RAdar para Detection and Avoidance em Veículos Aéreos Não Tripulados

RADAVANT
E6.5
RADAVANT PROJECT CONTRIBUTIONS FOR STANDARDISATION (EN)
CONTRIBUTOS DO PROJETO RADAVANT PARA ESTANDARDIZAÇÃO (PT)

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SUMMARY (EN):

This Deliverable builds on previous E6.2, clarifying and structuring project's possible contributions to standardisation on spectrum use, drone flight rules, and detection and avoidance regulatory matters. It pinpoints clear concrete inputs on such matters, as well as the plans to timely taking such proposals to the right places and stages, following the correct procedures. E6.1 and E6.2, as public documents, should be consulted jointly.

SUMÁRIO (PT):

Este Entregável baseia-se no anterior E6.2, clarificando e estruturando as possíveis contribuições do projeto para a estandardização na utilização do espectro, regras de voo de aeronaves, e questões regulamentares de *detection and avoidance*. Aponta contributos concretos e claros sobre estes assuntos, bem como os planos para levar tais propostas atempadamente aos lugares e fases corretas, seguindo os procedimentos apropriados. E6.1 e E6.2, como documentos públicos, devem ser consultados em conjunto.

Keyword list: UAV, Drones, Radar, Regulation, Spectrum, DAA, Professional, Inspection, Surveying, Surveillance

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List of Acronyms

ANAC	*Autoridade Nacional da Aviação Civil*
ANACOM	*Autoridade NAcional de Comunicações*
BRLOS	Beyond Radio Line-of-Sight
BVLOS	Beyond Visual Line-of-Sight
CEPT	European Conference of Postal and Telecommunications
DAA	Detect And Avoid
EASA	European Aviation Safety Agency
EC	European Commission
ECC	Electronic Communications Committee
EP	European Parliament
ISM	Industrial, Scientific and Medical
ITU	International Telecommunication Union
NAA	National Aviation Authority
NPA	Notice of Proposed Amendment
NRA	National Regulatory Authority
RLOS	Radio Line-of-Sight
RF	Radio-Frequency
SRD	Short Range Device
STS	Standard Scenario
UAV	Unmanned Aerial Vehicle
VLOS	Visual Line-of-Sight
WRC	World Radiocommunication Conference

1. Scope

This Deliverable primarily builds on the previous, directly related, E6.2 Deliverable, *Present Regulation Situation and Evolution II*, publicly published by the RADAVANT project in 30-11-2020 [source]. The aim of this E6.5 deliverable is to report on the opportunity to contribute to the relevant regulation, presently or in the future, structuring such contributions. These regard the following fields: a) spectrum use for the radar component, b) spectrum use for the data link component and c) radar for Detect And Avoid (DAA) procedures in Unmanned Aerial Vehicles (UAVs). These major aspects have been well identified and structured, based on the anchor RADAVANT system blocks, shown in Deliverable E6.1 Figure 1 and along the whole E6.2.

Deliverables E6.1 and E6.2, as public documents, should be consulted jointly. As before, all E6.1, E6.2 and this E6.5 share similar table of contents structure, for simpler consultation. Several directed references will be made to the content of E6.2, avoiding unnecessary repetition, for simplification and clarity.

The contributions to national and international standardisation bodies are complex and subject to specific procedures and timings. Along the project, also as reflected in these Deliverables, the Consortium has followed and learned how the respective matters have been evolving. One major rule that the Consortium respects is to favour national contacts, prior to going forth with international contacts. There are cases, nevertheless, where public input is possible, e.g., European Aviation Safety Agency (EASA)'s Notice of Proposed Amendments (NPAs), if the right time window arises. During the project, for the matters at hand, there has been no particular window of opportunity from such institutions. In some situations, actions toward the involved national and international institutions are better to be developed in parallel.

Now that the project is reaching its conclusion, with the built capacity to show well-based knowledge and insight on the respective matters, this Deliverable structures the plans for post-project future action, following the right procedures and windows of opportunity, if and when these arrive. The Consortium has also been concerned to outline concrete, clear, direct and simple proposals, for the concerned matters.

2. Spectrum use for the RADAVANT Radar Component

2.1. Contributions to using the 24 GHz ISM band

As claimed in E6.2, Section 2, in the context of drone industrial use, for professional purposes, drone safety and DAA, the project is **ready to propose the clarification and classification of such UAV radar system as an Industrial, Scientific and Medical (ISM) application**. In this RADAVANT specific case, in the 24 GHz ISM band (24-24.25 GHz). Accordingly, RADAVANT's radar Radio-Frequency (RF) block is not a telecommunications but an industrial system, emitting electromagnetic waves, RF energy, for a specific localised purpose.

This view goes along the International Telecommunication Union (ITU) Radio Regulation [ITU RR 1.15] definition, also following [ITU RR 5.150] and [ITU RR 15.13] provisions [source].

2.2. Form and window of opportunity for contribution

The formal institutions towards which this proposal should take place are the following:

- *Autoridade NAcional de Comunicações* (ANACOM), the National Regulatory Authority (NRA) in Portugal for communications, to analyse and take such proposal to the most appropriate World Radiocommunication Conference (WRC), possibly WRC - 2023, along the usual ITU process;
- *Autoridade Nacional da Aviação Civil* (ANAC), the National Aviation Authority (NAA) in Portugal for UAV operations, to seek technical opinion and support in taking such discussion to the EASA;
- Jointly address the European Conference of Postal and Telecommunications (CEPT)/Electronic Communications Committee (ECC), together with EASA, to introduce such discussion in their joint agenda for UAV systems (as has been done for ECC Report 268, *Technical and Regulatory Aspects and the Needs for Spectrum Regulation for Unmanned Aircraft Systems (UAS)* [source, Feb 2018].

Regarding the respective window of opportunity, there is no specific time line. Anyhow, the Consortium believes that the following plan should take place:

- ANACOM should be consulted on an initial basis, for their formal technical input;
- ANAC should be consulted on an initial basis, for their formal technical input;
- Upon ANACOM's and ANAC's positive feedback, then contact CEPT/ECC and EASA in a coordinated manner, to issue a related keynote, Opinion or NPA;
- Parallel actions need to be weighed.

3. Spectrum use for the RADAVANT Data Link Component

3.1. Contribution for the communications frequency band

As claimed by E6.2, Section 3, in the context of drone industrial use, for professional purposes, drone safety, higher level of security and resilience, **the project is ready to propose the creation of a dedicated, licensed spectrum band, for professional UAV communications use**, evolving to a safer market.

In parallel or alternatively, **propose the use of the possible ISM, non-specific Short Range Devices (SRDs) or *Wideband Data Transmission System* SRDs bands for the communication use in drones, under the known technical demands, further adding a specific security layer for the professional UAV case**.

3.2. Form and window of opportunity for contribution

The formal institutions towards which this proposal should take place are the following:

- ANACOM, to analyse and take such proposal to the most appropriate WRC, possibly WRC - 2023, along the usual ITU process;
- ANAC, to seek technical opinion and support in taking such discussion to EASA;
- EASA, to definitely introduce such discussion in their joint agenda for UAV systems, for either a specific dedicated band or for added security layer in already known license-free regulated use bands.

Regarding the respective window of opportunity, there is no specific time line. Anyhow, the Consortium believes that the following plan should take place:

- ANACOM should be consulted on an initial basis, for their formal technical input;
- ANAC should be consulted on an initial basis, for their formal technical input;
- Upon ANACOM's and ANAC's positive feedback, then contact CEPT/ECC and EASA in a coordinated manner, to issue a related keynote, Opinion or NPA;
- Parallel actions need to be weighed.

4. Relevant DAA and UAV operational issues

4.1. Contribution for the DAA, Operation Categories and Scenarios

As claimed by E6.2, Section 4, in the context of drone use, for better and complete regulation, the project is ready to propose the following:

- The clear distinction of *Beyond Visual Line-of-Sight* (BVLOS), *Visual Line-of-Sight* (VLOS), *Beyond Radio Line-of-Sight* (BRLOS) and *Radio Line-of-Sight* (RLOS);
- Clarify important definitions for flight operations in the non-segregated airspace, most likely and in most professional inspection and surveying operations, e.g., *conflicting traffic*, *terrain and obstacles*, *hazardous meteorological conditions*, *ground operations*, *other airborne hazards*;
- Contributing to the definition of a new Standard Scenario (STS), included or based on the STS-02 scenario, to include short-distance BVLOS conditions.

4.2. Form and window of opportunity for contribution

The formal institutions towards which this proposal should take place are the following:

- ANAC, to seek technical opinion and support in taking such discussion to EASA;
- EASA, to take these contributions into account, in their regulation proposals to the European Commission (EC)/European Parliament (EP).

Regarding the respective window of opportunity, there is a specific time line that should be followed. The Consortium believes that the following plan should take place:

- ANAC should be consulted on an initial basis, for their formal technical input;
- Upon ANAC's positive feedback, then contact EASA in a coordinated manner, to issue a related keynote, Opinion or NPA;
- Parallel actions need to be weighed.

5. Conclusions

This Deliverable E6.5 structures and pinpoints clear concrete inputs to relevant regulation, following the previous E6.1 and E6.2 Deliverables, in the fields of spectrum use for the radar component, spectrum use for the data link component, and radar for DAA procedures in UAVs.

Along the project, we have kept the extensive look at the several regulatory bodies concerned. We have guided all RADAVANT's decisions on its radar, data link and combined DAA functions, according to the respective abiding regulation. We have also followed how such bodies have publicly shown how regulation was planned to evolve.

Upon reaching the current final project stages, the Consortium members are now capable of also defining the approach to take action, conducting such inputs to the right places and stages. Such plan is also finally outlined in this Deliverable. TWEVO is particularly interested and concerned, following its commercial-oriented view on RADAVANT's outcome.