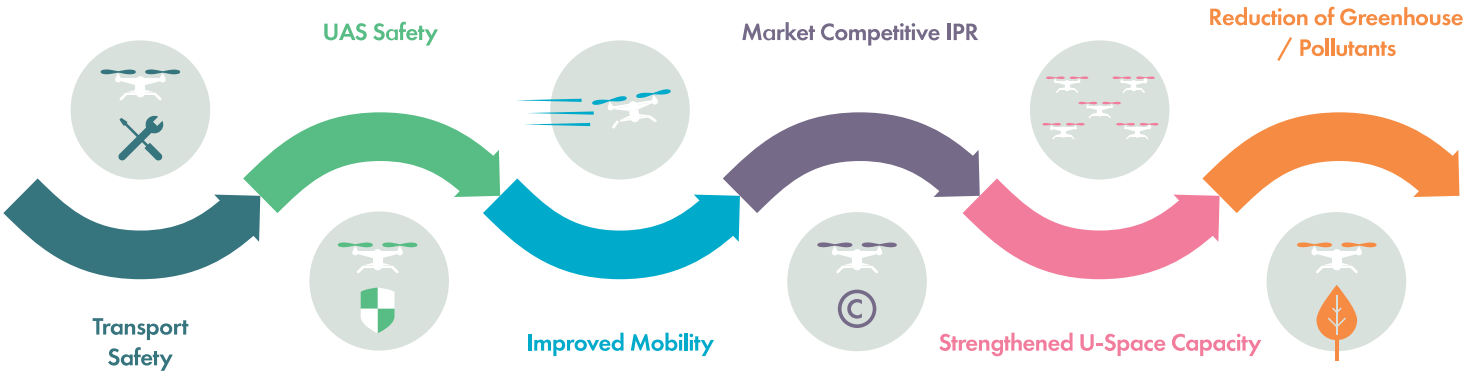
D1.4 Regulatory Compliance

New EU Rules on Drones:

A RAPID Regulatory Compliance Analysis

29 September 2020



The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Document Context

Project Acronym:	**RAPID**
Grant Agreement number:	**861211**
Project title:	**Risk Aware Port Inspection Drones**
Funding agency:	**H2020**
Call:	**H2020-MG-2019-TwoStages**
Type of action:	**Research and Innovation**
Start date of project:	**01/06/2020**
Duration:	**36 Months**
Project website:	**https:// rapid2020.eu/**

Project Summary
RAPID will save lives by delivering an early warning system that will detect critical deterioration in transport system infrastructure, while also minimising system disruption and delays to critical supply chains. It will achieve this goal by combining and extending state-of-the-art drone technology to deliver a fully automated and safety assured maintenance-inspection (MI) service for bridge inspection, ship hull surveys and more. By combining self-sailing unmanned surface vehicles (USV) with swarms of autonomous unmanned aerial systems (UAS), RAPID will dramatically cut the time and cost of structural condition monitoring. RAPID-enabled MI services will increase efficiency and competitiveness for maritime transport stakeholders – such as ports, shipping companies, and landside transport authorities – and will deliver the safe and seamless operation of supply chain and mobility infrastructures – such as material handling equipment, cargo and passenger ships, and bridges. It encourages prioritisation of safer transport infrastructure where the technology seeks to improve environmental impact. The attractive return on investment will enable RAPID to gain market traction and incentivise commercial proliferation, bringing RAPID into widespread use for the overall benefit of society. By 2028, a newly formed company will generate €124 million and save in the order of 100 lives per year (reaching c. 20% share of the serviceable addressable maritime transport market through strategic partnership with 50 ports). RAPID brings together interdisciplinary partners with the expertise and capacity required to develop and validate this unique service model. The project will develop the consolidated maritime and aviation regulation standard for safe USV / UAS operations and the business model to scale the pilot service. RAPID will validate the high level of digitalisation, automation, and regulation required to support safe, beneficial, and scalable access to U-Space.

Deliverable number:		1.4			
Deliverable title:		Regulatory compliance			
Work package:		1			
Type:	**R**	**Delivery date**	M4	**Version:**	**1.0**
Dissemination level:					
This document is confidential, only consortium members should have access.					

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Disclaimer

The opinions expressed in this document reflect only the author's view and in no way reflect the opinion of the European Commission. The European Commission is not responsible for any use that may be made of the information it contains.

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Table of Contents

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

1. Until 2019 all activities with aircraft lighter than 150 kg were under the domestic regulatory competence of EU member states. This changed with the adoption of the so-called 'Basic Regulation' (Regulation 2018/1139) which brought all aircraft, regardless of weight, under EU competence and established the European Union Aviation Safety Agency (EASA).

2. The Basic Regulation also provided a mandate for the European Commission to adopt legislation in relation to the operation of unmanned aircraft systems (UAS) – commonly known as 'drones' – as well as requirements for their production and certification (similar to the 'CE' marking scheme). The aim of these new rules is to create harmonised provisions for UAS operations across the EU.

3. The new rules, which will enter into force on 31 December 2020, exist in two separate but interlinked regulations. The 'Delegated Regulation' (2019/945) deals with the requirements to be met by designers, manufacturers, importers and distributors in order to obtain an EU certification. Whereas the 'Implementing Regulation' (2019/947) deals with the rules and procedures for the use of unmanned aircraft by pilots and operators, defining categories of UASs and requirements for their use.

4. The regulations adopt a risk-based approach and as such do not distinguish between leisure or commercial activities but apply to all UASs, except for toys or UASs used indoors. Thus the new regulations do not cover tests in enclosed laboratories.

5. UASs are divided into different categories depending on factors such as the weight and specifications of the UAS and the operation it intends to undertake, e.g. flying over, close to or away from people. The rules are complex, but the following seeks to provide an overview of their impact on the Rapid project.

6. Initially, however, it should be noted that the EASA has also proposed a new regulation on unmanned airspace (U-space) and related services via its Opinion No 01/2020. Safely and sustainably integrating UAVs into existing airspace is one of the critical issues facing the aviation industry. The Opinon contains draft regulations on the management

of U-space, proposing that there be only one common information service and U-space service provider (USSP) for each designated area. If approved, this regulation should enter into force in 2022. The fundamental idea is to provide alternatives to today's air traffic management systems, which are already reaching their limits and are expected to be overwhelemed by the growth in UAS traffic.

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

The UASs Regulation Package

7. The new rules distinguish between three categories of UASs (defined in Articles 4, 5 and 6 of the Implementing Regulation):

8. UASs in the **Open category** present a low (or no) risk to third parties. The category is bounded by three main factors: 1) the maximum take-off mass of the UAS must be less than 25kg; 2) it must be operated within visual line of sight (VLOS); and 3) the UAS must not be flown higher than 120 metres. Operations conducted in accordance with the basic and pre-defined characteristics are not subject to any further authorisation requirements. A UAS operation does not belong to the Open category when at least one of the general criteria listed in Article 4 of the Implementing Regulation is not met, e.g. when the UAS is operating beyond visual line of sight (BVLOS). The Rapid project intends to fly beyond visual line of sight and therefore falls outside the Open category.

9. The **Specific category** covers UAS operations that present a greater risk or where one or more elements of the operation falls outside the boundaries of the Open category. Operations in this category require an authorisation from the relevant national civil aviation authority. The new EU rules introduce the concept of a 'standard scenario' where, for some relatively simple types of operation, the burden on UAS operators is removed through the use of a number of 'pre-assessed' operating procedures. These standard scenarios are discussed in more detail below.

10. The last, so-called **Certified category,** covers operations of UASs that present an equivalent risk to that of manned aviation. As such it will be subjected to the same regulatory regime (i.e. certification of the aircraft, certification of the operator, licensing of the pilot). This category includes the transport of people or dangerous goods, if the payload is not in a crash-protected container.

11. RAPID will combine and extend state-of-the-art UAS technology to deliver a fully automated and safety assured maintenance-inspection service for bridge inspection, ship hull surveys and more. By combining self-sailing unmanned surface vehicles with swarms of autonomous unmanned aerial systems, RAPID will enable long range inspections and dramatically cut the time and cost of structural condition monitoring. As the Rapid project does not present an equivalent risk to that of manned aviation it falls within the Specific category and for that reason the standard scenarios are of importance to our project.

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Standard scenarios

12. To avoid repetitive individual approvals, the new EU rules allow the EASA and national civil aviation authorities to define 'standard scenarios' for identified types of operations. Standard scenarios refer to UAS operations (in the Specific category) for which the safety risk assessment has already been conducted by the EASA or the civil aviation authority. If an operation falls within such a scenario the operator can simply 'declare' the intent to operate to the national civil aviation authority. The first two standard scenarios (STS-01 and STS-02) were published in Regulation 2020/639 and added to Appendix 1 to the Annex of the Implementing Regulation. The first concerns VLOS operations over a controlled ground area in a populated environment and the second BVLOS with visual observers over a controlled ground area in a sparsely populated environment. Rapid is not, however, planning to have visual observer and therefore falls outside the standard scenarios published to date.

13. If an operation does not fall within the Open or Certified category and is not covered by one of the standard scenarios, then the UAS operator, such as the Rapid project, must seek authorisation from the national civil aviation authority. The process currently varies from one EU country to another, but as of January 2022 national authorisations, certificates, declarations must be fully converted to the new EU System.

14. In the UK there are currently two processes controlled by the Civil Aviation Authority (CAA). Applications for relatively simple operational authorisations are addressed via an online application. Whereas applications for more complex operational authorisations or those that require a specific exemption from the Air Navigation Order are addressed via a paper-based application form - the SRG 1320. The latter covers all operations that contain a greater element of operating risk, which includes all operations beyond visual line of sight. Thus, the Rapid project falls within this latter category.

Harmonisation across the EU

15. Article 11 of the Implementation Regulation seeks to harmonise risk assessments across the EU and contains rules for conducting an operational risk assessment. The EASA has published an acceptable means of compliance method (AMC1), developed by the Joint Authorities for Rulemaking on Unmanned Systems (JARUS). The method in the AMC1 helps to identify the risk level of operation and to identify the mitigations and operational safety objectives needed to make the operation safe. The first step of any specific operations risk assessment (SORA) requires the applicant to collect and provide the relevant technical, operational and system information needed to assess the risk associated with the intended operation. This information is then

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

sent to the national civil aviation authority. When the national civil aviation authority is satisfied of the safety of the operation, it provides the UAS operator with the necessary authorisation.

16. In accordance with the principle of harmonisation, the new regulations make provisions for UASs to be flown in other EU Member States with relatively minimal burden on the operator. For the Open category UASs, these can be operated across the EU. Thus, a UAS bought in one EU country may be flown in any other EU country. The same is true for the Certified category. In contrast, operations within the Specific category outside the country where the original authorisation was given require prior liaison with the national civil aviation authorities where the operation is to be conducted. If, for example, Rapid obtains an authorisation from the UK but wants to fly our UAS into the Republic of Ireland then we need to contact the Irish Aviation Authority (IAA) beforehand. The same procedure needs to be followed if Rapid wants to operate in other EU countries.

17. A new risk assessment is not required. Instead, Rapid is only required to provide a copy of the operational authorisation from the UK as well as details of the additional mitigation measures that will be taken in order to address any risks that are specific to Ireland and location(s) where the operation is intended to take place. Once received, the IAA is required to assess the application and, if satisfied, provide Rapid and the CAA with a confirmation that the updated mitigation measures are satisfactory.

18. National aviation authorities may suggest that a specific operation is approved across the EU. In this case, it will be assessed by the EASA and if approved published in Appendix 1 to the Annex of the Implementing Regulation.

19. Some countries, such as Germany, are already in the process of developing U-spaces. Thus the project partner Hamburgh Port Authority (HPA) is in negotions with the city of Hamburg and the federal aviation authorities to develop a U-space in the port of Hamburg with the HPA working as the USSP.

Brexit

20. All of the above is complicated by the UK leaving the EU. The UK Government has been clear that as the UK exits the EU, its aim is to ensure 'continued transport connectivity in support of successful economic and social ties'. Negotiations are currently ongoing and different outcomes are possible, but the respective positions outlined in the EU and UK negotiating mandates make clear that the UK will no longer participate in EASA

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

systems after the end of the transition period on 31 December 2020. Thus, unless there is a deal, the new rules will no longer be directly applicable in the UK.

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Version history

Version	Changes	Responsible	Reviewed by
<Date>	First Version	<UWS>	<UoD>

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211

Risk-aware Automated Port Inspection Drone(s) – RAPID

RAPID will save lives by delivering an early warning system that will detect critical deterioration in transport system infrastructure, while also minimising system disruption and delays to critical supply chains.

RAPID will save lives, minimise system disruption and delays to critical supply chains.

What is RAPID - Risk-aware Automated Port Inspection Drone(s)?

The EU-funded RAPID project will combine and extend drone technology to deliver a fully automated and safety-assured maintenance inspection service for bridges, ship hull surveys, and more. Specifically, the service will combine self-sailing unmanned surface vehicles with autonomous unmanned aerial systems. The aim is to reduce the time and cost of structural condition monitoring of maritime transport infrastructures such as material-handling equipment, cargo and passenger ships, and bridges. RAPID's new system will also facilitate the prioritisation of safer transport infrastructure.

Project Coordinator
Dr. James Riordan
University of the West Scotland
James.Riordan@uws.ac.u

Communication Coordinator
Hadil Ayoub
REVOLVE
hadil@revolve.media

The Rapid project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°861211