

Course notes, module 4, week 38

UAS safety & risk assessment

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1 Agenda

1. Lecture on EU drone regulations and the SORA procedure.
2. Introduction to the exercises.
3. Exercises.

2 Theory presented in class

The topic of this module is the EU drone regulations in general and the basic principles of the Specific Operations Risk Assessment (SORA) procedure in particular, which is used by operators to acquire permission for medium risk flights in the European Union.

The theory consists of what is covered in the slides presented in class, which can also be found on itslearning. Reading pages 35 to 70 and 98 to 123 in the 'Easy Access Rules for Unmanned Aircraft Systems (Revision from September 2021)' will explain the SORA process on a fundamental level.

The following are the learning goals of this module.

1. Learn where to seek information for your drone flights.
2. Get familiar with the concepts of the SORA procedure.
3. Gain hands-on experience with assessing drone operation risks.

3 Exercises

The exercises are to be compiled into a lab report for each group, containing the headlines and the solutions/answers for each bullet point in the following. When writing the lab report, please remember to cite sources and back claims. The deadline for handing in the report is 23:59 Monday the 3rd of October. The report must be handed in through itslearning.

3.1 Robustness

Robustness is a key concept in the SORA nomenclature.

- Which two components make up robustness?
- How can an operator typically provide a *medium* level of assurance?
- If a *medium* integrity is proven with a low *assurance*, what is the robustness?

3.2 Ground Risk Class, Air Risk Class, and Specific Assurance and Integrity Level

An operator wishes to use an [Avy Aera 3](#), figure 1, for a Beyond Visual Line Of Sight (BVLOS) logistics operation flying from [55.619417, 10.615725] to [55.767110, 10.603164].



Figure 1: Avy Aera 3 eVTOL.

- How would you categorize the overflowed ground area and why? (Controlled ground area, Populated area, Sparsely populated area, or An assembly of people)
- Is the operation VLOS or BVLOS?
- What will the Intrinsic UAS Ground Risk Class (GRC) be?
- Looking at Table 3, p. 47 in the Easy Access Rules for Unmanned Aircraft Systems, what could you do to reduce the final GRC?
- What kind of airspace does the operation take place in?
- What is the initial Air Risk Class (ARC)?
- With your final GRC and initial ARC, what is the SAIL?

3.3 Operational Safety Objectives (OSOs)

The OSOs change based on the SAIL. Some are excluded at low levels and common for all is that they increase in robustness requirements when the level goes up.

- Which OSOs are optional in a SAIL II scenario?
- According to the OSOs, is a *procedure manual* for maintenance required for a SAIL III?
- What are the OSO#02 integrity requirements for a SAIL IV and how is it assured?
- Which OSOs require EASA validation at a high level of assurance?

3.4 Step #9

Step #9 in the SORA states that *"no probable failure of the UAS or of any external system supporting the operation should lead to operation outside the operational volume"*. A failure could for instance be a motor breaking or a navigation malfunction.

- Come up with a drone design fulfilling this requirement. Explain the design and provide a sketch.