Specific Operations Risk Assessment (SORA) – ECA Position Paper –

Executive summary

- SORA (Specific Operations Risk Assessment) is a **multi-stage process of risk assessment** aiming at risk analysis of certain unmanned aircraft operations, as well as defining necessary mitigations and operational safety objectives and their required level of robustness.
- While ECA supports the underlying idea of SORA process, it is concerned that **inadequate consideration** is given to the **complexities** involved in the **respective UAS-operation**, especially as regards the Air Risk Class (ARC), i.e. the risk of mid-air collisions.
- SORA is a mainly qualitative process. For this, an adequate **detailed knowledge and expertise within both the operator and the competent authority is required**.
- Every manned aircraft has a layered approach to collision avoidance which builds its resilience. Great consideration should be given to how similar **resilience** can be achieved **for unmanned aircraft**.
- To facilitate the SORA process - **Standard Scenarios** (STS) and **Predefined Risk Assessments** (PDRA) are being developed for certain types of operations. ECA warns **against the use of STS and PDRA as an "easy and quick way" to operate** UAS.
- It is crucial that all relevant experts and stakeholders are involved in the **process and in the review of the SORA content**.
- The gathered **expertise should be consolidated preferably at the European level**, while developing and maintaining a comprehensive database of the SORA content. Incorporating into such a database a **non-punitive reporting system** is highly recommended.
- **Operations according to a STS do not require an authorization but only an operational declaration.** ECA is concerned that there is not enough expertise and capacity to perform an effective oversight of the operators´ compliance.

European Cockpit Association AISBL
Rue du Commerce 20-22, 1000 Brussels, Belgium I T +32 2 705 32 93 I F +32 2 705 08 77 I eca@eurocockpit.be I www.eurocockpit.be

The Background

The Specific Operations Risk Assessment (SORA) concept was developed by Working Group 6 (WG6) of the Joint Authorities for the Rulemaking of Unmanned Systems (JARUS). It has been endorsed by the European Aviation Safety Agency (EASA) as an Acceptable Means of Compliance (AMC) to fulfil the requirements of the European UAS Regulations (Basic Regulation, Implementing Act, Delegated Act and Annexes).

What is SORA

The Specific Operations Risk Assessment (SORA) is a novel approach on how to safely create, evaluate and conduct an Unmanned Aircraft System (UAS) operation. It focuses on assigning to an UAS-operation two classes of risk, a ground risk class (GRC) and an air risk class (ARC). The SORA allows operators to utilise certain or mitigating measures to reduce both risk-classes. The GRC and ARC form the basis to determine the so-called Specific Assurance and Integrity Level (SAIL). The SAIL represents the level of confidence that the UAS operation will stay under control within the boundaries of the intended operation. The SAIL corresponds to:

- the Operational Safety Objective (OSO) to be complied with
- the description of the activities that might support compliance with those objectives; and
- the evidence that indicates that the objectives have been satisfied

ECA Position

ECA supports the underlying idea of SORA as a world-wide, standardized, and harmonized risk assessment methodology. ECA also sees the potential benefits in a risk- and performance-based approach towards the integration of UAS.

However, ECA expects several problematic issues in the practical application of SORA, especially in determining the ARC. ECA is concerned that some of the underlying principles of SORA (as outlined in the JARUS-Guidelines) might not be fully understood and/or embraced by some of the stakeholders involved. This in turn could undermine the effectiveness of SORA as a tool to assess safety risks and ensure safe UAS operations.

In this context ECA re-emphasises the following points from the JARUS-Guidelines:

- SORA document shall neither be used as a 'checklist' nor be expected to provide answers to all the challenges
- SORA is a tailoring guide that allows an operation to have the best fit for the mitigation means and thus a risk reduced to an acceptable level. For this reason, it does not contain prescriptive requirements but rather objectives to be met at various levels of robustness
- SORA methodology is based on the principle of a holistic / total system safety risk-based assessment model.

While the aim of the SORA-process is to make the risk-assessment more transparent and reduce some of the workload, there is a risk that inadequate consideration is given to the complexities involved in the respective UAS-operation. This is especially the case for the determination of the ARC which is very complex.

Collision avoidance, especially avoidance of mid-air-collisions with manned aviation, has been identified by ECA as a key area to address when integrating drones into common airspace. Airspace-structure, ATC-services, right-of-way-procedures are inter alia all means to lower the risk of collisions between aircraft. Every manned aircraft has a layered approach to collision avoidance. For example, the principle of see and avoid as means to avoid collisions - is valid in manned aviation even in complex airspaces with complex rules and several safety nets. The resilience which is achieved by this layered approach is a very important safety factor. Great consideration should be given to how similar resilience can be achieved for unmanned aircraft.

The JARUS guidelines distinguish between 12 Airspace Encounter Categories (AEC) that correspond to four Air Risk Classes (ARC). A multitude of different factors, such as airspace structure, traffic type, operational volume, ATM/UTM infrastructure, environment are taken into account. The JARUS WG6 has highlighted this complexity by a statement in the guidelines: "It is important that both the competent authority and operator take great care to understand the Operational Volume and under what circumstances the definition of the ARC assignment process could be invalidated". It is therefore crucial that both the UAS operator and the authority are able to fully understand this Operational Volume and do draw the right conclusions as to the determination and validity of the ARC, and hence the safety of the envisaged operation, especially when it comes to an operation in an airspace volume integrated with manned aviation.

Importance of competence

The assessment of risk classes is a key element of the entire process. SORA is a mainly qualitative process. For an adequate assessment, detailed knowledge and expertise within both the operator and the competent authority is required. However, in numerous cases, this may not be the case.

Consequently, an independent group of experts from competent third parties (e.g. manned aviation stakeholders, manufacturers, ANSPs (ATM/UTM), academia, associations) should be consulted on the risk assessment for certain UAS operations. It is imperative that representatives from these and other relevant stakeholders are involved in the process and in the review of the SORA content.

Ideally, this knowledge and expertise will be consolidated in “SORA competency-centres” (this could be “qualified entities”), preferably at the European level. These competency-centres could offer their services to the entire UAS community, which would also facilitate international standardisation and harmonisation.

The competency-centres could also develop and maintain a comprehensive database of the SORA content (both input and outcome). This data-base would allow for a continuing cross-check and validation of expected outcomes in reference to gathered relevant experience (including information about incidents) of the actual UAS operations that were based upon the SORA. This, in return, would have a learning added value. Such a database could prove to be very helpful for the overall SORA process and especially for the development and validation of Standard Scenarios (STS) and Predetermined Risk Assessments (PDRA).

UAS operators are required to report to the competent authority any safety-related occurrence and exchange information regarding its UAS in compliance with Regulation (EU) No 376/2014. This in principle allows safety incident (and accident) data to be collected and analysed, enabling this fast-growing sector to benefit from a quick feed-back loop. The current setup of the reporting system, however, does not allow to connect the occurrence report and the underlying SORA thus it cannot be used to improve the SORA process or the STS and PDRA. Link to D4S?

Standard Scenarios

ECA has concerns about certain developments surrounding Standard Scenarios (STS). It appears that some stakeholders may, at least initially, view STS as an “easy and quick way” to operate UAS. The operator self-declares compliance with the STS. The SORA process, in general, and the STS in particular, are too new to allow an operation solely based upon “declaration” by the operator. ECA doubts there is currently enough expertise and capacity to allow effective oversight. At least until there has been sufficient operational experience with SORA and STS gathered by all relevant stakeholders, all operations should require an operational authorisation by a competent authority.

Declarative Authorisations

ECA foresees potential problems with the EASA - EU-STS (Standard Scenarios for Operations of Unmanned Aircraft Systems in the Specific Category) regarding “declarative” authorisations, whereby the UAS operator self-declares compliant and safe.

The SORA process, in general, and the STS in particular, are too new to allow an operation solely based upon “declaration” by the operator. At least until there has been sufficient operational experience with SORA and STS gathered by all relevant stakeholders, all operations should require an operational authorisation by a competent authority.

Conclusion

ECA understands that SORA could be a way forward to assess and mitigate the risks for the operations in the Specific Category. ECA’s objective is to maintain a high uniform level of safety in the air, achieved due to the experience built by manned aviation. The new (standard) way of risk assessment – in particular air risk – can only lead to that objective if all above stated considerations are taken into account.

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GLOSSARY

ARC	Air Risk Class
ASRS	Aviation Safety Reporting System
ECCAIRS	European Coordination Centre for Accident and Incident Reporting
GRC	Ground Risk Class
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
MAC	Mid-air collision
OSO	Operational Safety Objectives
SAIL	Specific Assurance and Integrity Level
SORA	Specific Operations Risk Assessment
STS	Standard Scenario
UA	Unmanned Aircraft
UAS	Unmanned Aircraft Systems
UTM	UAS Traffic Management System