Ref. Ares(2020)4514323 - 31/08/2020

5 services of Drones for increased airports and waterways safety and security

PROJECT AND RISK MANAGEMENT PLAN

Document Summary Information

Grant Agreement No	861635	**Acronym**	5D-AeroSafe
Full Title	5 services of Drones for increased airports and waterways safety and security		
Start Date	01/06/2020	**Duration**	36 months
Project URL	www.5d-aerosafe.eu		
Deliverable	D1.1 – Project and Risk Management Plan		
Work Package	WP1 – Project Management and IPR Management		
Contractual due date	31/08/2020	**Actual submission date**	14/08/2020
Nature	Report (R)	**Dissemination Level**	~~Confidential (CO)~~/Public (PU)
Lead Beneficiary	ADS		
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Contributions from	AFIT		

Revision history (including peer reviewing & quality control)

Version	Issue Date	Stage	Changes	Contributor(s)	Comments
1	**14/08/2020**			Agnieszka Kamińska (AFIT)	
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This project has received funding from the European Union's Horizon 2020 innovation programme under the Grant Agreement No 861635.

Executive Summary

The 5D-Aerosafe Project and risks management Plan (PRMP) has been set up for ensuring that 1) the project achieves its goals as specified in the Description of Action and 2) that the outputs of the projects respect the OQOTOC criteria (On Quality, On Time and On Costs). It allows the coordination team and the partners to manage the project easily and to properly manage the risks. The current PRMP is consistent with ADS procedures and Business Management System (BMS). The PRMP does not repeat the procedure defined in the Grant Agreement and Consortium Agreement. These 2 documents are used as applicative references for the PRMP.

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Glossary of terms and abbreviations used

Abbreviation / Term	Description
BMS	Business Management System
DOA	Description of Action
EC	European Commission
GA	Grant Agreement
OQOTOC	On Quality, On Time and On Costs
PMB	Project Management Board
PRMP	Project and Risk Management Plan
REA	Research Executive Agency
TC	Technical Committee
Overall project risk rating	The highest risk priority of risks in the Risk Register.
Process	A systematic series of actions directed to some end. Sequence of interdependent steps for converting inputs into outputs.
Risk	Effect of uncertainty of objectives.
Risk Register	Register of identified risks

1 Introduction

This document defines the project management processes and procedures to be used within the 5D-AeroSafe project.

Such processes and procedures shall be driven by the following general principles:

- Lean and efficient management that:
    - meets the EC & INEA requirements;
    - meets the needs of the project;
    - minimizes overhead;
    - maximizes effort available for project delivery;
- Technical work shall be driven and managed by the Level 1 WP Leaders and coordinated through the 5D-AeroSafe Technical Committee composed of the Coordinator, the Scientific & Technical Manager and the WP leaders.
- Focus on the project objectives
- Focus on what we need to produce, rather than "what we need to do"

The reference documents in the next section define the contractual requirements that the project must comply with. This document supplements, and does not attempt to copy, those contractual requirements as this document is intended to be used as a stand-alone document with low risk of obsolescence or conflict with other documents.

If any partner requires further guidance on any project management matter not covered in this document, a request should be made to the Coordinator in the first instance.

1.1 Scope of this Document

The Project and Risk Management Plan describes the project management process and how project and risk management activities will be organized and performed during the **5 services of Drones for increased airports and waterways safety and security** project duration.

1.2 Audience

The document is intended for project consortium members and stakeholders who are involved and should follow the Project and Risk Management Process.

2 5D-AeroSafe Project Description

5D-AeroSafe is a 36-month project that will develop a set of drone-based services to increase the safety and security of airport and waterway, while reducing operational costs through the offering of five services, namely: CNS/GNSS equipment inspection and calibration, security checks in the airport perimeter and approaches, runways and taxiways inspections, aircraft inspections, waterways operation and inspections.

The challenge is to integrate the flight of drones in restricted areas where they will co-exist with numerous commercial flights without increasing risks. The integration UTM/ATM is thus studied in detail in the project to propose these efficient solutions. The services are based on the use of several drones (fixed wings for large area monitoring, and VTOLs for detailed inspections and calibrations) integrated in a generic ground station equipped with innovative ITC capabilities, connected to the airport legacy systems.

The 5D-AeroSafe modules will be connected, via SWIM, to airport maintenance systems for infrastructure inspection and calibration aspects, operations systems for the aircraft inspections, and finally with the local ATM for the ATM/ UTM integration aspects.

The project will be implemented under the control of relevant end-users' stakeholders (airport and water airport operators), and authorities (Civil Aviation Authorities). The tests and validation of the system will be performed through three operational test pilots at different stages of the project as the implementation will be incremental, and will take place in real locations and in as much as possible real conditions. As the technological and operational innovations are multiple, the project will target a final TRL of 6-7.

The consortium and the User Advisory Board encompass a large set of end-users and authorities which is a guaranty of the operationality of the project outcomes, and the industry and research partners have been involved for a long time in drone services development.

3 5D-AeroSafe Project Objectives

3.1 General project objectives:

For the 5D-Aerosafe project the following objectives have been established:

1. Scope and Scientific & Technical Objectives (STOs):

The solution, meeting requirements from Grant Agreement 861635 , will:

- STO1-conduct flight inspection, calibration and/or flight validation missions using RPAS for airport CNS systems, through the development and application of miniaturized CNS transceivers on drones (tasks conducted in WP3 and WP5).;
- STO2-provide a flight inspection and calibration solution for landing aids (navaids), such as the Precision Approach Path Indicators (PAPIs) and VHF Omnidirectional Range (VORs) using RPAS (tasks conducted WP4 &WP5)
- STO3-conduct airport Obstacle Limitation Surfaces (OLS) and runway and taxiways/waterway inspection using UASs looking for Foreign Object Debris (FOD), birds, etc. Specifically, for water alighting procedures, a routine check of critical waterway parameters, such as wave conditions or obstacles (swimmers, boats etc.) before alighting clearance by Air Traffic Control, minimising risks and increasing safety (tasks conducted in WP4 and WP5,
- STO4-provide validation of GNSS (Global Navigation Satellite System) RNAV (aRea NAVigation) approach procedures using UASs (tasks conducted in WP3 and WP5).
- STO5-provide real time monitoring of GNSS and EGNOS (European Global Navigation Satellite System) signal in space and geolocation of interference/jamming sources using UAS (tasks conducted in WP4 and WP5
- STO6- build an API toolbox that will enable the easy integration of future applications on UTM Systems through the 5D-AeroSafe platform (tasks conducted in WP5).
- STO7-support security operations by patroller UAS for protection of sensitive sites or safety critical airport infrastructure (i.e. perimeter surveillance, critical infrastructure access control, vehicles behaviour analysis, etc.) (tasks conducted in WP4 and WP5).
- STO8- pave the way for the airborne means of surveillance and control to serve Remote Tower Operations (related activities in WP3, WP4 and WP5

The overall objective of 5D-AeroSafe project is to develop a solution for the safe and efficient integration of UAS – Unmanned Aerial Systems (also known as Remotely Piloted Air Systems - RPAS) in airport and waterway daily operations, that will conduct Flight Inspections, i.e. inspections and calibrations on CNS (Communication, Navigation and Surveillance) systems and landing visual aids, and to safeguard airport restricted areas, and to inspect runways and taxiways (and water runways) to detect Foreign Object debris or any other threat to aircraft movement on the ground (and water surface). This concept will allow the smooth operation and integration of UAS in Aerodrome ATM (Air Traffic Management) systems via the co-operation with UTM (Unmanned Aircraft System Traffic Management) Systems, enhancing mutual situation awareness.(Mutual situational awareness means drones are aware of other air traffic around them, and vice versa: local air traffic as well as air traffic controllers know where drones are located.)

This objective is to be accomplished through the execution of GA.

2. Schedule objectives

The duration of project will be 36 months , starting date from 1st June 2020 under the following High level Schedule.

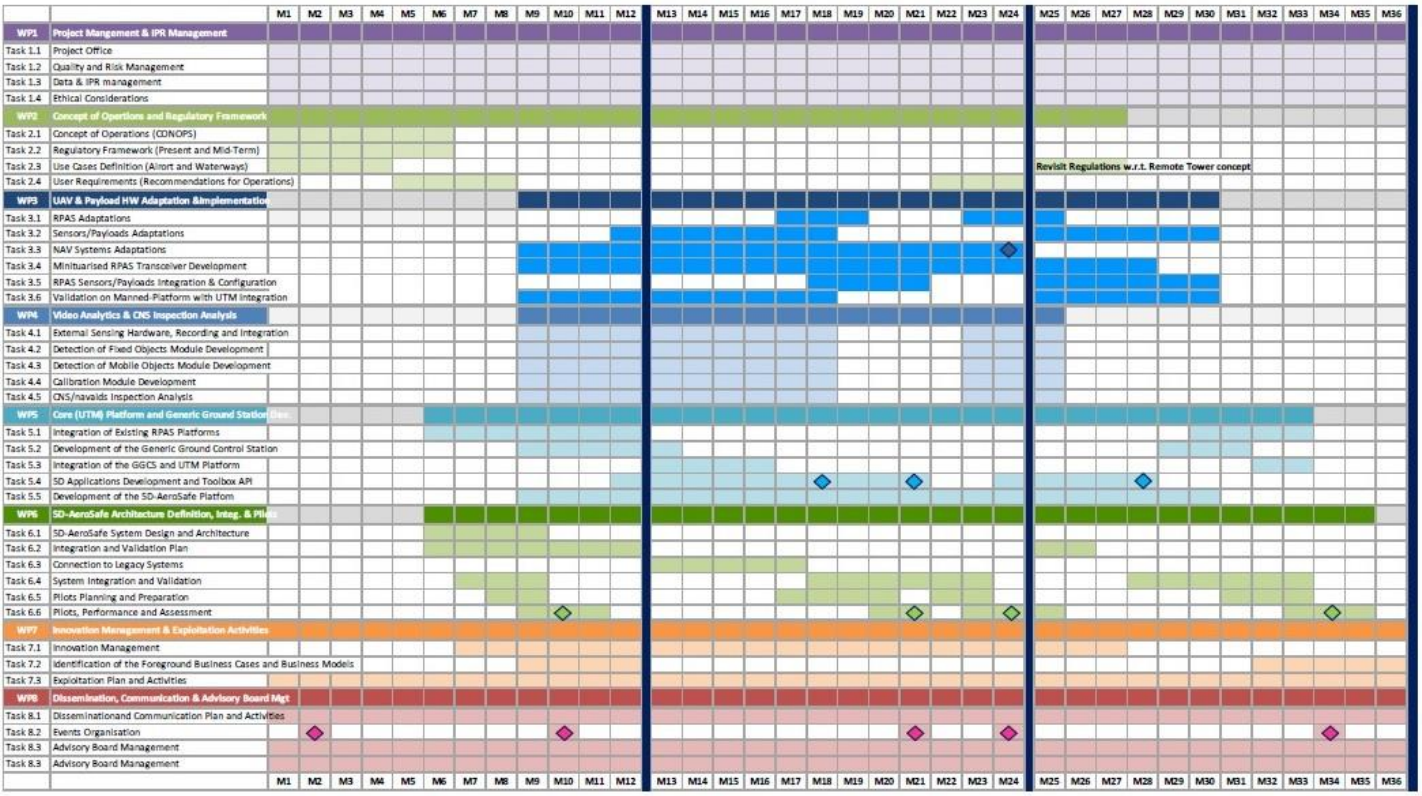

Figure 1. Project full schedule

Phase	WP	Est. Due Date
Phase 0 -Planning, Management	WP1- Project Management and IPR Management	31 May 2023
Phase 1- Requirements, Regulations, Concept of Operations:	WP2- Concept of Operations and Regulatory Framework	28 Feb 2021
Phase 2- Development and Testing	WP3 -UAV and Payload Hardware Adaptation and Implementation	30 Nov 2022
	WP4- Video Analytics and CNS inspection Analysis	28 Feb 2022
	WP5- Core 5D-AeroSafe Platform Development	28 Feb 2023
Phase 3- Demonstration and Validation	WP6- 5D-AeroSafe Architecture Definition, Integration and Pilots	31 May 2023
Phase 4- Dissemination and Communication Activities, Innovation Management and Exploitation Activities	WP7- Innovation Management and Exploitation Activities	31 May 2023
	WP8- Dissemination and Communication Activities, and User Advisory Board Management	30 Apr 2023

3. Budget objectives:

- The total cost of project does not exceed estimated budget (EU contribution) 3 497 475,00 EUR.
- Each beneficiary- partner of consortium does not exceed estimated eligible costs (per budget category).

No	Participant	Country	(A) Direct personnel costs/€	(B) Other direct costs/€	(C) Direct costs of sub-contracting/€	(D) Direct costs of providing financial support to third parties/€	(E) Costs of inkind contributions not used on the beneficiary's premises/€	(F) Indirect Costs / € (=0.25(A+B-E))	(G) Special unit costs covering direct & indirect costs / €	(H) Total estimated eligible costs / € (=A+B+C+D+F+G)	(I) Reimburse-ment rate (%)	(J) Max.EU Contribution / € (=H*I)	(K) Requested EU Contribution/ €
1	Airbus Defence And Space Sas	FR	530000	38500	0	0	0	142125,00	0	710625,00	100	710625,00	710625,00
2	Future Intelligence Erevna	EL	391500	53000	0	0	0	111125,00	0	555625,00	100	555625,00	555625,00
3	Ecole Nationale De L Aviation Civile	FR	176800	10000	0	0	0	46700,00	0	233500,00	100	233500,00	233500,00
4	Instytut Techniczny Wojsk	PL	202500	97000	0	0	0	74875,00	0	374375,00	100	374375,00	374375,00
5	Fundacion Centro De Tecnologias	ES	226180	29000	0	0	0	63795,00	0	318975,00	100	318975,00	318975,00
6	Ellinliko Mesogeiako Panepistimio	EL	224000	38000	0	0	0	65500,00	0	327500,00	100	327500,00	327500,00
7	Ferrovial Corporacion Sa	ES	154000	12000	22000	0	0	41500,00	0	229500,00	100	229500,00	229500,00
8	Greek Water Airports	EL	76500	12000	0	0	0	22125,00	0	110625,00	100	110625,00	110625,00
9	Airmap Deutschland Gmbh	DE	478400	31000	0	0	0	127350,00	0	636750,00	100	636750,00	636750,00
10	Eurocontrol - European Organisation	BE	231949	10000	0	0	0	60487,25	0	302436,25	100	302436,25	0,00
	Total		2691829	330500	22000	0	0	755582,25	0	3799911,25		3799911,25	3497475,00

3.2 Specific project objectives

1. Achievement of Key Point Indicator

STO	Key Point Indicator	Metrics and indicator of success
STO1	1. Miniaturised transceiver size. 2. Correlation of measurements with the miniaturised transceivers to existing avionic transceivers.	1. Size and volume reduction by more than 50% compared to typical CNS transceivers (currently: e.g. 342mm ⍰⍰157mm ⍰⍰200mm, 5.1kg2). 2. Correlation coefficient of measurements (more than 80% of the current measurements
STO2	1. Correlation of the results with the RPAS inspection/calibration of navaids to existing inspection /calibration procedures and results. 2. Reduction of duration of navaids inspection/calibration	1. The number of inspection/calibration parameters of a navaids check report that are sufficiently (w.r.t. tolerances) inspected with the RPAS will between 18 and 20. 2. Reduction of duration of the UAS inspection/calibration compared to the typical duration (~2 hours) of an aircraft conducted flight inspection/calibration of navaids by 60%.
STO3	1. Reduction of duration of a runway/waterway inspection 2. Reliable assessment of wave parameters	1. The Typical duration of UAS runway/waterway inspections compared to the typical duration (~2 hours) of inspections by typical means (cars, boats, cameras, etc) reduced by 50%. 2. Wave height estimation by UAS measurement and analysis

	within requirements of waterway operation	w.r.t. sea surface measurements.
STO4	1. Reliability of validation of RNAV approach procedures using UAS.	1. The number and type of PBN navigation specifications that are sufficiently validated by UAS will be approximately 1-2.
STO5	1. Detection of GNSS interference in a timely and accurate manner.	1. The time delay of GNSS interference detection flag should be less 5 secs. 2. The accuracy of estimated position of jamming source should be less than 100m.
STO6	1. Level of integration. 2. Security aspects	1. Degree of the API toolbox integration will be between 50% and 100% (by the end of the project). 2. API security metrics utilising state of the art measures.
STO7	1. Speed of patrolling and in situ engagement. 2. Operation under any weather and ambient light conditions.	1. The time required for UAS operations should be 50% less compared to typical security procedures (~ 40mins). 2. Availability of patrolling function in different weather and light conditions will be dependent on the UAS type.
STO8	1. Capability of UAS to serve contingency remote tower operations.	1. Correlation of UAS surveillance results with steady cameras and ATCOs observations.

2. WP successful – all deliverables in each WP accepted.

WP Deliverables						
WP No	Del Rel. No	Del No	Title	Lead Beneficiary	Nature	Est. Del. Date (GA- Annex I)
	D1.1	D2	Project and Risk Management Plan	ADS	Report	31 Aug 2020
	D1.2	D3	Periodic stakeholders' inputs V1	ADS	Report	31 May 2021
	D1.3	D4	Periodic stakeholders' inputs V2	ADS	Report	31 May 2022
	D1.4	D5	Periodic stakeholders' inputs V3	ADS	Report	31 May 2023
	D1.5	D6	Intermediate Progress Report	ADS	Report	30 Nov 2021
	D1.6	D7	Data Management Plan V1	ADS	Report	30 Nov 2021
	D1.7	D8	Data Management Plan V2	ADS	Report	31 May 2023
	D1.8	D9	Final Activity Report	ADS	Report	31 May 2023
	D1.9	D53	Project and risk management Plan V2	ADS	Report	31 Oct 2021
	D1.10	D54	Project and risk management Plan V3	ADS	Report	30 Apr 2023
WP1	D1.11	D55	Preliminary Data Management Plan	ADS	ORDP: Open Research Data Pilot	30 Nov 2020
	D2.1	D10	Synthesis of the Regulatory Framework and Concept of Operations V1	ENAC	Report	30 Nov 2020
	D2.2	D11	Synthesis of the Regulatory Framework and Concept of Operations V2	ENAC	Report	31 Aug 2022
WP2	D2.3	D12	Use Cases Definition	GWA	Report	28 Feb 2021
WP3	D3.1	D13	Miniaturised UAS Transceiver User Manual and Configuration	FINT	Demonstrator	30 Sep 2022

	D3.2	D14	Payload User Manual and Configuration	VICOM	Report	31 Mar 2022
	D3.3	D15	Sensors ready for integration V1	ITWL	Demonstrator	30 Nov 2021
	D3.4	D16	Sensors ready for integration V2	ITWL	Demonstrator	30 Nov 2022
	D3.5	D17	UAVs ready for integration in the GGCS V1	ADS	Demonstrator	30 Nov 2021
	D3.6	D18	UAVs ready for integration in the GGCS V2	ADS	Demonstrator	30 Nov 2022
	D4.1	D19	Visual Analytics configuration description and setup	VICOM	Report	31 Oct 2021
	D4.2	D20	Visual analytics and AI algorithm module for of Airport Obstacle Limitation Surfaces (OLS) and PAPIs V1	VICOM	Report	28 Feb 2022
	D4.3	D21	Visual analytics and AI algorithm module for of Airport Obstacle Limitation Surfaces (OLS) and PAPIs V2	VICOM	Report	30 Jun 2022
WP4	D4.4	D22	CNS/navaids Analysis Module	FINT	Demonstrator	30 Jun 2022
	D5.1	D23	CNS/navaids Analysis Module V1	ADS	Demonstrator	31 May 2021
	D5.2	D24	UAVs ready to be integrated V2	ADS	Demonstrator	30 Nov 2022
	D5.3	D25	Integrated GGCS with applications and communications V1	ADS	Demonstrator	30 Jun 2021
	D5.4	D26	Integrated GGCS with applications and communications V2	ADS	Demonstrator	31 Dec 2022
	D5.5	D27	Integrated UTM platform V1	AM	Demonstrator	30 Sep 2021
	D5.6	D28	Integrated UTM platform V2	AM	Demonstrator	28 Feb 2023
	D5.7	D29	5D-AeroSafe Platform and applications V1	FINT	Demonstrator	28 Feb 2022
WP5	D5.8	D30	5D-AeroSafe Platform and applications V2	FINT	Demonstrator	28 Feb 2023
	D6.1	D31	5D-AeroSafe System design document	ADS	Report	28 Feb 2021
	D6.2	D32	Pilots planning document	FERROVIAL	Report	31 Aug 2021
	D6.3	D33	5D-AeroSafe System integration report V1	ADS	Report	31 Jan 2022
	D6.4	D34	5D-AeroSafe System integration report V2	ADS	Report	28 Feb 2023
	D6.5	D35	Pilots assessment V1	FERROVIAL	Report	30 Jun 2022
	D6.6	D36	Pilots assessment V2	FERROVIAL	Report	30 Apr 2023
WP6	D6.7	D37	Final assessment and recommendations for the future	FERROVIAL	Report	31 May 2023
	D7.1	D38	Exploitation Plan V1	FERROVIAL	Report	28 Feb 2021
	D7.2	D39	Exploitation Plan V2	FERROVIAL	Report	31 Mar 2023
	D7.3	D40	Business Plan & Models V1	ADS	Report	31 May 2021
WP7	D7.4	D41	Business Plan & Models V2	ADS	Report	31 May 2023

	D7.5	D42	Roadmap for industrialisation and recommendations	ADS	Report	31 May 2023
	D8.1	D43	User Workshop and Report	HMU	Report	31 Jul 2020
	D8.2	D44	Project Dissemination Materials (project factsheet/leaflet, presentation and website)	ITWL	Websites, patents filling, etc.	30 Sep 2020
	D8.3	D45	Dissemination and Communication Plan V1	ITWL	Report	30 Nov 2020
	D8.4	D46	Dissemination and Communication Plan V2	ITWL	Report	30 Nov 2021
	D8.5	D47	Pilots' Events 1 Reports (including questionnaires and training)	HMU	Report	28 Feb 2022
	D8.6	D48	Pilots' Events 2 Reports (including questionnaires and training)	HMU	Report	31 May 2022
	D8.7	D49	Pilots' Events 3 Reports (including questionnaires and training)	HMU	Report	31 Mar 2023
	D8.8	D50	Project videos 1	HMU	Websites, patents filling, etc.	31 Mar 2022
	D8.9	D51	Pilot videos 2	HMU	Websites, patents filling, etc.	30 Jun 2022
WP8	D8.10	D52	Pilot videos 3	HMU	Websites, patents filling, etc.	30 Apr 2023
WP9	D9.1	D1	POPD - H - Requirement No. 1	ADS	Ethics	30 Jun 2020

3.3 Project Assumptions

- The development of 5D-AeroSafe platform will be based on loose-coupling the between state of the art and already developed platforms like **FINoT** platform provided by FINT and **UTM Cloud** platform provided by **AirMap**, alongside with the **Generic Ground Control Station (GGCS)** provided by ADS.
- Dedicated orchestration will interconnect multi-stakeholders like UAS operators, UAS pilots and Airport TWR (tower) Air Traffic Controllers in a collaborative decision system, in order to provide a set of useful applications and microservices in a common use and flexible airspace, achieving the highest level of safety.
- Each provision service before final execution or before any next step, must receive by the Clearance Operator Authority of ANSP, a proprietary restriction ticket list denoting its clear state. Otherwise all next steps are prohibited and they are locked automatically by the platform due to the safety reasons. Geo-fencing capability is the mandatory requirement for any UAS used in a TMA area. Special payloads drivers, web user interfaces, and analytics algorithms will be developed on the 5D-AeroSafe platform, to meet the application's advanced requirements.

3.4 Project Constraints

- The total cost of the project must stay in the approved budget
- Eligible cost are limited to set out in Annex 2 in Grant Agreement
- 5% of budget retained by Agency as Guarantee Fund
- Multi-cultural, international environment, various organizational forms of entities: research/academic partners, industry partners, SMEs, governmental sector.
- Facilities restrictions and dependencies
- System of control of transportation, transfer, transit of military use products restrictions law
- Public procurement law procedures
- Organizational constraint such as the need to share resources with functional managers in consortium partners divisions.

4 Project Management Structure and Procedures

4.1 Project Management Structure

The project management structure as presented in Figure 17, is considered appropriate to the scale and complexity of the project, and sufficient to ensure that the proposed objectives are met. The structure and procedures are also to ensure the proper level of coordination and cooperation within the consortium and guarantee effective project administration, project organisation, management of the technical progress of the project and co-ordination with other EU-funded projects, as well as with other interested parties. It is defined to identify the responsible members of the various entities of the consortium, as well as to optimisecommunication between the members of the consortium, the work package leaders and the Project Coordination Board (PCB).

The proposed project management structure will allow efficient decision making and implementation of procedures, and thus enable the consortium to address all needs concerning partnership and management issues as well as ensuring the project achieves its objectives. It is based on the experience of the partners in previous collaborative projects, lessons learnt and the exploitation of methods and tools that have proved their efficiency.

The project's Consortium Agreement (CA), based on the DESCA 2020 Model Consortium Agreement, will define the 5D-AeroSafe project management structure, the rules of action and modalities of interaction among the project partners, and entail detailed operational procedures for the project boards (representation, meeting preparation, organisation, minutes, voting, quorum, and veto rules) – all documented in the CA.

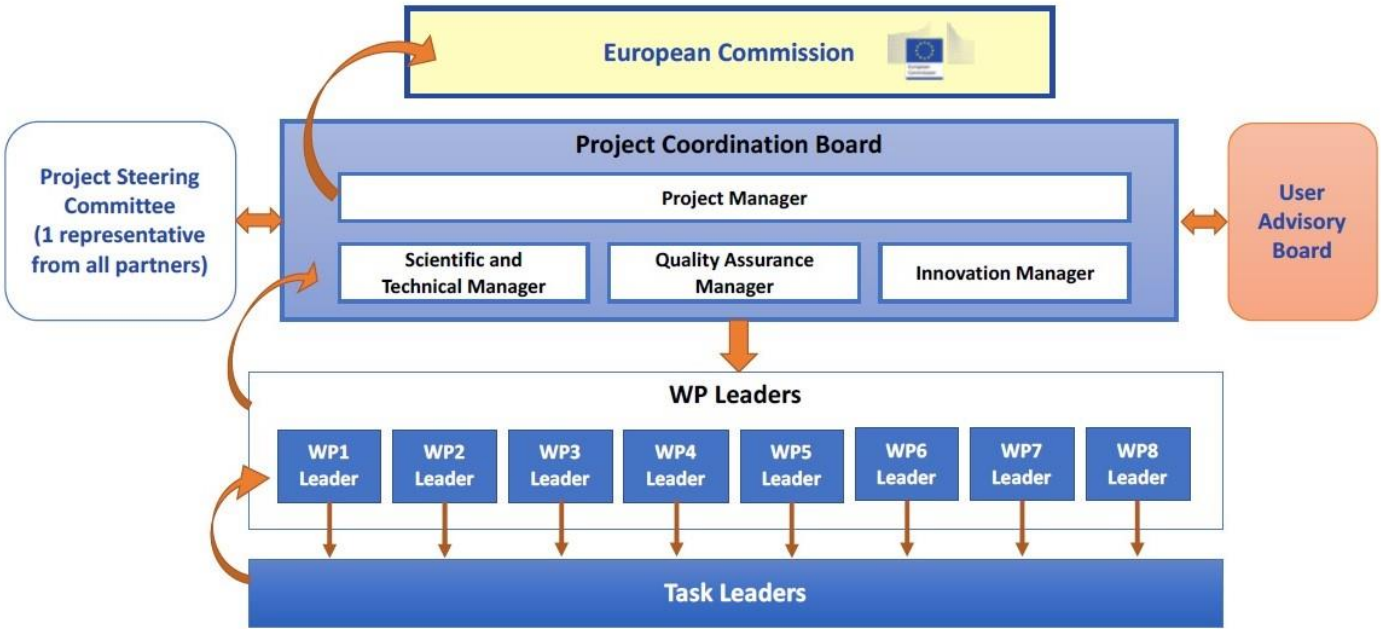

Figure.2 Project Management structure

The project management structure is designed to have the following objectives:

- To coordinate and provide interface with the European Commission;
- To ensure timely and qualitative achievement of the project objectives;
- To provide timely and efficient financial and administrative coordination of the project;
- To coordinate at the consortium level the activities of the 5D-AeroSafe project;
- To provide decision making, quality control and conflict resolution mechanisms to support the project's consortium and its evolution;

The 5D-AeroSafe project management structure will distinguish three levels of actions:

1. **Decision-making**: handling contractual issues regarding the Consortium Agreement, changes in the project Consortium Plan, the Consortium structure (incl. new partners), etc.

2. **Operational management**: implementing decisions taken by the decision-making bodies, coordination of the WPs and of the reporting tasks, financial and administrative management, etc.

3. **Advice and feedback**: advising the decision-making bodies about project orientations on issues such as progress of scientific/technical state-of-the-art, evolution of market context, dissemination and exploitations aspects, IPR, ethical issues, etc.

The 5D-AeroSafe project management structure is comprised of the following decision-making bodies:

- The General Assembly as the ultimate decision-making body of the Consortium;
- The Steering Committee Board as the supervisory body for the execution of the Project
- The User Advisory Board comprising of the project's end users and other key interested stakeholders,

who will provide the user requirements, provide strategic guidance to the technological developments, test and validate the 5D-AeroSafe components and platform, and review and validate project results.

4.2 General Assembly

The General Assembly (GA) is composed of all involved project partner. Each member has one vote, whereas all other non-voting researchers working for this project may join the meetings and discussions. The main tasks of the General Assembly are:

- Grant proper implementation of the Participants respective rights and obligations in accordance with the contractual framework of the project and the Consortium Agreement.
- Decide upon withdrawal, inclusion and exclusion of Participants to the project.
- Take preliminary decisions on the amendment of the Consortium Agreement (subject to ratification by the authorised legal representatives);
- Agree on standard operation procedures within the project in relation to the reporting procedures;
- Agree on procedures and policies in accordance with the Grant Agreement, Articles 23, 28 and 29 for dissemination of foreground and IPR;
- Approve the provisional budgets, discuss and approve the annual executive budget and cost claims prepared by the Steering Committee including the reimbursements to the Participants.

Urgent decisions may be taken via teleconference, and/or via e-mail, phone at the request of the Project Coordinator or of one third of the Participants if none of the Participants has reasonable objections to this way of deciding.

4.3 Project Management Board

The project is contractually managed by the Project Coordinator supported by the Project Management Board (PCM). The Project Management Board consists of:

- The Project Coordinator (PM),
- The Scientific and Technical Manager (STM),
- One representative of each partner (each partner in the consortium has one vote for each voting session),
- Innovation Manager (IM),
- Quality Assurance Manager (QAM).

The PMB is in charge of all the actions related to the contractual project management. The coordinator is the unique point of contact with the EC and relays if needed the information and decisions from the PMB to the PO.

4.4 Technical Management

Most of the work within this project will be focused within the technical WPs managed by the Level 1 WP Leaders, who may delegate some responsibilities to the Level 2 Task Leaders.

Each Level 1 WP Leader is responsible for ensuring that his/her work package produces the required deliverables, as specified in the DOA, on time, within budget, and with the required quality.

The Level 1 WP Leader of each open work package shall provide a report every 3 months on the progress of his/her work package to the Scientific and Technical Manager using a standard reporting format. If the Level 1 WP Leader becomes aware of any arising that threatens the delivery of the work package or achievement of the project objectives, the Level 1 WP Leader shall notify the STM and the PC immediately rather than wait until the next monthly report is due. If there is likely to be a knock-on effect on any other WPs, then the Level 1 WP Leader shall notify the Level 1 Leaders of those WPs also.

Further details of the management structures and processes are provided in the DOA and the Consortium Agreement.

If a project participant has any difficulty or requires any help to deliver their obligations, they are expected to ask for help from their Level 2 Task Leader or Level 1 WP Leader, or the STM or PC as appropriate.

4.5 Decision Making and Conflict resolution

Decision making and conflict resolutions are done in WP1 (Management) and through the General Assembly that meet every 6 months or on specific request from one or several partners if an important issue needs to be handled immediately. The WP leaders will be responsible for monitoring the implementation of the decisions that affect their WPs. In case of major disagreement, regarding a financial, administrative or technical issue, the following procedure for conflict resolution will be adopted.

As soon as the Coordinator detects problems, which can endanger the objectives of the project, such as serious delays of deliverables, he will call for an extraordinary Plenary Board meeting. In this meeting, the

situation will be analysed by consensus and a decision will be proposed in order to solve the problem. Any conflicts that cannot be resolved through the principles above will be handled according to the dispute resolution provision set forth in the CA. The Risk Management and Contingency Plan, as well as the Quality Control Plan discussed above will be handled both at a WP level, as well as centrally within WP1. An initial identification of risks and related contingency plans can be found in Section 3.2.4.

The Responsibility for solving conflicts within the consortium is with the Steering Committee. The Project Manager and the Scientific and Technical Manager are in charge to identify administrative and technical solutions respectively and present those solutions to the Project Coordination Board. However, in the interest of efficiency, technical decisions that are not of strategic importance to the project will be taken at the lowest possible level, through discussion among the Task Leader and participants of the given task. If and only if no agreement can be achieved, the decision-making will be passed on to the WP Manager. If a decision impacts other WPs, the issue will be reported to the STM who will mediate with the WP Managers and propose a consensual solution. If no consensus can be reached or if the issue is of strategic importance to the project, the issue will be discussed in the PCB and a decision taken by a majority vote. Strategic decisions and only these, following major delays in achieving milestones that put the project as a whole at risk, defaulting participants or the withdrawal of a participant, are taken by the PMB. If conflict arises, the PM and the STM, in liaison with the WP Managers, act as mediators between the parties. If this is not accepted by the participants, the issue is discussed in the PCB and a consensual solution is sought. If no consensus is possible, a decision is taken by a majority vote in the PCB. For the sake of lean and efficient procedures, related debates and polls may take place upon face-to-face meetings but also by email or phone/video conference. Within the framework of the Consortium agreement, the most straightforward and early solution will always be sought. The PC thanks to his management experience will strive to identify the conflicts at early stage and solve the issues as fast as possible through negotiation with the interested parties.

5 Collaboration and Communication

5.1 Overview

The success of a project of this nature will depend on effective collaboration between partners, and efficient and effective communication is vital for such collaboration.

The following means of communication are anticipated:

Shared data environment

A Web-based shared document library will be set up in the private part of the Web site.

Email

Email is expected to be widely used. Care shall be exercised to avoid information overload, i.e. senders shall ensure emails are sent to the appropriate recipients, rather than sending everything to everyone. In particular, the following rules should be respected: 1.The sender should verify that any name put in the addressee list is here for action and 2. The sender should verify that any name put in the cc list is really interested in the content of the e-mail. Group mailing lists will be used for specific activities within the project (WP lists).

Telephone

The telephone is expected to be widely used. Callers shall be considerate and take account of time differences, office hours and known holidays in the different partner countries, especially if calling to a mobile number or if it is believed that the recipient's office phone could be connected through to a mobile number. A contact list was established at the beginning of the project and will be maintained by the Project Coordinator.

Teleconference

Teleconference is expected to be widely used if more than two partners need to be involved. Some partners may not have the facility to initiate a teleconference, in which case they may ask another partner to do so if a teleconference is the most efficient and effective way to achieve the required communication.

Video Conference

Video conference may be used, although some partners may not have the facility, and may not be suitable if more than two partners need to be involved.

Webex

Webex is a convenient and effective way to communicate if Internet access and a telephone are available. Documents and presentations may be opened and viewed simultaneously by all participants. Some partners may not have the facility to initiate a Webex, in which case they may ask another partner to do so if a Webex is the most effective and efficient way to achieve the required communication. In particular, the Project Coordinator (ADS) can easily set up Webex meeting.

Meetings

Meetings are the most effective way to progress, but they are expensive in time and travel. Moreover, concerning to COVID-19 in some cases required meetings may not be possible according to the schedule. Some meetings are required (plenary meetings, every 4 months), whilst others will be discretionary and specific. Is a case of required meeting with no possibility to organize it in the B2B form, the meeting will be exchanged by Video Conference. If the meeting is discretionary, alternatives shall be considered first. Even if meetings are scheduled, partners should continue to communicate through other means, and resist the temptation to "save things up" for the next meeting.

5.2 Partner contact register

The coordinator shall maintain and distribute a register of contact details and roles for all individuals within the partner organisations who are involved in the project.

If a new person joins the project, or a change or correction to the existing data is required, or a person leaves the project, the affected person or a member of their organisation shall notify the Coordinator. The Coordinator shall collect all such requests, and shall update and re-distribute the register from time to time.

5.3 Meetings

5.3.1 Types of meetings

The following kinds of face-to-face meetings are envisaged:

- Plenary meetings (every 4 months),
- EC Review (at M18 for the first one and at the end of the meeting),
- 5D-AeroSafe Project Management Board (PMB) (every 6 months),
- 5D-AeroSafe Technical Committee (TC) (every 6 months, collocated with the PMB meeting with teleconference at intermediate 3 months),
- WP Working Meetings (WP) (at discretion of WP Leader),
- Other Meetings (as required/ad hoc).

5.3.2 Organisation of meetings

As a general principle, Dates and locations of meetings should be fixed at least 1 month (preferably longer) in advance of each meeting, in order to take advantage of cheaper travel and to ensure good attendance by the most appropriate people.

A named meeting organiser, who will be the focal point for all organisational and administrative matters, shall be appointed for each meeting. The meeting organiser need not be the same person as the meeting chairperson, and need not be a member of the host organisation. The meeting organiser may delegate certain responsibilities (e.g. chairing, hosting, travelling advice) to other named individuals.

The meeting organiser shall liaise with the meeting host and announce the location of the meeting as soon as possible, as the proximity of the location to attendees' other commitments can influence their available dates.

The meeting organiser may canvass the potential attendees to determine their availability and preferences for meeting dates. A tool such as www.doodle.com may be used for that purpose.

If it is not possible to agree an ideal date(s) when all potential attendees are available, the meeting organiser shall make a compromise decision, taking into account the purpose of the meeting, the known availability and preferences of the potential attendees, and the relative importance of each potential attendee actually attending.

At least 1 month (preferably longer) before the meeting, the meeting organiser shall confirm the date(s), location, and the start and finish times, and shall supply travel and hotel information.

The meeting attendees shall confirm their attendance and provide any necessary security information at least 1 week before the meeting, or by the date specified by the meeting organiser, whichever is earlier. Late requests for attendance may only be granted at the discretion of the meeting organiser and the meeting host.

5.3.3 Preparation

At least 1 month before the meeting, the meeting organiser shall issue a draft agenda, making clear which partners are expected to have specific responsibilities such as chairing a session or delivering a presentation. The agenda may be refined during the weeks leading up to the meeting, and shall be finalised at least 1 week before the start of the meeting. Late changes to the agenda will be permitted only if all affected participants agree.

Presentation slides should be prepared in advance of the meeting, and sent to the meeting organiser by a specified date before the meeting if so requested.

If not sent before the meeting, the slides should be given to the meeting organiser on a memory device during the meeting, or sent as soon as possible after the meeting, so that they can be distributed with the meeting minutes.

5.3.4 The actual meeting

A named meeting chairperson, who will be responsible for the overall conduct of the actual meeting, shall be appointed. The chairperson may be, but need not be, the same person as the meeting organiser. The chairperson may delegate specific responsibilities (e.g. timekeeping, minute taking, domestic matters) to other named individuals.

5.3.5 Minutes

The meeting organiser shall be responsible for ensuring that the minutes are issued within 2 weeks of the actual meeting.

The form of the minutes is at the discretion of the meeting organiser. As a minimum, the minutes should cover the meeting purpose, attendance list, summary of important discussions, record of decisions and actions, and should be issued together with copies of the slides that were presented.

The writing of minutes is often considered a burden, and sometimes takes a long time. An efficient way is to use the slides presented at the meeting as the basis of the minutes. If that option is followed, the slides may be modified during or after the meeting to take account of the discussions, an attendance list, list of decisions and list of actions can be added, and the resulting file can constitute the minutes and can be distributed promptly.

If nobody has objected within 2 weeks of the minutes being issued, then those minutes shall be deemed to be an accurate record of the meeting.

5.3.6 Follow up

The meeting organiser shall be responsible for ensuring that actions are followed up in a timely manner.

6 Deliverables

6.1 General requirements

The DOA included in the Grant Agreement (GA) defines a large number of deliverables and their due dates. Every effort shall be made to complete each deliverable by the due date. A deliverable is deemed to be completed when it has been uploaded to the Participant Portal.

Many of the deliverables are vital inputs to subsequent WPs, or to subsequent tasks within the same WP that produced the deliverable. Project success therefore depends on the production of deliverables:

- On time,
- Within budget,
- With the required quality.

On-time delivery is important because the dates of the scenario trials will need to be fixed well in advance. Late deliverables can cause knock-on effects and could jeopardize the success of the trials, and of the project.

Delivery within budget is important because if partners overspend on a deliverable, they will need to find savings elsewhere in the project, or subsidize the project from their own resources.

Delivery with the required quality is the most important of all and is dealt with in the following sub-sections

6.2 Quality Control

Definition: Quality = fitness for purpose

Absolute perfection is not required, and often can only be achieved at great cost and at the expense of reduced scope and depth (documents) or capability (equipment). Nevertheless all deliverables must be fit for their intended purpose.

For a document to be fit for purpose, it must:

- be easy to read (as for many partners English is not their native language, the structure of the sentences should be kept simple and should avoid stylistic effects from other languages that often do not exist in English),
- be clear, consistent and unambiguous,
- contain the required information,
- not repeat paragraphs of the DOA. The DOA is the major reference document and is always consultable. In particular, the deliverables should not include the description and objectives of the project from the DOA and any other item that is not directly related to the deliverable purpose,
- avoid duplication of parts of other deliverables if not necessary for the document self-comprehension,
- not contain any unnecessary information (annexes are permissible if you need to provide background or gain recognition for other relevant work done),
- not integrate copied elements from other documents unless they are essential for the document to be understandable on a stand-alone basis,
- Finally, concision should be targeted for each deliverable. Given the number of deliverables in the project (>80), the time to write them and to review them will take a huge time for the consortium (and therefore cost a lot), so any economy in this domain will be profitable for the implementation of the project.

Poor quality can be less obvious at first, but can cause enormous problems later. Therefore, procedures shall be followed to ensure that all deliverables are fit for their intended purpose.

6.3 Procedures for ensuring documents are fit for purpose

Quality control is responsibility of everybody involved in the each project activity.

The quality control task performed by the Coordinator at project level will not substitute for internal quality control used in the various partner organizations for their internal work. All partner organizations should ensure that their existing internal quality control procedures are applied to 5D-AeroSafe project tasks.

However, as part of their role, the Project Coordinator, the Innovation Manager and the Technical Board will act as Project Quality Assurance Team.

Objectives of the Project Quality Assurance Team are:

- to ensure appropriate application of the procedures in 5D-Aero-Safe;
- to control the main outputs (mainly documents) of the Project/Work Packages & organising reviews.

With reference to **Project Deliverables**: each project deliverable is assigned to one leading responsible partner. This partner takes the responsibility that the deliverable is of high quality and timely delivered. The responsible partner assures that the content of a deliverable is consistent with the team-workings of the deliverable and that the particular objectives related to the goals of the project are met. Any issues related to deliverables, endangering the success of the work package or the project, have to be reported by the WP leader immediately to the Project Management and discussed within the Coordination team.

6.4 Reviews for Documentation/Deliverables

A Reviews Process involving each partner and selected reviewers is adopted in the Consortium to ensure the quality of deliverables and of any other external publication with regard to the technical content, the objectives of the project and to adhere to formal requirements established in the Grant and Consortium Agreements. Review process ensures that publications and deliverables comply with IPR of the partners. For external publications as well as for project deliverables, the review process will involve all Consortium partners and requires the approval of the Project Quality Assurance Team.

Project documentation will be reviewed against the following criteria regarding form as well as content of the document:

- Format of the document according to the document templates.
- Identification and correction of typing mistakes, etc.
- Check of consistency:
    - with the overall scope of the document (e.g. it contains the right information, avoiding unnecessary information, etc.);
    - with previous relevant documentation (e.g. technical specifications vs requirements definition, no redundancy with other documents, etc.).
- Technical aspects of the documentation will be reviewed also by the Quality Assurance Manager in order to ensure that the document meets the technical goals of the project, and that all technical information is advancing the current state of the art and the recent technological research level.

The procedures and timeline for the review project documentation are described hereafter.

- The partner responsible for preparing the deliverable, drafts a Table of Contents (ToC), assigns tasks to all involved partners and sets the respective deadlines (considering also time needed for quality review).
- Involved partners provide their feedback within the deadlines and the responsible partner prepares the first draft of the document.

- This draft is sent to the entire consortium for comments and improvements/additions. The feedback period for project partners should last at least five working days. Feedback is sent directly to the responsible partner who revises the document and prepares the semi-final version.
- The Quality Control Process begins based on the semi-final version of the deliverable. **This version has to be ready no later than 20 working days before the final deadline.** At least two Internal Reviewers have been assigned in advance (refer to the reviewers table).
- The Internal Reviewers send their comments (by five working days) to the Quality Assurance Manager who consolidates and checks the reports and sends them to the partner responsible.
- This partner responsible for preparing the deliverable then improves the document based on received comments. In case the comments/suggestions cannot be realised, the reasons for this must be documented. If necessary (i.e. if there are too many comments on the first round), another round of comments from the Internal Reviewers takes place.
- The partner responsible addresses them appropriately and prepares the final version of the document, which is sent to the Project Coordinator (at least five days before the final deadline).

The Project Coordinator then submits the document to the EC.

6.5 Procedure for ensuring equipment deliverables are fit for purpose

As with the document deliverables, each further deliverable has a responsible producer, contributors and one or more consumers (who will use the deliverable and will consequently be affected by it).

Equipment deliverables are mostly confined to WP3, WP4, WP5 and WP6. They constitute the prototypes and components of the various systems that will be used in the trials.

The producer of the deliverable shall identify the relevant consumers and engage with them early on to understand their requirements and expectations. For equipment deliverables the relevant consumers are, in most cases, other WP partners who are supplying equipment that interacts with the deliverable, the WP integration team, and representatives of the user community.

If the consumers' requirements and expectations are too demanding in time or budget, a ranking and order of importance shall be negotiated and agreed.

The consumers shall review the deliverable, considering it's required purpose and its fitness for that purpose, and shall provide a report (e.g. by email) of the results. The producer WP leader shall record the results of the reviews and report the results to the Technical Committee in their monthly report.

In general, reviews shall be conducted at the Beginning, Middle and End of the development process for each equipment deliverable, using the following checklist:

- Is the equipment fit for its intended purpose?
- Does the equipment meet the specification produced in WP2?
- Does the equipment interact correctly with the other 5D-AeroSafe systems (example: it respects the ICDs defined in WP2)
- Does the equipment perform as required?
- Is the equipment ready for the level of integration that will be undertaken?

However, the review process for each equipment deliverable shall be tailored to the nature of the equipment, its role in the 5D-AeroSafe system, and the consequences if it is sub-optimal in its fitness for purpose. Good judgement shall be used in determining the scope and timing of each review and the specific consumers to be consulted at each stage. The overall aim shall be to ensure that the equipment is fit for its intended purpose, and to detect any problems as early as possible during the development process.

From a contractual point of view, it is not possible to deliver a piece of equipment or prototypes to EC. It is therefore necessary to accompany this deliverable (that will remain internal to the consortium) with a document that describes what has been produced. This document will be considered as the formal deliverable for EC and will give visibility for the reviewers to the real physical deliverable. So, it has to be illustrative (i.e. show the prototype and its main building blocks), explicative (explain the works that has been done to produce the components and to integrate them) and position the equipment in the development plan of the whole system. In addition it has to explain the deviation from the initial specifications if any.

Each item of equipment shall be validated when delivered (by the development WPs), according to the tests specified in WP6. We will perform an acceptance check when received from the development WPs. This acceptance check can be largely based on the results of the validation tests.

6.6 Procedure for ensuring event deliverables are fit for purpose

Event deliverables are generally confined to WP6 and WP8. They constitute the training, trials and dissemination events that are being undertaken. The producer of the deliverable shall identify the relevant consumers and engage with them early to understand their requirements and expectations. The consumers shall be considered as the TC members and representatives of the final audience of the event. If the consumers' requirements and expectations are too demanding in time or budget, a ranking and order of importance shall be negotiated and agreed.

Events shall be reviewed by representative consumers during the planning stages:

- Beginning: after the agenda and the overall script have been set.
- Middle: half way through planning the event and preparing the material for the event.
- End: shortly prior to the execution of the event (leaving sufficient time to address final comments).

At each stage, the following review check list shall be used:

- Does the plan for the event meet the original brief?
- Are the appropriate logistics in place? (Venue booked, invites to relevant individuals sent, catering organised, presenters/participants booked and briefed, etc.)
- Is the material content of the event appropriate and relevant? (Trials scenario, presentation material etc.)
- Is the overall event message sufficiently prominent? (i.e. will the consumers understand the purpose of the trial, training session or dissemination event?)

If the event is also associated with a deliverable document, the procedures for reviewing document deliverables shall also apply.

If the event is a deliverable by itself, it has to be accompanied by a synthetic document describing the event that will constitute the formal deliverable to EC.

7 Reporting

7.1 Internal Progress Reporting

The WP Leader for each open WP shall prepare a report each 3 month following a prescribed format in an e-mail. Additional slides are not required. The report shall be sent to the Scientific and Technical Manager by the last working day of the last month. The Scientific and Technical Manager shall collate the WP reports into a single word document and distribute to all TC members.

The format shall be as follows:

1. WP progress (milestones achieved),
2. WP issues (i.e. issues that can potentially impact the rest of the project),
3. WP deviations and proposed mitigation solutions (planning or work content),
4. WP risks (described and send as the Risk Appraisal Form, see section 8)

To be fully efficient, the internal progress reports need to be concise (mentioning only the points that are of interest for the rest of the project), accurate (with possibly concrete evidence/s) and focussed.

The internal progress reporting will be the main formal source to identify issues and problems and allow us to be in a position to solve them. It is therefore of utmost importance for the WP leaders not to neglect or ignore them as they can help to better manage their WP with the support of the other WP leaders, Technical Manager or Coordinator.

7.2 Internal Cost and Budget Reporting

Partners shall be responsible for controlling their own spending, and shall ensure that they retain sufficient funds to perform all their obligations. In particular, they shall ensure that they retain sufficient funds to support the integration process and the scenario trials towards the end of the project.

Partners shall record their hours spent at Level 2 Task level. Every 6 months, each partner will be asked to report their cumulative person-months spent on each Level 2 Task.

For each review with EC, each partner will be required to fill a financial claim form (Form C) and a Certificate of Methodology where required.

7.3 Reporting to the European Commission

7.3.1 Overview

Throughout the project, the European Commission will monitor our progress and achievements in order to perform their duties and ensure that we are meeting our commitments and providing value for money to the European taxpayers.

In performing their duties, the European Commission will, amongst other things, consider the following criteria:

- Have the Deliverables been produced on time and with the required quality?
- Have the milestones been achieved?
- What foreground has been generated?
- What steps have been taken to protect and exploit foreground IPR?
- What dissemination has been done?

Such monitoring will be done primarily online through the Participant Portal:

http://ec.europa.eu/research/participants/portal/page/home

This is the entry point for electronic administration of the project. Each partner has his/her own login account, and is required to upload certain information from time to time, and is expected to be aware of the latest general and project-specific information available through the Participant Portal.

The following paragraphs provide details of the information required to be uploaded to the Participant Portal, and the procedures for uploading it.

7.3.2 Deliverables

A large number of deliverables, which must be of satisfactory quality. The responsible partner (lead beneficiary) for each deliverable shall upload the deliverable to the Participant Portal by the due date, after completing the project internal review process. The Coordinator shall then submit the deliverable via the Participant Portal.

7.3.3 Publications

The results of the project (subject to protecting the legitimate commercial interests of the project partners). In this context, "publication" means in a peer-reviewed scientific journal, otherwise the activity should be classified as dissemination rather than publication.

Details of all publications shall be entered on the Participant Portal by the partner who elaborated the publication or by the lead partner if more than one partner contributed to preparing the publication.

7.3.4 Dissemination activities

The consortium is required to disseminate the results of the project work (subject to protecting the legitimate commercial interests of the project partners). Dissemination can take many forms, for example:

- Updated content on the project Web site,
- Contributing an article to a technical journal (online or paper),
- Presentation at a conference,
- Giving an interview on television/radio,
- Display of equipment or posters, or distributing brochures at an exhibition,
- Demonstration of our capabilities to an invited group of potential users.

Dissemination can be to the general public (e.g. at a conference to which the public may attend) or to a restricted audience (e.g. presentation to a specialist group of users).

Details of all dissemination activities shall be entered on the Participant Portal by the partner who completed and submitted the dissemination, or by the lead partner if more than one partner was involved.

7.3.5 Patents

The consortium is expected to take appropriate measures to protect the Foreground IP, for example by making applications to patent the inventions, register the trademarks, and register the designs.

Details of all such applications shall be entered on the Participant Portal by the partner who made the application or by the lead partner if more than one partner was involved.

7.3.6 Exploitable foregrounds

The production of a large amount of identifiable exploitable Foreground is expected. Such Foreground can include:

- General advancement of knowledge,
- Commercial exploitation of R&D results,

- Contribution to standards,
- Contribution to EU policies,
- Contribution to social innovations.

Details of all such exploitable foreground shall be entered on the Participant Portal by the partner who generated the Foreground or by the lead partner if more than one partner was involved.

7.3.7 Periodic and final reporting

Periodic Reports are required after 18 months (first review) and every 12 months later, and a Final Report at the end of the project. The preparation of the reports will be initiated by the Coordinator, and all Partners will be required to contribute.

7.3.8 Financial Reporting

Financial Reports (Form C) are required every 12 months plus a certificate if the funding is more than 375 000 € direct costs (cumulated from the beginning of the project). Each partner shall enter their own financial report via the Form C Editor on the Participant Portal. The Coordinator shall review the partner financial reports and, when satisfied, shall submit them to the European Commission.

7.3.9 Financial Reporting

A Review Report is required to support the formal European Commission reviews that are scheduled at 12-monthly intervals throughout the project (except for the first one which will be at Month 18). The preparation of the Review Reports will be initiated by the Coordinator, and all Partners will be required to contribute. The European Commission will use the information in the Review Report, together with all the information previously uploaded to the Participant Portal, to perform their review. The review may be done remotely, or the European Commission may require a specific meeting involving some or all of the partners.

8 Risk Management Process, Tools and Organization

The Risk Management Plan describes the risk management process and how risk management activities will be organized and performed during the 5 services of Drones for increased airports and waterways safety and security project duration.

Risk management activities contain the following elements: communication and consultation; establishing the context; risk assessment (comprising risk identification, risk analysis and risk evaluation); risk treatment; monitoring and review. (ISO 31000:2009).

The risk management plan does not address the responses to individual risks – these are documented in the Risk Register.

The purpose of risk management planning is to minimize the negative risk impacts identified for the project. This will be achieved by identifying all known project risks, performing an assessment of the probability of occurrence and potential impact, and creating action plans to manage the identified risks. Risk management planning defines how to approach and plan the risk management activities for a project. This process ensures that the efforts of risk management activities are appropriate for the importance of the project to all stakeholders.

Risk management is an iterative process, beginning as early as possible in the project initiation and planning phases. The approach to and appropriateness of risk management activities should be reviewed throughout the project.

8.1 Risk Management Process

The purpose of the risk management framework is identify potential risks which could have adverse effects on the assumed deliverables of the project phases and minimize and mitigate them as early as possible, in order to fulfil all of the project objectives.

This will be achieved by following a structured process utilizing the tools and techniques described in this plan, for ensuring the efforts of risk management activities are sufficient and appropriate for the importance of the project, its beneficiaries and stakeholders.

Risk Management as a valuable extension of project management process shall accomplish the following objectives:

- Identify the potential sources of risk and identify risk drivers.
- Analyse each of the identified risks in order to determine likelihood of its occurrence and impact on the project deliverables.
- Quantify risks and assess their impacts on cost, schedule and performance.
- Determine the sensitivity of these risks to program, product and process assumptions,
- Determine and evaluate alternative approaches to mitigate moderate and high risks.
- Take actions to avoid, control, assume or transfer each risk, and
- Ensure that risk is factored into decisions on selection of specification requirements and solution alternatives.

Risk Management is an iterative process, beginning in the start-up phase of a project and concluding at Project Closeout.

5D-AeroSafe Risk Management process has been prepared based on PRINCE2 Risk Management Methodology, ISO 31000;2009, and best practices used by Project Consortium in previous projects.

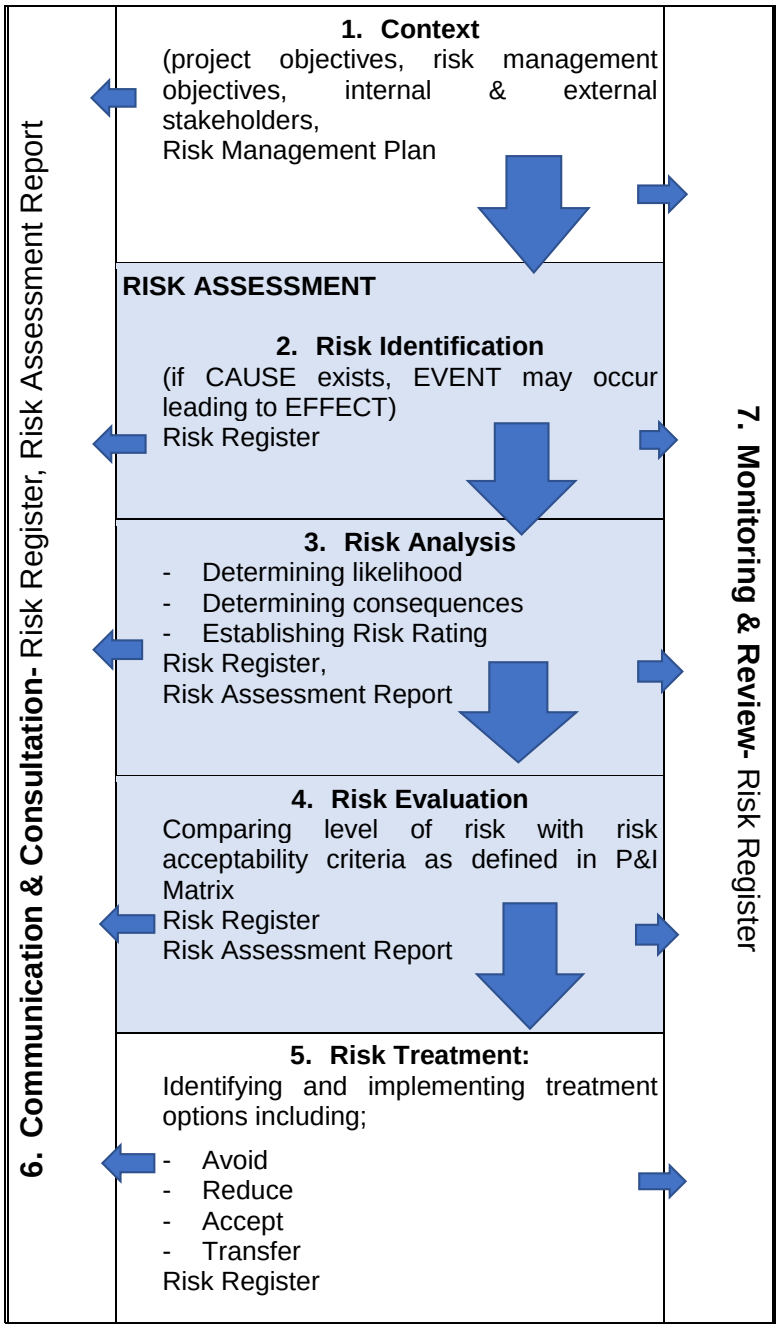

Figure 3. Risk Management Process and outputs based on ISO 31000:2009

8.2 Risk Management Activities

The Risk Management Plan describes Contractor activities required of the risk management process, and these are reflected in this plan.

For the 5D-Aerosafe project Risk Management activities will focus on eliminate or minimize the :

- Risk which have the potential for a negative impact on the project scope and scientific & technical objectives (STOs)

Risks from this category may have negative impact on:

  - quality of the deliverables;

- accordance with the requirements and technical specifications;
- functionalities of the designed solution.

The objective will be measured against the List of Key Indicators of the success.

- Risk which have the potential for a negative impact to the project schedule objectives.

5D-Aerosafe project will be finished during 36 months with the respect of the Phases and WPs included in current Project and Risk Management Plan.

The objective will be measured with WP Milestones Deadlines

The risks from this category are related to any delay in completion of the project phases according to the schedule, but assuming all of the project objectives and requirements can be met with the acceptable delay.

- Risk which have the potential for a negative impact to the project cost objective.
  - The total cost of project shall not exceed 3 497 475 EUR.

Events ,which can increase the total cost of the project, or cause exceeding estimated eligible costs (per budget category) so all of the project objectives and requirements can be met, above the limits acceptable for the Contactor, belong to this category.

The objective will be measured against Financial Statement for each Beneficiaries for Quarterly Period.

8.3 Risk Assessment

The purpose of risk assessment is to provide evidence-based information and analysis to make informed decisions on how to treat particular risks and how to select between options. (ISO 31000:2018). The process includes: Risk Identification, Risk Analysis, Risk Evaluation.

8.3.1 Risk Identification

The process of determining and documenting which risks may affect the project.

The risk identification activity will:

- Take place through scheduled project review sessions.
- Identify a comprehensive list of potential risk events that have a negative (threat) impact on the 5D-Aerosafe project objectives ,
- Continue to be identified throughout the project review sessions, project status reports and periodic team members meetings.

Contractor has created a Risk Register, which is located in the share team environment. Additionally, each project team member can notify new potential risk by Risk Appraisal Form submitted via email to Project Coordinator through WP and Task Leaders.

The following tools and technics will be used for risk identification:

- Brainstorming done with the Project Management (Project Coordinator, WP Leaders, Task Leaders) team and project stakeholders;
- Check lists from previous project experience;
- Interviewing with project participants, stakeholders and experts:;
- Grant Agreement document review.

During risk identification a combination of the above listed technics will be used. A short description of these methods is presented in the attachment to this plan.

The following sources can be the input for risk identification:

- Analysis of project assumptions; requirements;
- Project schedule and critical path (IMS);
- Scientific & technical objectives (STOs));
- Development test and evaluation – design risks;
- Actual workload and productivity;
- Project Budget - financial risks;
- Resources;
- Reviews;
- Expert Knowledge;
- Analogy - review risk management efforts from similar projects;
- Interview stakeholders – beneficiaries, customer, subcontractor, supplier, third parties.

In case of risk identification, Project Coordinator is obliged to register the risk in Risk Register including the following data:

- Risk ID (consecutive number);
- Date Raised (the date of risk identification);
- Raised by (the person who raised the risk);
- Title (Short risk name);
- Description (Risk detailed description). The description should include the cause of the risk, risk characteristic and the effect of the risk. A structure for describing risks using risk statements may be applied, for example: EVENT may occur causing IMPACT, or If CAUSE exists, EVENT may occur leading to EFFECT
- Category (Technical / Organizational / External / Project Management);
  - Technical [T] Technical risk categories or sources of risk, such as: requirements, technology, complexity and interfaces, quality,
  - External [E] External risk categories or sources of risk, such as: subcontractors and suppliers, regulatory, market, customer, weather
  - Organizational [O] Organizational risk categories or sources of risk, such as: project dependencies, resources, funding, prioritization
  - Project Management [PM] Project management risk categories or sources of risk, such as: estimating, planning, controlling, communication.

The risk categories support the further allocation of the risk ownership. In case of need of more detailed categorization, it would be developed in the next project stages in the way of Risk Breakdown Structure;

- Status (“O” – open, “A” - assigned & active, “CM”- closed mitigated, “CI” - closed issue).
  - Open [O] Risk has been opened but not assigned for mitigation yet;
  - Assigned [A] Risk has been analyzed and responsible for mitigation assigned;
  - Closed Mitigated [CM] Risk is no longer applicable and has been mitigated and closed ;

  - Closed (Issue) [CI] Risk is no longer applicable and has been closed because of issue.
- Milestone(WP) affected by the risk- project phase, task defined in schedule (IMS) that will be affected by the risk during project phases.

The updated Risk Register is and output of this process.

8.3.2 Risk Analysis

Risk Analysis is primarily concerned with determining which risk events need response, and it is a process to comprehend the nature of risk and to determine the level of risk priority.

The purpose of risk analysis is to develop an understanding of the risks identified during the risk identification process and provide input on how to treat risks, and what measures should be taken to mitigate negative risk effects.

Risk analysis evaluates all identified risks to estimate the likelihood of their occurrence, consequences to the project deliverables in terms of:

- objectives and requirements ;
- impact on the project schedule;
- impact on costs.

Risks are analyzed by determining both their likelihood and their impacts.

The process covers:

- qualitative analysis, which leads to the determination of the scope of risk,
- quantitative analysis, which leads to the determination of the amount of risks;

This process leads to:

- assessing the probability of the risk and its impact on the project objectives using standard probability and impact labels defined in the risk tool (Risk Register);
- prioritization – to narrow the focus of the risk management effort to gain the greatest positive impact on the project for the applied resource effort.

Analysis will be determined considering project scope & technical performances objectives. project schedule objectives, and project cost objective.

Probability and impact estimates will be based on information derived from:

- Estimates;
- Expert judgment – Consultants, Stakeholders, Professional associations, Industry groups.

The following data are input for the risk analysis:

- Risk register;
- WP;
- Project schedule, critical path;
- Project budget, beneficiaries' financial reports ;
- Scientific & technical objectives;

- The probability and impact matrices;

The table below perform the rule for probability estimation:

Scale for Risk Probability					
Rating	1	2	3	4	5
Interpretation	Low	Medium	Medium-High	High	Fact
Percentage	<10%	10-40%	41%-69%	70%-90%	>90%

Table below shows the approach to impact assessment in relation to project objectives.

Impact (Level)	Scope & Technical Performance	Schedule	Cost
Minimal (1)	Minimal or no technical performance impact. No impact on main Project Objectives (functionality)	Minor or no impact.	Minimal or no impact
Minor (2)	Minor technical performance shortfall, same approach retained. Little or no impact on main Project Objectives	Minor impact. No impact on Project Phases deadlines and critical path. Schedule slip <= 1 month.	Additional cost <= 0,05 mil EUR
Moderate (3)	Moderate technical performance shortfall, but workarounds available. Limited impact on main Project Objectives	Minor schedule slip, able to meet Project Phases deadlines. Some milestones within the Phase might be delayed. Schedule slip 1-2 Months	0,05 mil Euro < additional cost <= 0,1 mil EUR
Significant (4)	Significant technical performance degradation. May jeopardize the main Project Objectives	Cannot meet Project Phases deadlines. Program critical path affected. Schedule slip 2-3 Months	0,1 mil Euro < additional cost <= 0,2 mil EUR
Severe (5)	Severe technical performance degradation. Cannot meet TRD, will jeopardize the main Project Objectives	Cannot meet Project Phases deadlines. Program critical path affected. Schedule slip > 3 Months	Additional cost > 0,2 mil EUR

The value of the Summary impact is the highest risk impact of all 3 criteria.

The qualitative and quantitative analysis is conducted for the risks for which priority is higher than Marginal. The results of analysis are presented in Risk Assessment Report.

Phase	Description	WP	Est. Due	2020	2021	2022	2023

			Date
Phase 0	Planning, Management	WP1	31 May 2023
Phase 1	Requirements, Regulations, Concept of Operations	WP2	28 Feb 2021
Phase 2	Development and Testing	WP3 WP4 WP5	30 Nov 2022 28 Feb 2022 28 Feb 2023
Phase 3	Demonstration and Validation	WP6	31 May 2023
Phase 4	Dissemination and Communication Activities, Innovation Management and Exploitation Activities	WP7 WP8	31 May 2023 30 Apr 2023

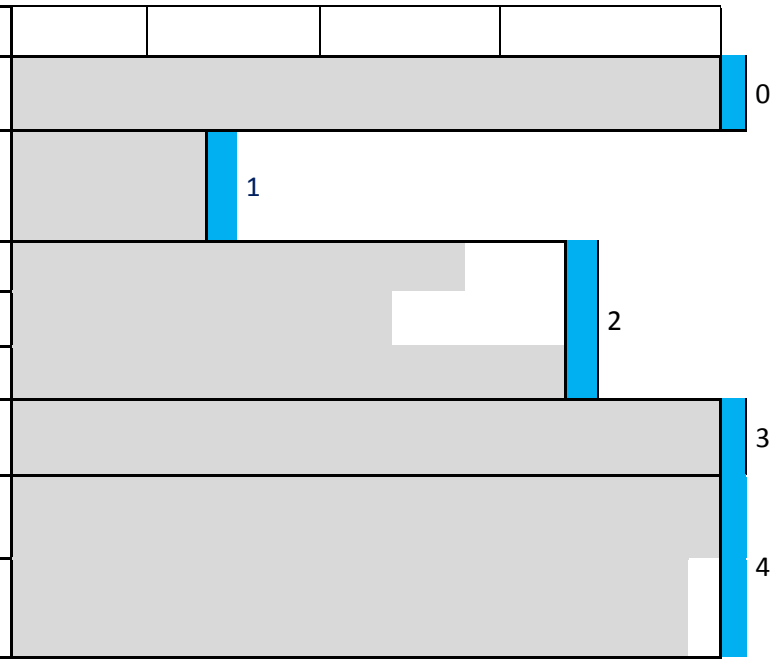

Figure 4. Top priority schedule

8.3.3 Risk Evaluation

Based on the outputs of the risk analysis the risk evaluation establishes which risks need treatment and the priority for treatment implementation.

Risk evaluation involves comparing estimated levels of risk with risk criteria defined in the established context (Impact Level on project Scope, Schedule and Cost) in order to determine the significance of the level and type of risk.

Based on the above parameters from risk analysis the priority of the risk is calculated by P&I Matrix (Probability * Impact).

Probability & Impact Matrix						
Probability		**Threats**				
Fact	5	5	10	15	20	25
High	4	4	8	12	16	20
Medium-High	3	3	6	9	12	15
Medium	2	2	4	6	8	10
Low	1	1	2	3	4	5
Impact:		1	2	3	4	5

Risk Priority

	High risk (threats)
	Medium risk (threats)
	Low risk (threats)
	Marginal risk (Risks with marginal ratings of probability and impact (marginal risks) are included within the risk register as part of the watch list for future monitoring)

Figure 5. Probability & Impact Matrix

By P&I Matrix, comparing the level of risk with the established risk criteria, giving Risk Priority calculation, the need for treatment is considered:

- MARGINAL RISKS: Risks to be documented and watched during the risk monitoring and review process;
- LOW, MEDIUM & HIGH RISKS: Risks to be treated/mitigated;
- HIGH RISKS have priority for treatment implementation.

As a part of risk analysis, the following positions in the Risk Register are filled:

- Probability;
- Impact Summary (the highest value of the impact against project objectives);
- Priority (Probability*Impact Summary).

The output of the process is the updated Risk Register with prioritized list of risks and documentation of marginal risks for future monitoring.

Updates of the Risk Register build an expansion of the initially generated and already updated risk register by the following additional information:

- Probability of achieving objectives
- Prioritized list of quantified risks
- Trends in qualitative/quantitative risk analysis results

8.4 Risk Treatment- Risk Response Planning

Risk Response plans will be developed for the risks selected from the prioritization process, at a minimum, for those risks with an overall risk rating of "HIGH". Response strategies will be selected from those listed in below part of this section. Response plans will be integrated with the suitable project plans and be recorded in the Risk Register and document the following:

- The risk owner who is the person responsible for managing the response plan to the risk;
- The risk response strategy that will be used;
- The description of the mitigation plan;
- 5D Aero safe project objectives impacted by the risk.

The following approach for the risk priorities should be taken:

- High (Red) risks have priority for treatment implementation;
- Low (Yellow), Medium (Orange) and High (Red) risks: Risks to be treated/mitigated;
- Marginal (Green) risks: Risks to simply be documented and watched during the risk monitoring and review process.

Project Coordinator designates the risk owner, considering the required skills and knowledge depending of the risk. The status of the risk is changed to Assigned. The risk owner is responsible for preparation of the response strategy and plan and risk mitigation actions.

The approach to the risks is defined by choosing the listed below Risk Strategy- .

For the Marginal risk, Risk Strategy taken should be set to "Watch" unless otherwise decided.

For risks with Low, Medium and High priority the following strategies can be selected:

- Reduce: Implement actions to minimize the impact or likelihood of the risk;
- Avoid: Adjust program objective to eliminate the risk;
- Accept: Acknowledge the existence of a risk, and decide to accept it without engaging efforts to control it;
- Transfer: Reassign organizational accountability, responsibility, and authority to another stakeholder willing to accept the risk.

Mitigation actions identify the activities that are planned to reduce the probability of the occurrence of the risk and/or to minimize the adverse impact of the occurrence of the risk.

As a part of risk response planning the Project Coordinator fills the following fields in the Risk Register:

- Risk Owner;
- Reported To;
- Status (update to A).

As part of risk response planning the risk owner fills the following fields in the Risk Register:

- Risk Strategy;
- Mitigation Actions;
- Mitigation Actions Due Date; (due date for completion of the mitigation action)
- Actual Impact.

Impact on the project at the current stage if the planned mitigation actions are not successful or considering the current risk mitigation actions status.

As the output of the process there is the updated Risk Register and summary of required project plans updates considering mitigation actions planned.

8.5 Monitoring and Review

Based on the mitigation plans agreed as indicated in the Risk Register – the mitigation actions should be incorporated in the project plans.

The Project Coordinator is responsible for updates the plans accordingly.

The risk owner is responsible for implementation of the mitigation plan.

The risk owner reports the results of the plan implementation to the assigned person (reporting manager according the organization structure) and documents the actions in Risk Register.

The risk owner documents the actions undertaken for the mitigation of the risk in the Risk Register. This information is included in the fields:

- Mitigation Status (date and action taken).

The updated plans and updated Risk Register are the output of the process.

Based on the information gathered in the Risk Register, the Contractor will continually assess and revise risks throughout the execution of the project.

The Project Coordinator is responsible for the risk monitoring and control.

The process will include a risk assessment at the end of each major activity to review the identified risks for the next set of activities. The purpose of this assessment is to review and plan for potential risks identified in the Risk Register, identify new potential risks, and reassess the status and response strategies for previously identified risks.

During the process of internal project management activity, periodically - quaterly the Contractor's Risk Board reviews the Risk Register and the status of mitigation actions. The results of review are indicated in the Risk Register in CRB Decision column (date & decision).

The Project Coordinator will schedule and conduct internal status meetings with the Project Lead Teams to review the risk status for those risks with an overall rating of "MEDIUM" or "HIGH" and to identify the new risks.

In case of the risk occurrence – the risk becomes an issue and should be included in the project plans according the issue management process.

The risks which have occurred and the risks which are no more actual are closed in the Risk Register (Status –"C" – Closed);

8.6 Reporting and Communication

8.6.1 Reporting

The risk reporting goal is to ensure that project management receives all necessary information to make timely and effective decisions.

The primary reporting tools for Risk reporting will be the Risk Register- and the Risk Assessment Report. These documents will be stored in Project Repository in the section Deliverables.

Risk Register is run by the Project Coordinator. Individual risks can be reported by all persons participating in the project to the managers of their teams. Team Manager reports risk to Project Coordinator.

Project Coordinator evidence the risk in Risk Register which is stored on the project Repository.

The risks with High priority are required to be analyzed and monitored by Steering Committee.

Based on the Risk Register, it is created Risk Assessment Report. Risk Assessment Reports identify contract risks and their potential impact(s) to cost, schedule and performance. These reports shall directly support the Project Risk Reviews. Risk Assessment Report is reported to Steering Committe.

8.6.2 Communication

Effective communication and consultation with project stakeholders assure that risks are realistically assessed and nothing significant is overlooked.

The goal of risk communication is for all stakeholders to have a common understanding of the processes and assumptions used in risk assessment

Communication and consultation with internal and external Project Stakeholders will take place during all stages of project risk management process.

Risk communication and consultation will be carried out on:

- Project Team level
- Internal & External stakeholders level

Risk will be communicated to stakeholders using the following documents and reports:

- Project and Risk Management Plan
- Risk Register
- Risk Assessment Report
- Minutes of Meeting

Risk communication focuses on informing all involved in 5D Aero Safe Project stakeholders, and its main purpose is to to ensure that project management receives all necessary information to make timely and effective decisions.

Per the plan, several working meetings will be conducted to support cooperation and information interchange between Parties. Each meeting shall be preceded with Agenda and accomplished by Meeting Minutes.

8.7 Risk Management Organization

8.7.1 Roles and Responsibilities

Project Teams Members are responsible for:

- Risk identification;
- Support risk analysis;
- Support risk assessment;
- Risk ownership (for assigned risks in accordance to Project Coordinator's decision) covering elaboration and implementation the risk mitigation plan.

8.7.2 Risk Stakeholders

The main risk stakeholders that are affected by a risk or a risk mitigation strategy in 5D Aero-Safe project are:

Main Stakeholders
Innovation and Networks Executive Agency (INEA)- Contracting Authority
General Assembly
Steering Committe
User Advisory Board
Project Coordinator
Scientific & Technical Manager
Quality Assurance Manager
Innovation Manager
Work Package and Tasks Leaders
Airbus Defence & Space Project Team
Future Intelligence Ltd. Project Team
Ecole Nationale de l'Aviation Civile Project Team
Air Force Institute of Technology Project Team
Vicomtech- Project Team
Hellenic Mediterranean University Project Team
Ferrovial Corporacion SA- Project Team-USER
Greek Water Airports- Project Team-USER
AirMap Deutschland GmbH-Project Team
EUROCONTROL-Project Team-USER

Subcontractors

8.7.3 Risk Management Tools and Outputs

The following tools will be used to support and document outcomes from the risk management process on this project:

Risk Management Activity	Risk Management Tools and Outputs
Risk Management Planning	Project and Risk Management Plan
Risk Assessement: – Risk Identification – Risk Analysis – Risk Evaluation	Risk Register Risk Assessment Report
Risk Response Planning (Risk Treatment)	Risk Register
Risk Monitoring and Control	Risk Register Risk Assessment Report
Risk Communication	Risk Register Risk Assessment Report

The physical storage location of the risk-related documents will be in the 5D Aero Safe Project Repository in the section Deliverables, maintained by the Project Coordinator.

8.8 Templates for risk management

8.8.1 Risk Register

Project Name: 5D-AeroSafe																				
Technical					Risk Identification			Risk Analysis				Risk Response					Monitoring and Control			
Risk ID	Date Raised	Raised By	Status	Date Of Last Update	Title	Description	Category	Probability [see	Impact on Scope & System Performance / Schedule	Impact Summary	Priority [probability *impact]	Owner	Reported To	Risk Strategy	Mitigation Actions	Mitigation Actions Due Date	Actual Impact	Mitigation Status	CRB decisions	Date Occured
R-1						Cause - ..... Risk- ..... Effect-					Low		Project Coordinator							

Figure 6. Risk Register template

8.8.2 Risk Assessment Report

Summary of qualitative and quantitative analyses		
Risks requiring CEO attention		
Risk name	Risk id	Area of attention
Risks to jointly manage with INEA		
Risk name	Risk id	Area of attention
Executive summary and recommended actions:		

Figure 7. Risk Assessment Form template

8.8.3 Risk Appraisal Form

Project Name: 5D-AeroSafe								
Technical								
No	Date Raised	Raised By	Status	Date Of Last Update	Title	Description	Category	Mitigation action
						Cause- Risk- Effect-		

Figure 8. Risk Appraisal Form template

9 References

The following documents define the contractual requirements that all project partners are required to comply with:

References used in the development of this plan are:

- Grant Agreement 861635-Research and Innovation Action (which includes DOA, Grant Preparation Forms and annexes)

  This is our contract with the European Commission which defines what has to be done, how and the relevant efforts...

- Consortium Agreement

  This defines the partners obligations towards each other.

- Projects In Controlled Environments–PRINCE2 Methodology
- ISO 31000:2009

Each of the above documents was established at the start of the project, and copies were supplied to each partner. Each document could potentially be updated independently of the others during the course of the project following a prescribed process. In the event of any such update, the latest formal issued version shall apply.

In the event of a conflict between this document and any of the contractual documents referenced above, the contractual document(s) shall take precedence.

10 List of Figures

Figure 1. Project full schedule

Figure.2 Project Management structure

Figure 3. Risk Management Process and outputs based on ISO 31000:2009

Figure 4. Top priority schedule

Figure 5. Probability & Impact Matrix

Figure 6. Risk Register template

Figure 7. Risk Assessment Form template

Figure 8. Risk Appraisal Form template