, their dedication and experience in the organization.
- ✓ Occurrence Reporting Culture: Occurrence Reporting Culture considers the self-notification of the occurrence in which the operator is involved.

The following table shows the indicator structure, each of them divided into different sub indicators.

TECHNICAL INDICATORS		
INDICATOR	**SUB INDICATOR**	**DATA SOURCE**
OPERATIONAL	OP1 –ATC Coordinations	ATC Service suppliers
	OP2 – Urban environment	Ministry of Interior
REGULATORY CONTROL	CN1 – Regulatory Control in Operations	SIPA – UAS
	CN2 – Regulatory Control in Training	SIPA – UAS
	CN3 – Applications	SIPA – UAS
OCCURRENCE SEVERITY	SEV1 – UAS Occurrence severity	ECCAIRS
INFRACTIONS	INF1 – Sanctions	AESA Sanctioning proceedings
	INF2 – Nonfulfilment administrative resolutions	SIPA - UAS

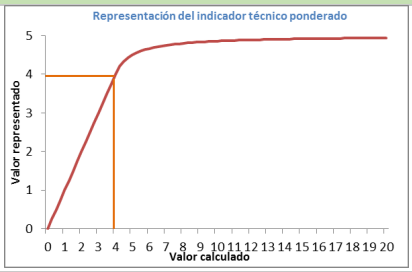
ORGANISATIONAL INDICATORS		
INDICATOR	**SUB INDICATOR**	**DATA SOURCE**
ACTIVITIES	ACT1 –Standard scenes	SIPA – UAS
	ACT2 – Authorisations	SIPA – UAS
FLEETS	FLOT1 – Fleet risk	SIPA – UAS
	FLOT2 – Fleet heterogeneity	SIPA – UAS
	FLOT3 – Fleet identifying	SIPA – UAS
TRAINING	FOR1 – Pilot practical training	DUAS/FOR Record
OCCURRENCE REPORTING CULTURE	CUL1 –Occurrence reporting culture	ECCAIRS
MANAGERS	RES1 –Managers' experience	SIPA – UAS
	RES2 – – Managers' dedication	SIPA – UAS
	RES3 – – Managers' turnover	SIPA – UAS

The following sections will define the indicators and stablish a formula to calculate them. Regarding the weighted indicators that define the axis of the priority area based on safety risk, a green table form has been chosen. Regarding the indicators that form the weighted indicators, a blue table form has been chosen. And finally, regarding the sub-indicators that form the different indicators, an orange table form has been chosen.

4. TECHNICAL INDICATORS

Technical indicators are indicators based on the results or lagging indicators and come of the UAS operators' activity. They look for measuring the operator safety risk based on the result of the supervision over the operator; risk associated with their activities and coordination with other entities; occurrences in which they have been involved; complaints and fines over the operator; regulation ignorance level based on requests and modifications required; just like any other information related to their activity that the Agency have.

The weighted technical indicator unities all technical indicator under only one indicator.

<table>
<tr><th colspan="3">WEIGTHED TECHNICAL INDICATOR</th></tr>
<tr><td>ACRONYM</td><td colspan="2">DEFINITION</td></tr>
<tr><td>i_{tec}</td><td colspan="2">Technical indicators weighting to quantify the operator's general technical status and to show its evolution on the priority area based on safety risk.</td></tr>
<tr><td colspan="3">CALCULATION</td></tr>
<tr><td colspan="3">Its value comes from the technical indicator weighting which form the methodology.
Value of the weighting factors will be adjusted to:
➢ Give more relevance to one indicator than other.
➢ Optimize the presentation of the operator's position on the priority area based on safety risk.
Values defined to weighting factors in each field will be included in annex GSO-TAC-P01-A01 – Coefficients and weighting factors.
In certain cases, the weighted technical indicator value can be greater than five. It is due to the weighting of the different indicators that form it. To avoid losing those operators' information when we show them on the priority area, if their technical indicator value is over four, we will do that the growth of this value approaches to asymptote to five. A correction over the technical indicator value in accordance with the formula describe on the following table, will be applied:
<table><tr><th colspan="2">i_{tec} CORRECTION FOR VALUES GREATER THAN FOUR</th></tr><tr><th>FORMULA</th><th>PRESENTATION</th></tr><tr><td>If $i_{tec} > 4$
$i_{tec}^{showed} = 5 - \frac{1}{i_{tec} - 3}$</td><td> 
</td></tr></table></td></tr>
<tr><td>TYPE</td><td>REGULARITY</td><td>SCOPE</td></tr>
<tr><td>Compound continuous quantitative</td><td>Calculation regularity
The indicator is calculated in accordance with the Committee regularity.
Data selection period
The reference time period is defined in each sub indicator.</td><td>UAS</td></tr>
<tr><td>VALUE RANGE</td><td colspan="2">FORMULA</td></tr>
<tr><td>0-5</td><td colspan="2">• $i_{tec} = f_{OP} \cdot i_{OP} + f_{CN} \cdot i_{CN} + f_{SEV} \cdot i_{SEV} + f_{INF} \cdot i_{INF}$</td></tr>
</table>

4.1. Operational indicators

Operational indicators look for measuring the associated risk with UAS operators` real operations. This risk will be quantified through the characteristic of the controlled air space coordination required and its operation at urban environment.

OPERATIONAL INDICATOR		
ACRONYM	**DEFINITION**	
i_{op}	Operational indicators aim to measure the risk associated with real operations of UAS operators. This risk will be quantified through the characteristic of the controlled air space coordinations required and its operation at urban environment.	
CALCULATION		
Its value comes of the operational sub indicators weighting: ➢ OP1 – ATC: Air space coordinations with ATC suppliers. ➢ OP2 – URB: Urban environment coordination with the Ministry of Interior Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors.*		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-5	• $i_{OP} = f_{ATC}^{OP} \cdot i_{ATC}^{OP} + f_{URB}^{OP} \cdot i_{URB}^{OP}$	

4.1.1. OP1 – ATC: Controlled air space coordination

OPERATIONAL SUB INDICATOR 1 – ATC COORDINATION	
ACRONYM	**DEFINITION**
i_{ATC}^{OP}	It aims to measure the risk associated with airspace coordination with ATS (Air Traffic Services) suppliers developed by UAS operators, based on the characteristics and quantity of their operations.
CALCULATION	

This indicator calculation is carried out in two phases:

✓ **Operational risk allocation to each UAS operator coordination with an ATS supplier:**

An operational risk value to each coordination between an UAS operator and a ATS supplier will be allocated. This value will comes from of multiplying the following factors:

- Number of operations under that coordination.
- Operational category - Coef_Cat: Different values will be allocated according to the risk category of the coordinated operation: Authorisation > National standard scenes > STS-ES-01 > STS-ES-02 > Open.
- Maximum height – Coef_Alt: Different values will be allocated according to the height. A linear distribution will be followed, allocating 0 value to a 0-meter height and the Coef_Alt maximum risk value to a 120 meters height or above.
- Airport environment – Coef_ADR: Coef_ADR value or 1 value will be allocated depending on whether the operation is inside the minimum distance to an aerodrome stablished by the regulation or outside. A higher risk will be allocated to UAS operations at airport environment.
- EAC Area – Coef_EAC: Coef_EAC value or 1 value will be allocated depending on whether the operation is inside a controlled air space area (EAC) or outside. A higher risk will be allocated to UAS operations at EAC areas.
- FIZ Area – Coef_FIZ: Coef_FIZ value or 1 value will be allocated depending on whether the operation is inside an air space area subject to information (FIZ) or outside. A higher risk will be allocated to UAS operations at FIZ areas.
- Attachments – Coef_Anc: Coef_Anc value or 1 value will be allocated depending on whether the operation is with the UAS fixed or not. A lower risk will be allocated to UAS operations with the UAS fixed.
- Vehicle in motion – Coef_Mov: Coef_Mov value or 1 value will be allocated depending on whether the operation is performed with the UAS in motion or not. A higher risk will be allocated to UAS operations with the UAS in motion.
- Schedule – Coef_Hor: Coef_Hor value or 1 value will be allocated depending on whether the operation is performed at daytime or nighttime. A higher risk will be allocated to UAS operations at daytime because of the potential impact on manned aircrafts.
- Remarks – Coef_OBS: Coef_Obs value or 1 value will be allocated depending on the ATS suppliers´ remarks made during the management coordination, such as the regulation ignorance or the refused coordination due to the lack of safety standards.

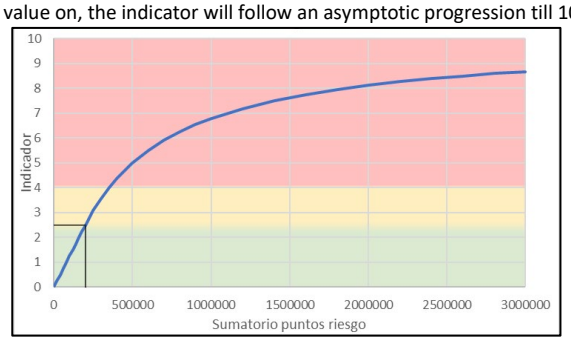
As a result, for each coordination, we get an operational risk value that comes of the following formula:

$$Coord_{ATC} = Nops \cdot Coef_{CAT} \cdot Coef_{ALT} \cdot Coef_{ADR} \cdot Coef_{EAC} \cdot Coef_{FIZ} \cdot Coef_{ANC} \cdot Coef_{MOV} \cdot Coef_{HOR} \cdot Coef_{OBS}$$

✓ **Summation of the operational risks from the coordination managed by each UAS operator.**

Values summation of the operational risks from the coordination managed by each UAS operator during the data selection period defined by the indicator is performed.

Next, the indicator is calculated based on a sector reference value. The indicator value up to this reference value will evolve in a linear way to a 2,5 value, and from this value on, the indicator will follow an asymptotic progression till 10.



Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors.*

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS

VALUE RANGE	FORMULA
0-10	$\boldsymbol{Si} \sum Risk_{ATC} < \boldsymbol{K_{Coord-ATC}} \rightarrow i_{ATC}^{OP} = \mathbf{2,5} * \frac{\sum Risk_{ATC}}{\boldsymbol{K_{Coord-ATC}}}$ $\boldsymbol{Si} \sum Risk_{ATC} \geq \boldsymbol{K_{Coord-ATC}} \rightarrow i_{ATC}^{OP} = \mathbf{10} - \frac{\mathbf{22,5} * \boldsymbol{K_{Coord-ATC}}}{\mathbf{2} * \boldsymbol{K_{Coord-ATC}} + \sum Risk_{ATC}}$

4.1.2. OP2 – URB: Urban environment coordinations

OPERATIONAL SUB INDICATOR 2 – URBAN ENVIRONMENT COORDINATION	
ACRONYM	**DEFINITION**
i_{URB}^{OP}	It aims to measure the risk associated with the coordination of UAS operations in urban environments with the Ministry of Interior, as developed by UAS operators, based on the number of their operations.

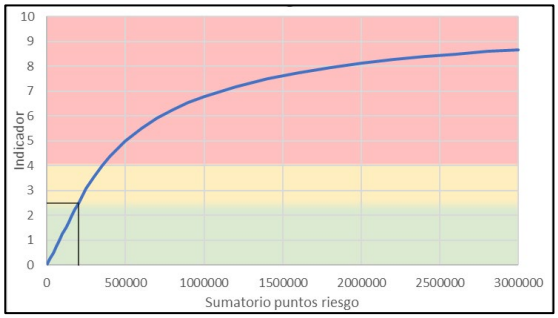
CALCULATION

This indicator calculation is carried out in two phases:

✓ **Operational risk allocation to each UAS operator coordination for an urban environment operation**:
An operational risk value to each coordination between an UAS operator and the Ministry of Interior to perform an urban environment operation will be allocated. This value will be the same as the number of operations developed under that coordination.

$$Coord_{URB} = Nops$$

✓ **Summation of the operational risks from the coordinations managed by each UAS operator**:
Values summation of the operational risks from the coordinations managed by each UAS operator during the data selection period defined by the indicator is performed.
Next, the indicator is calculated based on a sector reference value. The indicator value up to this reference value will evolve in a linear way to a 2,5 value, and from this value on, the indicator will follow an asymptotic progression till 10.



Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors.*

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS

VALUE RANGE	FORMULA
0-10	• $\boldsymbol{Si} \sum Risk_{URB} < \boldsymbol{K_{Coord-URB}} \rightarrow i_{URB}^{OP} = \mathbf{2,5} * \frac{\sum Risk_{URB}}{\boldsymbol{K_{Coord-URB}}}$ • $\boldsymbol{Si} \sum Risk_{URB} \geq \boldsymbol{K_{Coord-URB}} \rightarrow i_{URB}^{OP} = \mathbf{10} - \frac{\mathbf{22,5} * \boldsymbol{K_{Coord-URB}}}{\mathbf{2} * \boldsymbol{K_{Coord-URB}} + \sum Risk_{URB}}$

4.2. Regulatory control indicators

Regulatory control indicators look for measuring the risk based on the UAS operators' supervision results. The inspecting actions on the operators can be classified according to three groups, which will define the three sub indicators: actions under request or applications; regulatory control actions in the field of operations and regulatory control inspections in the field of training.

REGULATORY CONTROL INDICATOR		
ACRONYM	**DEFINITION**	
i_{CN}	Regulatory control indicators look for measuring the risk based on the UAS operators' supervision results. The inspecting actions on the operators can be classified into three sub indicators: actions under request or applications; regulatory control actions in the field of operations and regulatory control inspections in the field of training.	
CALCULATION		
Its value comes of the weighting of the regulatory control sub indicators: ➢ CN1 – OPS: Operations regulatory control. ➢ CN2 – FOR: Training regulatory control. ➢ CN3 – SOL: Applications. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{CN} = f_{OPS}^{CN} \cdot i_{OPS}^{CN} + f_{FOR}^{CN} \cdot i_{FOR}^{CN} + f_{SOL}^{CN} \cdot i_{SOL}^{CN}$	

4.2.1. CN1 – OPS: Operational regulatory control

REGULATORY CONTROL SUB INDICATOR 1– OPERATIONS		
ACRONYM	**DEFINITION**	
i_{OPS}^{CN}	This sub indicator shows the regulatory control inspections results in the field of UAS operators` operations.	
CALCULATION		
To calculate this indicator, all the regulatory control files in the field of operations during the reference period are considered. For every inspection or file, the number of open non-conformities (NC) during the inspections is identified and a weight according to the level assigned is allocated giving a greater value to the NC level 1 than to the NC level 2. Comments are not considered on this indicator. Subsequently, NC level 1 and NC level 2 are added, considering the NC categorization coefficient at every case; and they are divided into the inspection number. Additionally, the indicator is scaled with a fixed value to make easier the analysis and comparison between the different sub indicator of the methodology. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*. Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor and its aim is to limit its value to a maximum of 10.* So, a very high result on a sub indicator does not put the rest of the indicators in the shade when the weighting additions are performed.		
TYPE	**REGULARITY**	**SCOPE**
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{OPS}^{CN} = K_{OPS}^{CN} \frac{Coef_{Cat1}^{OPS} \cdot \sum n^{o}NC_{Cat1} + Coef_{Cat2}^{OPS} \sum n^{o}NC_{Cat2}}{\sum n^{o}Insp\ CN-OPS}$	

4.2.2. CN2 – FOR: Training regulatory control

REGULATORY CONTROL SUB INDICATOR 2– TRAINING		
ACRONYM	**DEFINITION**	
i_{FOR}^{CN}	This sub indicator shows the regulatory control inspections results in the field of UAS operators` pilots training.	
CALCULATION		
To calculate this indicator, all the regulatory control files in the field of UAS pilots training during the reference period are considered. For every inspection or file, the number of open non-conformities (NC) during the inspections are identified and a weight according to the level assigned is allocated giving a greater value to the NC level 1 than to the NC level 2. Comments are not considered on this indicator. Subsequently, NC level 1 and NC level 2 are added, considering the NC categorization coefficient at every case; and they are divided into the inspection number. Additionally, the indicator is scaled with a fixed value to make easier the analysis and comparison between the different sub indicator of the methodology. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*. Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor and its aim is to limit its value to a maximum of 10.* So, a very high result on a sub indicator does not put the rest of the indicators in the shade when the weighting additions are performed.		
TYPE	**REGULARITY**	**SCOPE**
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{FOR}^{CN} = K_{FOR}^{CN} \frac{Coef_{Cat1}^{FOR} \cdot \sum nºNC\ Cat1 + Coef_{Cat2}^{FOR} \sum nºNC\ Cat2}{\sum nºInsp\ CN-FOR}$	

4.2.3. CN3 – SOL: Applications

REGULATORY CONTROL SUB INDICATOR 3– APPLICATIONS		
ACRONYM	**DEFINITION**	
i_{FOR}^{CN}	This sub indicator shows the UAS operators` requested actions results through the NC opens during the applications and the unfavorable proceedings.	
CALCULATION		
Pending		
TYPE	**REGULARITY**	**SCOPE**
Pending	**Calculation regularity** Pending	UAS
	Data selection period Pending	
VALUE RANGE	**FORMULA**	
Pending	Pending •	

4.3. Occurrence severity indicator

REGULATORY CONTROL INDICATOR	
ACRONYM	**DEFINITION**
i_{SEV}	The Occurrence Severity Indicator aims to measure risk by evaluating the severity of incidents involving the UAS operator and its potential impact on other manned aircraft.
CALCULATION	

This indicator calculation is carried out in two phases:

✓ **Risk allocation to every UAS operator`s occurrence**:
A risk value to each occurrence in which the UAS operator has been involved will be allocated. This value will come of multiplying the following factors:

- Severity coefficient – Coef_Sev: For each occurrence, a severity coefficient is allocated according to the severity category assigned to every incident. A greater coefficient value will be allocated to accidents and severe incidents than to the major occurrences and significant occurrences (those ones in the last position). Minor occurrences are not considered on this indicator.
- Time coefficient - Coef_T: For each occurrence, its weight is diminishing over time following a linear decrease pattern
- Urban environment coefficient – Coef_Urb: For each occurrence, whether the occurrence has taken place at an urban environment or not is identified.
- Impact on other aircrafts coefficient – Coef_Avs: For each occurrence, if UAS incident has concerned third manned aircrafts or not is identified.
- Impact on humans coefficient – Coef_Hum: For each occurrence, if UAS incident has affected humans or not is identified.

As a result, for each occurrence, a risk value that comes of the following formula is got:

$$Risk_{incidente} = Coef_{SEV} \cdot Coef_{T} \cdot Coef_{URB} \cdot Coef_{AVS} \cdot Coef_{HUM}$$

✓ **Summation of the risks associated with UAS operator**.
Values summation of risks associated with UAS operator's occurrence is performed, and later it is divided into the exposition factor (the number of UAS aircrafts linked to the operator).

Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.

Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor*, and its aim is to limit its value to a maximum of 10. So, a very high result on a sub indicator does not put the rest of the sub indicators in the shade when the weighting additions are performed.

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{SEV} = \frac{\sum sucesos\left(Coef_{SEV} \cdot Coef_{T} \cdot Coef_{URB} \cdot Coef_{AVS} \cdot Coef_{HUM}\right)}{Nº UAS/1000}$	

4.4. Infraction indicator

Infraction indicators aim to assess risk by quantifying sanctioning proceedings and administrative resolutions for non-compliance issued to UAS operators.

INFRACTION INDICATOR		
ACRONYM	**DEFINITION**	
i_{INF}	Infraction indicators aim to assess risk by quantifying sanctioning proceedings and administrative resolutions for non-compliance issued to UAS operators.	
CALCULATION		
Its value comes of the weighting of the infraction sub indicators: ➢ INF1 – SAN: Sanctioning proceedings. ➢ **INF2 – INC**: nonfulfillment administrative nonfulfillment resolutions. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-5	• $i_{INF} = f_{SAN}^{INF} \cdot i_{SAN}^{INF} + f_{INC}^{INF} \cdot i_{INC}^{INF}$	

4.4.1. *INF1 – SAN: Sanctioning proceedings*

INFRACTION SUB INDICATOR 1 – SANCTIONING PROCEEDING		
ACRONYM	**DEFINITION**	
i_{SAN}^{INF}	This Indicator quantify the risk associated with the sanctioning proceeding issued to UAS operator in the field of its activity.	
CALCULATION		
This indicator calculation is carried out in two phases: ✓ **Weighting allocation to every UAS operator`s sanctioning proceeding**: For each UAS operator`s sanctioning proceeding, a Sanction coefficient is allocated according to the infraction categorization type (minor, severe or very severe). ✓ **Summation of every UAS operator`s sanctioning proceeding weighting**: Values summation of every UAS operator`s sanctioning proceeding weighting is performed. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*. Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor* and its aim is to limit its value to a maximum of 10. So, a very high result on a sub indicator does not put the rest of the sub indicators in the shade when the weighting additions are performed.		
TYPE	**REGULARITY**	**SCOPE**
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{SAN}^{INF} = \sum_{sanciones} Coef_{SANCION}$	

4.4.2. *INF2 – INC: Nonfulfilment administrative resolutions*

INFRACTION SUB INDICADOR 2 – NONFULFILMENT ADMINISTRATIVE RESOLUTIONS		
ACRONYM	**DEFINITION**	
i_{INC}^{INF}	This Indicator quantify the risk associated with the nonfulfillment administrative resolutions issued to UAS operator after AESA regulatory control inspections when the operator is not able to solve the NC.	
CALCULATION		
Pending		
TYPE	**REGULARITY**	**SCOPE**
Pending	**Calculation regularity** Pending	UAS
	Data selection period Pending	
VALUE RANGE	**FORMULA**	
Pending	Pending	

5. ORGANISATIONAL INDICATORS

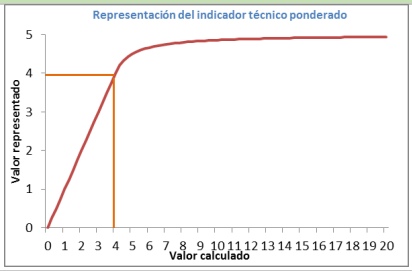
Operational indicators look for measuring the risks associated with UAS operators` organization, based on its complexity; type of activity and operational conditions that they can potentially perform based on their statement or authorization; characteristics and UAS fleet composition; volume of internal or to third party training performed; manager´s turnover and dedication; occurrence reporting culture; and just like any other information related to the organization that the Agency have.

The weighted organizational indicator unities all organizational indicators under only one indicator.

<table>
<tr><th colspan="3">WEITHED ORGANISATIONAL INDICATOR</th></tr>
<tr><td>ACRONYM</td><td colspan="2">DEFINITION</td></tr>
<tr><td>i_{org}</td><td colspan="2">Organizational indicator weighting to quantify the operator`s general organizational complexity and to show its evolution on the priority area based on safety risk.</td></tr>
<tr><td colspan="3">CALCULATION</td></tr>
<tr><td colspan="3">Its value comes of the organizational indicator weighting which form the methodology.

Value of the weighting factors will be adjusted to:
➢ Give more relevance to one indicator than other.
➢ Optimize the presentation of the operator`s position on the priority area based on safety risk.
Values defined to weighting factors in each field will be included in annex <i>GSO-TAC-P01-A01 – Coefficients and weighting factors</i>.
In certain cases, the weighted organizational indicator value can be greater than five. It is due to the weighting of the different indicators that form it. To avoid losing those operators` information when we show them on the priority area, if their organizational indicator value is over four, we will do that the growth of this value approaches to asymptote to five. A correction over the organizational indicator value in accordance with the formula describe on the following table, will be applied:

<table>
<tr><th colspan="2">i_{org} CORRECTION FOR VALUES GREATER THAN FOUR</th></tr>
<tr><td>FORMULA</td><td>PRESENTATION</td></tr>
<tr><td>If $i_{org} > 4$

$i_{org}^{\ showed} = 5 - \frac{1}{i_{org} - 3}$</td><td> 
</td></tr>
</table>
</td></tr>
<tr><td>TYPE</td><td>REGULARITY</td><td>SCOPE</td></tr>
<tr><td>Compound continuous quantitative</td><td>Calculation regularity
The indicator is calculated in accordance with the Committee regularity.

Data selection period
The reference time period is defined in each sub indicator.</td><td>UAS</td></tr>
<tr><td>VALUE RANGE</td><td colspan="2">FORMULA</td></tr>
<tr><td>0-5</td><td colspan="2">• $i_{org} = f_{ACT} \cdot i_{ACT} + f_{FLOT} \cdot i_{FLOT} + f_{FOR} \cdot i_{FOR} + f_{CULT} \cdot i_{CULT} + f_{RESP} \cdot i_{RESP}$</td></tr>
</table>

5.1. Activity indicators

ACTIVITY INDICATOR		
ACRONYM	**DEFINITION**	
i_{ACT}	Activity indicator looks for measuring the risk based on UAS operators operations that can potentially develop, quantified through the characteristics and the content of the standard scene statements and authorizations in a specific operational category.	
CALCULATION		
Its value comes of the activity sub indicators weighting: ➢ ACT1 – STS: Standard scene statements. ➢ ACT2 – AUT: Operacional authorizations. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{ACT} = f_{STS}^{ACT} \cdot i_{STS}^{ACT} + f_{AUT}^{ACT} \cdot i_{AUT}^{ACT}$	

5.1.1. ACT1 – STS: Standard scene statements

ACTIVITY SUB INDICADOR 1 – STANDARD SCENE STATEMENT		
ACRONYM	**DEFINITION**	
i_{STS}^{ACT}	It looks for measuring the risk associated with operations and fleets included in the operational statements in accordance with a standard scene in a specific operational category.	
CALCULATION		
To calculate this indicator, the active standard scene statements at the calculation moment are taken into account. A standard scene is a UAS operation type in a "specific" category, with regard to which a list of detailed mitigation actions has been stablished. An UAS operator presents an operational statement in accordance with a standard scene if its operation can be adjusted to any of the published standard scenes. To calculate this indicator, aircrafts linked to the statement to every standard scene are counted, and subsequently, they are added up and multiplied by a fixed value for every type of scene. A greater value is allocated to STS-01 than to STS-02. - STS-01: VLOS operations over the controlled terrestrial area in a populated environment with C5 type UAS. - STS-02: BVLOS operations over the controlled terrestrial area in a scarcely populated environment with C6 type UAS. Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor,* and its aim is to limit its value to a maximum of 10. So, a very high result on a sub indicator does not put the rest of the indicators in the shade when the weighting additions are performed.		
TYPE	**REGULARITY**	**SCOPE**
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Active operational statement at the calculation moment.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{STS}^{ACT} = K_{STS01}^{ACT1} \cdot Navs_{STS01} + K_{STS02}^{ACT1} \cdot Navs_{STS02}$	

5.1.2. ATC2 - AUT: Operational authorisations

ACTIVITY SUB INDICADOR 2 – OPERATIONAL AUTHORISATIONS		
ACRONYM	**DEFINITION**	
i_{AUT}^{ACT}	It looks for measuring the risk associated with operations and fleets included in the operational authorizations and not define in any of the published standard scenes in a specific operational category.	
CALCULATION		
To calculate this indicator, the active operational authorizations at the calculation moment are taken into account. If the intended operation neither can be performed inside the stablish limits for the open category nor defined in any of the published standard scenes, the UAS operator must have an authorization issued by AESA before operating. The operator will present an operational authorization based on risk assessment and this risk assessment can be adjusted to an EASA PDRA (Predefined Risk Assessment) or not. Pending to define how the indicator will be calculated.		
TYPE	**REGULARITY**	**SCOPE**
Pending	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Active operational statement at the calculation moment.	UAS
RANGO VALORES	**FÓRMULA**	
0-10	Pending	

5.2. Fleet indicator

TECHNOLOGICAL INDICATOR		
ACRONYM	**DEFINITION**	
i_{FLOT}	Fleet indicator looks for measuring the risk based on fleets operated by UAS operators in the framework of their operations.	
CALCULATION		
Its value comes of the weighting of the technological or fleet sub indicators: ➢ FLOT1 – RISK: Fleet Risk ➢ FLOT2 – HET: Fleet heterogeneity ➢ FLOT3 – MAR: Fleet identifier Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{FLOT} = f_{RISK}^{FLOT} \cdot i_{RISK}^{FLOT} + f_{HET}^{FLOT} \cdot i_{HET}^{FLOT} + f_{MAR}^{FLOT} \cdot i_{MAR}^{FLOT}$	

5.2.1. FLOT1 – RISK: Fleet risk

FLEET SUB INDICADOR 1 – FLEET RISK	
ACRONYM	**DEFINITION**
i_{RISK}^{FLOT}	This indicator looks for measuring the risk based on fleets included in UAS operators' operational statements and authorizations that can potentially operate in a specific operational category.

CALCULATION

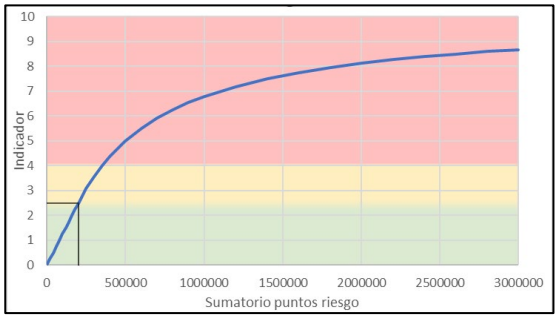
This indicator calculation is carried out in two phases:

✓ **Impact energy allocation to every UAS**:
An impact energy value from each aircraft included in UAS operator's operational statement or authorization will be allocated. This value will come of the Maximum Take Off Mass (MTOM) value and the UAS Maximum Speed value using the following formula:

$$E_{imp} = \frac{1}{2} \cdot MTOM \cdot V_{max}{}^{2}$$

✓ **Summation of UAS operator aircrafts' impact energy**:
Values summation of energy impact value from each aircraft included in UAS operator's operational statement or authorization is performed.

Next, the indicator is calculated based on a sector reference value. The indicator value up to this reference value will evolve in a linear way to a 2,5 value, and from this value on the indicator will follow an asymptotic progression till 10.



Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Active operational statement or authorization at the calculation moment.	UAS

VALUE RANGE	FORMULA
0-10	• $Si \sum E_{imp} < K_{imp} \rightarrow i_{RISK}^{FLOT} = 2,5 * \frac{\sum E_{imp}}{K_{imp}}$ • $Si \sum E_{imp} \geq K_{imp} \rightarrow i_{RISK}^{FLOT} = 10 - \frac{22,5 * K_{imp}}{2 * K_{imp} + \sum E_{imp}}$

5.2.2. FLOT2 – HET: Heterogeneity

FLEET SUB INDICADOR 2 – FLEET HETEROGENEITY		
ACRONYM	**DEFINITION**	
i_{HET}^{FLOT}	This indicator looks for measuring the risk based on fleet heterogeneity or aircrafts diversity included in UAS operators` operational statements and authorizations, taking into account UAS configuration type, MTOM sections, UAS manufacture and UAS model.	
CALCULATION		
To calculate this indicator, the following four parameters are counted: ✓ **UAS configurations**: For each UAS, its type of configuration is identified, such as: - Helicopter - Aircraft - Multirrotor - VTOL - Lighter than air - Other ✓ **MTOM Section**: For each UAS, the section of the MTOM is identified, such as: - Up to de 0.25 kg - Between 0.25 kg and 5.00 kg - Between 5.00 kg and 25.00 kg - Above 25.00 kg ✓ **UAS manufacture**: For each UAS, its manufacture is identified. ✓ **UAS model**: For each UAS, its model is identified. For each UAS, the number of configurations, the MTOM sections, the manufactures and the fleet model are counted, and the weighted addition of the summations giving more relevance (risk) to configurations, followed by the MTOM sections, manufactures and lastly the different models is performed. Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*. Furthermore, when the value of an indicator is greater than certain high threshold, a correction asymptote will be applied. This correction asymptote is defined in in annex *GSO-TAC-P01-A01 – Coefficients and weighting factor,* and its aim is to limit its value to a maximum of 10. So, a very high result on a sub indicator does not put the rest of the sub indicators in the shade when the weighting additions are performed.		
TYPE	**REGULARITY**	**SCOPE**
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Active operational statement or authorization at the calculation moment.	UAS
VALUE RANGE	**FORMULA**	
0-10	$$i_{HET}^{FLOT} = K_{HET} \cdot (K_{CONF}^{HET} \cdot N^{o}_{CONF} + K_{SEC}^{HET} \cdot N^{o}_{SEC} + K_{FAB}^{HET} \cdot N^{o}_{FAB} + K_{MOD}^{HET} \cdot N^{o}_{MOD})$$	

5.2.3. *FLOT3 – MAR: Fleet identifier*

FLEET SUB INDICADOR 3 – FLEET IDENTIFIER		
ACRONYM	**DEFINITION**	
i_{MAR}^{FLOT}	This indicator looks for measuring the risk based on fleets included in UAS operators` operational statements and authorizations through the identification of the aircraft type.	
CALCULATION		
UAS must comply with the predetermined standards of the **identification type**. This must be done through the CE labeling stablished by the European Regulation (UE) 2019/945. The identification type includes from C0 type to C6 type, being the C0 type the one with less technical requirements to operate in the different operational categories and C6 type the one with more ones. C0, C1, C2, C3 and C4 types are reserved to open category operations, and C5 and C6 types are reserved to specific category operations. Pending to define how the indicator will be calculated.		
TYPE	**REGULARITY**	**SCOPE**
Pending	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Active operational statement or authorization at the calculation moment.	UAS
VALUE RANGE	**FORMULA**	
Pending	Pending	

5.3. Training indicator

TRAINING INDICATOR		
ACRONYM	**DEFINITION**	
i_{FOR}	This indicator looks for measuring the risk based on UAS pilots' training performed by UAS operators, such as the operator itself and through any other recognized entity.	
CALCULATION		
Its value comes of the weighting of the training sub indicators: ➢ FOR1 – VOL: Training volumen. ➢ FOR2 – CONT: Training continuity Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.		
TYPE	**REGULARITY**	**SCOPE**
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is defined in each sub indicator.	UAS
VALUE RANGE	**FORMULA**	
0-10	• $i_{FOR} = f_{VOL}^{FOR} \cdot i_{VOL}^{FOR} + f_{CONT}^{FOR} \cdot i_{CONT}^{FOR}$	

5.3.1. FOR1 – VOL: Training volume

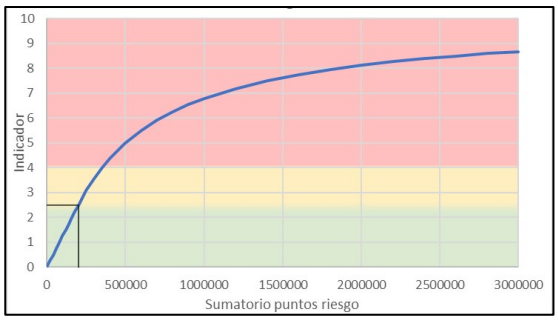
TRAINING SUB INDICADOR 1 – TRAINING VOLUME	
ACRONYM	**DEFINITION**
i_{VOL}^{FOR}	This indicator looks for measuring the risk based on the volume of the training performed, based on the operational category of the training and the number of UAS pilots` certificate issued.

CALCULATION

To calculate this indicator, the number of **UAS pilots` certificates** issued by each UAS operator (such as the operator itself and through any other recognized entity) are counted. Additionally, its risk will be increased by multiplying it by a fixed value depending on whether the operator owns an operational statement for training on STS-01 or STS-02.

$$Volumen_{for} = K_{STS} \cdot N^{o}{}_{certificados}$$

Next, the indicator is calculated based on a sector reference value. The indicator value up to this reference value will evolve in a linear way to a 2,5 value, and from this value the indicator will follow an asymptotic progression till 10.



Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS

VALUE RANGE	FORMULA
0-10	• $Si \sum Volumen_{FOR} < K_{VOL} \rightarrow i_{VOL}^{FOR} = 2,5 * \frac{\sum Volumen_{FOR}}{K_{VOL}}$ • $Si \sum Volumen_{FOR} \geq K_{VOL} \rightarrow i_{VOL}^{FOR} = 10 - \frac{22,5 * K_{VOL}}{2 * K_{VOL} + \sum Volumen_{FOR}}$

5.3.2. *FOR2 – CONT: Training continuity*

TRAINING SUB INDICADOR 2 – TRAINING CONTINUITY	
ACRONYM	**DEFINITION**
i_{CONT}^{FOR}	This indicator looks for measuring the risk based on the lack of training continuity on the UAS operators providing the training.
CALCULATION	

This indicator calculation is carried out in two phases:

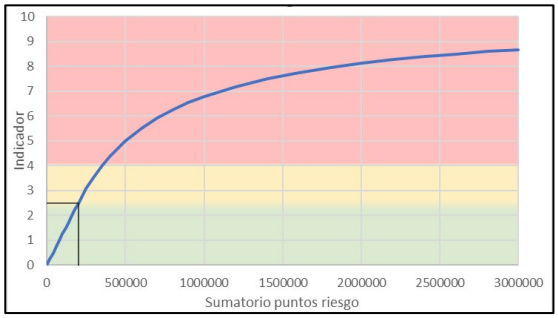
- ✓ **To identify whether the UAS operator provides training or not**:

If the UAS operator has never issued a training certificate, the value of this indicator is 0.

- ✓ **To count the number of months the operator does not issue an UAS pilot training certificate**.

The number of months the UAS operator has not issued any UAS pilot training certificate during the indicator reference time period will be counted.

Next, the indicator is calculated based on a sector reference value. The indicator value up to this reference value will evolve in a linear way to a 2,5 value, and from this value the indicator will follow an asymptotic progression till 10.



Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.

TYPE	REGULARITY	SCOPE
Simple continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS

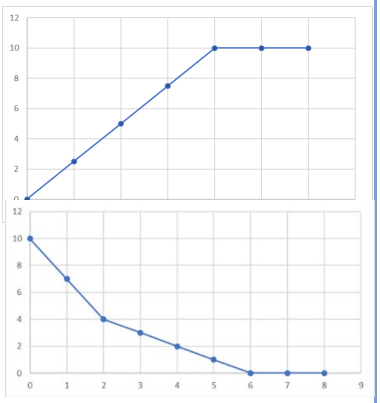
VALUE RANGE	FORMULA
0-10	• $Si \sum N_{meses} < K_{CONT} \rightarrow i_{CONT}^{FOR} = 2,5 * \frac{\sum N_{meses}}{K_{CONT}}$ • $Si \sum N_{meses} \geq K_{CONT} \rightarrow i_{CONT}^{FOR} = 10 - \frac{22,5 * K_{CONT}}{2 * K_{CONT} + \sum N_{meses}}$

5.4. Managers indicator

MAMANERS INDICATOR	
ACRONYM	**DEFINITION**
i_{RESP}	This indicator looks for measuring the risk based on UAS operators` managers` turnover, their experience and dedication.

CALCULATION

Its value comes of the weighted addition of the following three sub indicators:



- Managers` turnover: This sub indicator is calculated based on the manager´s resignations number during the reference time period and it looks for measuring the stability of the managers. The manager´s turnover is measured, in a lineal way, as the managers` resignation number occurred during the reference time period, giving the maximum value to four managers` resignations and the minimum value at 0 managers` resignations (in between, values follow a lineal distribution).
- Managers` experience in the position: This sub indicator is calculated based on the number of years the managers have been on their position and it looks for measuring the experience the managers have on this position at the organization. It is measured, in a lineal way, in two different sections: the first section covers the first year and during this first year the indicator starts from its maximum value at 0 years decreasing to medium values at 1 year; and the second section up to three years in the position and at that time the value decreases to the minimum value. And from that point on, the indicator has its minimum value. This indicator is calculated for each manager analyzed and afterwards it is averaged among the rest of the managers to calculate the managers` experience in the position at the organization.
- Managers` dedication: This sub indicator is calculated based on the number of responsible positions a manager holds in and out of the organization (when AESA knows it). The indicator is calculated for every manager, counting on the one hand the number of managers that implies dedication and on the other hand the number of different organizations having any of these managers. A greater weight will be allocated to the number of different organizations having any of these managers. On this part, the use of sector common representatives is penalized.

The manager considered in the field of UAS operators is the UAS Operator Manager.

Once the three sub indicators have been calculated, the weighting addition of them is calculated. Values defined for the coefficients and the reference values in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors*.

TYPE	REGULARITY	SCOPE
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** Managers included in the operational statement or authorization will be taken into consideration.	UAS

VALUE RANGE	FORMULA
0-10	$$i_{rot}^{RESP} = min\left\{5 \cdot \frac{\sum N_{ceses}}{N_{cargos}}, \quad 10\right\}$$

$$i_{exp\ cargo\ j}^{RESP} = \begin{cases} Si\ Ant_{cargo_j} < 2años & 10 - 3 \cdot Ant_{cargo_j} \\ Si\ Ant_{cargo_j} \geq 2años & max\left\{6 - Ant_{cargo_j}, 0\right\} \end{cases} \rightarrow i_{exp}^{RESP} = \frac{\sum i_{exp\ cargo\ j}^{RESP}}{N_{cargos}}$$

$$i_{ded\ cargo\ j}^{RESP} = K_{ded}^{RESP}\left\{0,8 \cdot N\ org_{cargo_j} + 0,2 \cdot N\ carg_{cargo_j} - 1\right\} \rightarrow i_{ded}^{RESP} = \frac{\sum i_{ded\ cargo\ j}^{RESP}}{N_{cargos}}$$

$$i_{RESP} = fp_{exp}^{RESP} \cdot i_{exp}^{RESP} + fp_{rot}^{RESP} \cdot i_{rot}^{RESP} + fp_{ded}^{RESP} \cdot i_{ded}^{RESP}$$

5.5. Ocurrence reporting culture indicator

OCCURRENCE REPORTING CULTURE INDICATOR	
ACRONYM	**DEFINITION**
i_{CULT}	This indicator looks for measuring the risk based on the lack of occurrence and incidents reporting by UAS operators.

CALCULATION

This indicator calculation is carried out in two phases:

✓ **To identify whether the UAS operator has report the occurrence in which it has been involved or not**:
For all UAS operators` occurrences, the notifier is identified to check if it is the operator itself the one who reports the occurrence. That way, the number of occurrences reported or not by the operator itself is counted.

✓ **Risk allocation to every UAS operator occurrence**:
For every occurrence in which the UAS operator is involved a risk value is allocated and this risk value comes of multiplying the following factors:

- Severity Coefficient – Coef_Sev: For every occurrence, a severity coefficient is allocated according to the severity category allocated to every occurrence. A greater coefficient is allocated to accidents and severe incidents, and after them, a lower coefficient is allocated to major occurrences and a lower one is allocated to the significant occurrences. Regarding this indicator, minor occurrences are not considered.
- Urban environment Coefficient – Coef_Urb: For every occurrence, whether the incident has happened at urban environment or not is identified.
- Aircraft affected Coefficient – Coef_Avs: For every occurrence, whether the UAS incident has affected third manned aircrafts or not is identified.
- People affected Coefficient – Coef_Hum: For every occurrence, whether the UAS incident has affected people or not is identified.

As a result, for every occurrence, a risk value comes of the following formula is obtained:

$$Risk_{incidente} = Coef_{SEV} \cdot Coef_{URB} \cdot Coef_{AVS} \cdot Coef_{HUM}$$

✓ **Summation of risk associated with UAS operator`s occurrences, identifying the occurrences that have been reported or not**.
A summation of the risk values associated with UAS operator`s occurrences reported by the operator itself is performed and also of the risk values associated with UAS operator`s occurrences not reported by the operator itself.

The indicator final calculation comes of multiplying a fixed value by the division of the risk associated with the UAS operator`s non reported occurrences summation into the total sum of the reported and not reported occurrences.

Values defined to weighting factors in each field will be included in annex *GSO-TAC-P01-A01 – Coefficients and weighting factors.*

TYPE	REGULARITY	SCOPE
Compound continuous quantitative	**Calculation regularity** The indicator is calculated in accordance with the Committee regularity. **Data selection period** The reference time period is two years.	UAS

VALUE RANGE	FORMULA
0-10	$$i_{CULT} = K_{cult} \frac{\sum_{NO\ notif}^{sucesos}(Coef_{SEV} \cdot Coef_{URB} \cdot Coef_{AVS} \cdot Coef_{HUM})}{\sum_{TOTAL}^{sucesos}(Coef_{SEV} \cdot Coef_{URB} \cdot Coef_{AVS} \cdot Coef_{HUM})}$$

6. PRIORITY AREA BASED ON SAFETY RISK

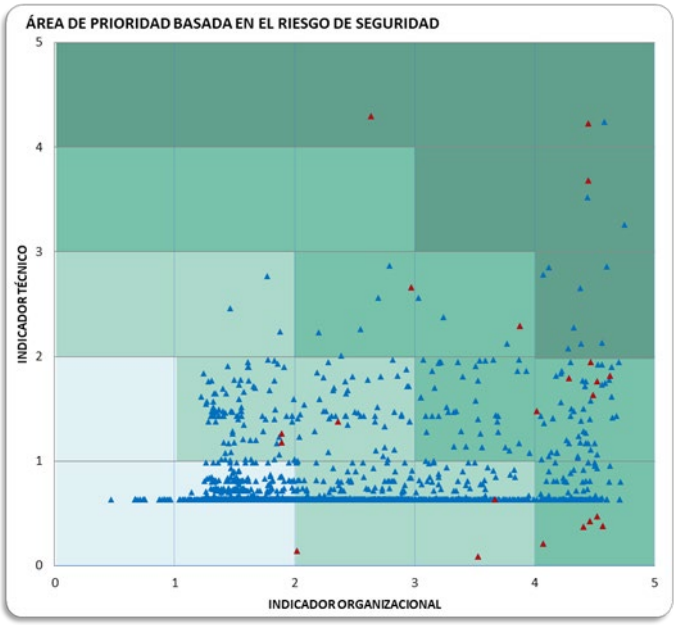
The application of this methodology to safety data collected will result into different numerical values to the indicators previously defined for every UAS operator analyzed. Through the combination of these indicators, it will be possible to prioritize or to stablish rankings based on risk.

In this part, different criteria to prioritize UAS operator will be defined. Operators with poorer results will be given priority, and they will have access to the indicator values and other relevant information of interest, such as whether the operator has undergone inspection, been subject to sanctioning proceedings, experienced safety occurrences, and more.

6.1. General priority – priority area

The priority area is the main visual presentation of the methodology results, and it allows us to show, in the same common area, all the analyzed organizations, making possible to prioritize the analysis of those operators identified as the ones with the worst results or evolution in the indicators.

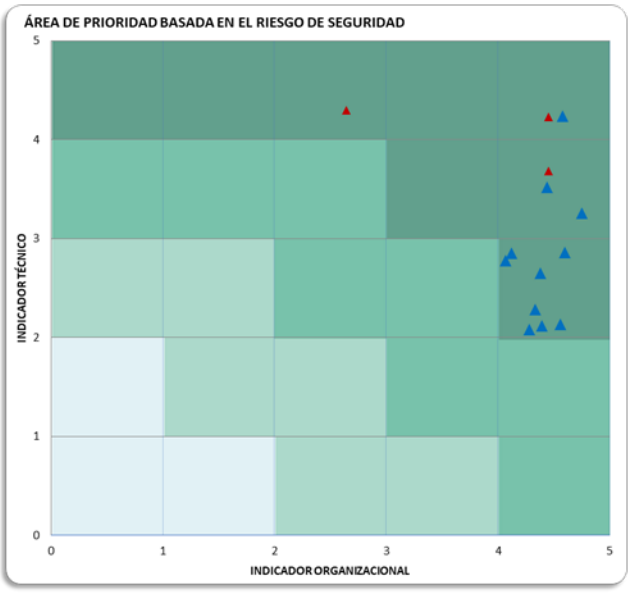
The priority area is defined as a Cartesian coordinate system with a maximum value of 5 on each axis. The organizational indicator is represented on the X-axis, while the technical indicator is on the Y-axis. Those axes mark out the area where the point cloud made up of the analyzed UAS operators` positions is shown. It is possible to identify in a different color the UAS operators which have been already inspected.



Additionally, a priority area for each type of UAS operator in a specific operational category (authorized and declared) could be defined.

Inside the priority area based on safety risk, four areas in different chromatic tonalities are defined, allocating a greater risk value to the ones more far away from the origin of the coordinates. That way, the operators placed in the upper part of the risk area (area far away to the origin of the coordinates) will be prioritized in what is called the “general priority”.

Next, an example of the general priority is provided:



OPERADOR UAS	Inspeccionado	Ind TÉCNICO	ORGANIZACIOI	Prior OPS	Prior FOR	Prior TEC
OPERADOR 001	NO	4.2	4.6	SI	SI	SI
OPERADOR 003	NO	3.3	4.8	SI	SI	SI
OPERADOR 005	NO	3.5	4.4	SI	SI	SI
OPERADOR 007	NO	2.9	4.6	SI	SI	SI
OPERADOR 009	NO	2.7	4.4	SI	NO	SI
OPERADOR 011	NO	2.1	4.6	SI	NO	SI
OPERADOR 013	NO	2.9	4.1	SI	NO	SI
OPERADOR 015	NO	2.8	4.1	SI	SI	NO
OPERADOR 017	NO	2.3	4.3	SI	NO	SI
OPERADOR 019	NO	2.1	4.4	SI	NO	SI
OPERADOR 021	NO	2.1	4.3	SI	NO	SI
OPERADOR 023	SI	4.2	4.5	SI	SI	SI
OPERADOR 025	SI	3.7	4.5	SI	SI	SI
OPERADOR 027	SI	4.3	2.6	SI	NO	SI

6.2. Specific priority – priority area

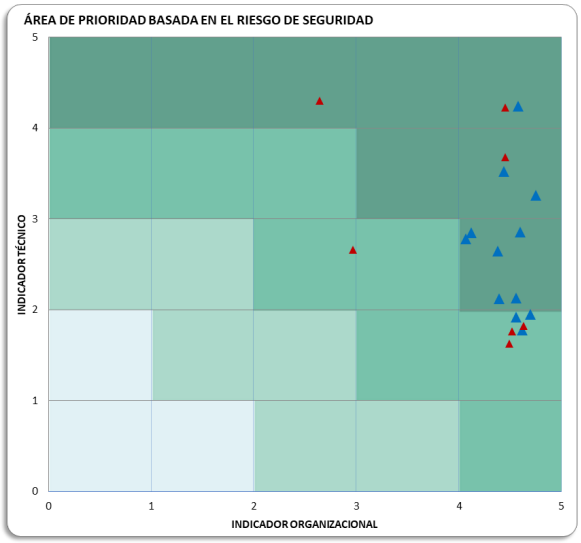
Priority rates are combinations of the different organizational and technical indicators in every field, so that operators can be prioritized according to three different criteria (additionally to the general criteria): operations, training and technological.

Each priority rate comes of the combination of the organizational and technical indicators, giving more relevance to those with a clear operational, training or technological part.

The weights for the prioritization rates of the weighted additive method are as follows:

OPERATION PRIORITY RATE		TRAINING PRIORITY RATE		THECNOLOGICAL PRIORITY RATE	
INDICATOR	WEIGHTING	INDICATOR	WEIGHTING	INDICATOR	WEIGHTING
ACT1 – STS	3	FOR	3	FLOT1 – RISK	3
ACT2 – AUT	3	CN2 – FOR	3	FLOT2 – HET	3
OP1 – ATC	3	INF1 – SAN	2	FLOT3 – MAR	3
OP2 – URB	3	INF2 – INC	2	INF1 – SAN	2
CN1 – OPS	3	SEV	2	INF2 – INC	2
INF1 – SAN	2	CULT	2	SEV	2
INF2 – INC	2	FLOT1 – RISK	1	CULT	2
SEV	2	FLOT2 – HET	1	ACT1 – STS	2
CULT	2	FLOT3 – MAR	1	ACT2 – AUT	2
FLOT1 – RISK	1	RESP	1	OP1 – ATC	2
FLOT2 – HET	1	ACT1 – STS	0.5	OP2 – URB	2
FLOT3 – MAR	1	ACT2 – AUT	0.5	CN1 – OPS	1
RESP	1	OP1 – ATC	0.5	CN2 – FOR	1
CN2 – FOR	0.5	OP2 – URB	0.5	RESP	1
FOR	0.5	CN1 – OPS	0.5	FOR	0.5
CN3 - SOL	0.5	CN3 - SOL	0.5	CN3 - SOL	0.5

Next, an example of specific priority is provided:



OPERADOR UAS	Inspeccionado	Ind TÉCNICO	ORGANIZACIO	Prior OPS	Prior FOR	Prior TEC
OPERADOR 023	NO	3.3	4.8	SI	SI	SI
OPERADOR 025	NO	4.2	4.6	SI	SI	SI
OPERADOR 027	NO	2.9	4.6	SI	SI	SI
OPERADOR 029	NO	3.5	4.4	SI	SI	SI
OPERADOR 031	NO	2.1	4.6	SI	NO	SI
OPERADOR 033	NO	2.0	4.7	SI	SI	SI
OPERADOR 035	NO	2.7	4.4	SI	NO	SI
OPERADOR 037	NO	2.9	4.1	SI	NO	SI
OPERADOR 039	NO	2.8	4.1	SI	SI	NO
OPERADOR 041	NO	2.1	4.4	SI	NO	SI
OPERADOR 043	NO	1.8	4.6	SI	SI	SI
OPERADOR 045	NO	1.9	4.6	SI	SI	SI
OPERADOR 047	SI	4.2	4.5	SI	SI	SI
OPERADOR 049	SI	3.7	4.5	SI	SI	SI
OPERADOR 051	SI	4.3	2.6	SI	NO	SI
OPERADOR 053	SI	1.8	4.6	SI	SI	SI
OPERADOR 055	SI	2.7	3.0	SI	NO	SI
OPERADOR 057	SI	1.8	4.5	SI	SI	SI

Finally, a summary table with all the UAS prioritized operators according one or other criteria will be defined.

TIPO PRIORIZACIÓN	OPERADOR UAS	Inspeccionado	Ind TÉCNICO	d ORGANIZACIONA	Prior OPS	Prior FOR	Prior TEC
GEN	OPERADOR 003	NO	4.2	4.6	SI	SI	SI
GEN	OPERADOR 017	NO	3.3	4.8	SI	SI	SI
GEN	OPERADOR 031	NO	3.5	4.4	SI	SI	SI
GEN	OPERADOR 045	NO	2.9	4.6	SI	SI	SI
GEN	OPERADOR 059	NO	2.7	4.4	SI	NO	SI
GEN	OPERADOR 073	NO	2.1	4.6	SI	NO	SI
GEN	OPERADOR 087	NO	2.9	4.1	SI	NO	SI
GEN	OPERADOR 101	NO	2.8	4.1	SI	SI	NO
GEN	OPERADOR 115	NO	2.3	4.3	SI	NO	SI
GEN	OPERADOR 129	NO	2.1	4.4	SI	NO	SI
GEN	OPERADOR 143	NO	2.1	4.3	SI	NO	SI
OPS	OPERADOR 157	NO	2.0	4.7	SI	SI	SI
OPS	OPERADOR 171	NO	1.8	4.6	SI	SI	SI
OPS	OPERADOR 185	NO	1.9	4.6	SI	SI	SI
FOR	OPERADOR 199	NO	1.9	4.6	SI	SI	SI
FOR	OPERADOR 213	NO	1.6	4.6	SI	SI	SI
FOR	OPERADOR 227	NO	0.8	4.7	SI	SI	SI
FOR	OPERADOR 241	NO	1.8	4.2	SI	SI	NO
FOR	OPERADOR 255	NO	0.8	4.6	NO	SI	SI
FOR	OPERADOR 269	NO	0.6	4.5	NO	SI	NO
FOR	OPERADOR 283	NO	1.9	4.5	SI	SI	SI
FOR	OPERADOR 297	NO	1.4	4.7	SI	SI	SI
TEC	OPERADOR 311	NO	1.8	4.6	SI	NO	SI
TEC	OPERADOR 325	NO	1.4	4.7	SI	NO	SI
TEC	OPERADOR 339	NO	1.7	4.6	SI	SI	SI
TEC	OPERADOR 353	NO	0.6	4.6	NO	NO	SI