

Proposal Evaluation Form

	EUROPEAN COMMISSION Horizon Europe (HORIZON)	Evaluation Summary Report - Research and innovation actions
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Call: HORIZON-SESAR-2025-DES-ER-03
Type of action: HORIZON-JU-RIA
Proposal number: 101289612
Proposal acronym: QUANTAIR
Duration (months): 24
Proposal title: Quantum Technologies for Airspace Innovation and Resilience
Activity: ER-03-WA1

N.	Proposer name	Country	Total eligible costs	%	Grant Requested	%
1	DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV	DE	167,350	17.70%	167,350	17.70%
2	Qoro Quantum Ltd	UK	435,086.16	46.02%	435,086.16	46.02%
3	SkyNav Europe	BE	342,890.63	36.27%	342,890.63	36.27%
Total:			945,326.79		945,326.79	

Abstract:

European air traffic management is becoming increasingly complex. The system now has to handle a growing variety of airspace users — from hypersonic vehicles and high-altitude long-endurance platforms such as stratospheric balloons and HAPS, to conventional subsonic flights. These vehicles often operate in overlapping altitude bands but have vastly different speeds, climb/descent profiles, and manoeuvring capabilities.

At the same time, environmental policy drivers are stronger than ever. The EU Green Deal, ICAO’s long-term aspirational goals, and national climate strategies are pushing for measurable reductions in both CO₂ and non-CO₂ impacts, such as persistent contrails. Resilience has also become a priority, with the network increasingly affected by severe weather, technical failures, and geopolitical events that can close or restrict airspace at short notice.

One of the biggest technical challenges in all of these contexts is that many stakeholders — States, ANSPs, airlines, and defence operators — cannot freely share operationally, privacy, or commercially sensitive data. Without that data, current modelling and optimisation tools have to work with partial information, limiting their effectiveness.

Previous European research has already demonstrated that Federated Learning (FL) can bridge this gap, enabling accurate predictions without requiring data to leave its origin. QUANTAIR proposes to take this further by pairing FL with quantum optimisation — allowing us to integrate richer, privacy-protected data from multiple stakeholders, and then solve the resulting large-scale, multi-variable problems at speeds suitable for operational decision-making.

Evaluation Summary Report

Evaluation Result

Total score: 11.30 (Threshold: 10)

Criterion 1 - Excellence

Score: 4.00 (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:
 - Clarity and pertinence of the proposal: degree to which the objectives, scope and requirements set out in the call material are well understood and fully addressed.

- Soundness of the proposed methodology for developing the SESAR solutions, including the underlying concepts, models, assumptions and interdisciplinary approaches. This criterion also includes appropriate consideration of the integration of a gender dimension into R&I content and the quality of open science practices, including sharing and management of research outputs and engagement of citizens, civil society and end users where appropriate.

- Level of awareness of the state of the art: degree to which the proposal demonstrates knowledge of current operations and relevant previous R&D work (both within and outside SESAR), explains how the proposed work will go beyond the state of the art and demonstrates innovation potential.

QUANTAIR proposal is well-structured, in scope and addresses the priority 'Quantum Computing (QC) applications in ATM' under Work Area 1. The four diverse case studies give breadth and robustness to the analysis and ensures relevance across operational domains.

Objectives are realistic and very promising to obtain a collaborative modeling aligned with SESAR Digital European Sky ambitions. Objectives will be realistically achievable. However, they are broadly defined and therefore their measurability and verifiability are difficult. This approach does not make it possible to establish KPIs or more concrete expectations at project conclusion. This is a shortcoming.

The proposal fits in idea to application's spectrum, and it properly identifies the work in early stages of R&I maturity, concluding at TRL1.

The proposal proposes investigation on AI-based techniques and/or systems. However, there is no concretion on which federated learning methods will be used, leading to difficulty assessing the approach in explainable AI, considering the technical robustness, reproducibility, and reliability. This is a minor shortcoming.

The research framework proposed is well described and logic to explore how Quantum Federated machine Learning (QFL) can be applied in ATM. The four exploratory cases identified are concise and will guide the investigation. They are well formulated and balanced for resilience, operational efficiency, integration of new entrants and sustainability. Furthermore, limitations of the actual approaches are well argued and consequently, the expected outputs from each case are very well identified.

The proposal does not fully provide an adequate rationale on how to address automation level 4 and/or how it would revert to conditional automation level 3. This is a shortcoming.

The interdisciplinary methodology proposed is convincingly presented in order to achieve the expected outcomes of the project. However, the proposal does not sufficiently detail candidate models and/or methods to be researched as well as the datasets to cover all cases to generate synthetic data, leading to an insufficient level of technical insights. This is a shortcoming.

The proposal provides a solid explanation of how distributed learning enables privacy-preserving collaboration across fragmented data sources. It clearly defines assumptions, limitations, and the role of quantum computing as a conceptual extension rather than immediate delivery.

Open science (OS) practices are of a high standard and are adequately managed in the proposal. OS are aligned with the Horizon Europe guidelines, disseminating research outputs in open and accessible formats using FAIR rules such as publications, software and modelling artifacts and synthetic data generated. Other relevant strategies proposed are knowledge-sharing channels and organization of technical workshops. The proposal provides a detailed plan for transparent research outputs and open access. It includes clear information on documentation, repositories, and licensing. Besides, the proposal also identifies and justifies no raw data will be disseminated. In addition, the use of open-source data for simulations is convincing.

The research data management plan is properly addressed following the FAIR principles.

The proposal is very innovative because it uses a distributed approach instead of a centralized one for training models with dispersed data sources, something very common in the ATM environment.

The proposal demonstrates good knowledge of operations, however, the proposal is limited in terms of state of the art review on both, quantum methods and federated machine learning, outside and inside SESAR, not including sufficient references of SESAR projects such as SINAPSE. This is a shortcoming.

Criterion 2 - Impact

Score: **4.00** (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:

- Credibility of the pathways to achieve the expected outcomes and impacts specified in the call material.
- Suitability and quality of the measures in terms of maximising expected outcomes and impacts, as set out in the dissemination and exploitation (D&E) plan, including communication activities.

The proposal addresses very well the expected outcomes of the topic, i.e. investigate quantum computing applied to ATM. The project outcomes will positively contribute to a better understanding of the uses, benefits and limitations of QFL in ATM. It also demonstrates awareness of policy needs and engagements required to influence and promote across international organizations such as ICAO, EASA and EUROCONTROL. Therefore, the project results will support defining a pathway in this domain and a research agenda to progress towards higher TRLs in a more structured manner.

The proposal includes strong policy alignment and situational awareness linkages to higher-airspace roadmaps, contingency frameworks and climate work.

The proposal presents a thoughtful impact prospectus by setting a credible goal for collaborative modelling ATM, both in medium-term and to the wider long-term. ATM challenges are well suited through the four exploratory cases proposed: predictability, higher-airspace entrants, disruption response and contrail mitigation.

The proposal addresses the wider impacts of the ATM Master Plan and justifies adherence to SESAR Deployment Objectives (SDOs) 3, 5 and 8, although in very general terms. SESAR Phase D implementation and Key Performance Areas (KPs) are not well considered. This is a shortcoming.

Requirements and key barriers that may influence whether the pathways can be realized are well identified, being data privacy and sovereignty a driver to use federated machine learning. Potential barriers associated with quantum computing and methods are overlooked in the proposal. The mitigation measures for the recognized barriers are ambiguous because they are very generically addressed. This is a shortcoming.

Target groups and beneficiaries are properly identified and described.

The communication and dissemination strategy is effective and appropriate with well described common communication channels, target groups and potential panels and forums at ICAO and EASA, attendance at conferences, marketing material, among others. Open science commitments and programme-level dissemination routes are well covered too focusing on participation in conferences and publications. Measures to share and reuse outputs with open access and repositories are proportionate.

However, no clear reference KPIs are established to define targets and assess the performance at project closure, as well as a preliminary list of potential and relevant peer-reviewed journals for dissemination (publications targets), website and social media reachability targets. In addition, exploitation will be conducted through institutional channels, but this is insufficiently described in the proposal. All this is a shortcoming.

The intellectual-property approach is generically described. Furthermore, access/licensing terms for reuse and any embargo logic are not clearly specified. This is a shortcoming.

Criterion 3 - Quality and efficiency of the implementation

Score: **3.30** (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:

- Quality and effectiveness of the work plan and assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall.
- Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.

The work plan proposed is structured in four WPs. However, the work plan is not clearly articulated because the different concrete outputs between WP2 and WP3 are not clearly distinguished. In addition, there are no clear tasks and assignments of roles among partners in each WP to clearly identify the work and responsibilities. There are inconsistencies regarding the duration of the work packages and deliverables according to the Project Handbook, because the duration of the project is 24 months and the last 6 months are dedicated to CDE activities. This implies that technical deliverables should be delivered at M14, for instance, deliverables 3.1, 3.2 and 3.3 are incorrectly delivered. In addition, deliverables 4.2, 4.3 and 4.4 should be delivered at M22. Furthermore, the GANTT chart shows a duration for WP2 of 6 months and a duration of 12 months for WP3, whereas in the work package description the duration of WP2 and WP3 is 9 months each. These issues are collectively hindering the implementation and consequently entail a shortcoming.

CDE activities are split into two different WPs and led by two different partners, which causes unclarity in responsibilities in this aspect. This is a minor shortcoming.

All technical deliverables required for TRL1 are listed, as well as classified as PU.

Regarding milestones, they are not aligned with the Project Handbook, because there is no explicit "Exit Maturity Gate" milestone. This is a shortcoming.

There is a good list of critical risks identified and categorized with an adequate set of mitigation measures and strategies to manage them. Risk management is tailored to TRL1 and include inconclusive findings and synthetic-data credibility with pragmatic mitigations as well.

Regarding efforts, allocations and distribution among partners and WPs are reasonable to perform the work, except for WPI.

However, it is noted that SkyNav employs more Person Months than the Coordinator in WPI; this may be justified by SkyNav's CDE lead, but it is unusual for management. Furthermore, there are clear incoherences between the information presented in table 3.1a and the information included in table 3.1f, in terms of PMs allocated to the same partner (DLR WPI 10 PMs vs 5PMs; Ooro WP2 18PMs vs 14PMs). In addition, it is unclear whether the total PM for the project is 50 (from table 3.1a) or 78.8 (from table 3.1f). This is a shortcoming.

The project team combines researchers, distributed systems engineers and air traffic management experts. Their roles are clearly delineated, and the joint design approach is well structured for conceptual integration rather than development. Technical work packages are properly distributed at high-level and consistent with the knowledge and background of partners. Tasks are very convincingly assigned to members of the consortium according to their technical background and expertise and covers the required scientific and technical disciplines.

The Consortium brings together the necessary expertise required by the project framework and the project coordinator demonstrates also relevant experience in SESAR for undertaking the project management.

Scope of the application

Status: **Yes**

Comments (in case the proposal is out of scope)

Not provided

Exceptional funding

A third country participant/international organisation not listed in [the General Annex to the Main Work Programme](#) may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). (For more information, see the [HE programme guide](#))

Please list the concerned applicants and requested grant amount and explain the reasons why.

Based on the information provided, the following participants should receive exceptional funding:

Not provided

Based on the information provided, the following participants should NOT receive exceptional funding:

Not provided

Use of human embryonic stem cells (hESC)

Status: No

If YES, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not, because of a lack of information.

Not provided

Use of human embryos

Status: No

If YES, please explain how the human embryos will be used in the project.

Not provided

Activities excluded from funding

Status: No

If YES, please explain.

Not provided

Do no significant harm principle

Status: Yes

If Partially/No/Cannot be assessed please explain

Not provided

Exclusive focus on civil applications

Status: Yes

If NO, please explain.

Not provided

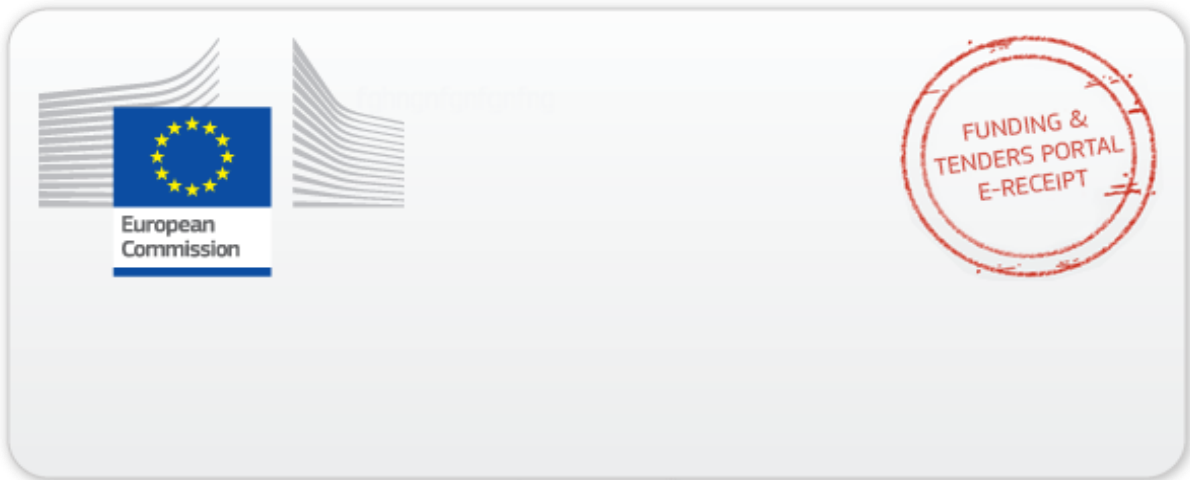
Artificial Intelligence

Status: **Yes**

If YES, the technical robustness of the proposed system must be evaluated under the appropriate criterion.

Overall comments

Not provided



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