



## UNMANNED TRAFFIC MANAGEMENT 4D PATH PLANNING TECHNOLOGIES FOR DRONE SWARM TO ENHANCE SAFETY AND SECURITY IN TRANSPORT

<b>Deliverable Title</b>	D 10.8 LABYRINTH summary and conclusions event
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<b>Abstract</b>	The objective of this deliverable is to summarize the results presented in the final event of the project and the conclusions generated during the event. Likewise, the conclusions and the next steps to be taken by Labyrinth for its commercialization will be included.



G.A. Nº 861696 D 10.8-LABYRINTH summary and conclusions event



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## VERSIONING & CONTRIBUTION HISTORY

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## 1 EXECUTIVE SUMMARY

The main objective of the project is to create and validate new swarm drone applications to enhance safety, security and efficiency in the civil system transport, through the research and development of drone swarming 4D (3 spatial dimensions + time) path-planning algorithms -for implementation in Ground Control Stations- and new U-space services (drone swarm deconfliction and flight planning) supporting drone swarms auto-guidance. With the development of these technologies and the validation of vertical use cases in collaboration with end-users and transport regulatory authorities, it is expected to give rise to applications capable of revolutionizing civil transport and speeding-up regulatory changes that will allow their implementation in real situations in all the countries of the European Union.

In addition, LABYRINTH has the economic objective of increasing the competitiveness of the civil transport sector through a reduction in the cost of maintaining safety and managing transport (inspections, surveillance...), as well as reducing cost derived from accidents or other potential issues, creating new business models that may open drone industry to new markets, focusing on public or private entities in charge of regulate and/or manage transport infrastructures.

It should be noted that this deliverable is a summary of task 10.5 and a summary of the conclusions that took place during the final event of the consortium, where Labyrinth participants gave their general feedback on the project. For an in-depth look at the outcome of task 10.5, we recommend to see deliverable 10.5 Ensuring sustainability - Business Model development and potential Commercialization Strategies.



## 2 DESCRIPTION OF TASK

This task within the work package evaluates the presentation of project progress to end users and the general public and establishes communication channels with end users for regular updates on project results. This work package also aims to increase awareness of project-related issues among stakeholders and the general public, as well as the development of new business models.

During the life of the project, several use cases have been analyzed using a methodological approach defined in D10.6. From this approach, steps were defined to perform the business model analysis for each use case.

Some additional relevant use cases were also discussed or defined to give a broader view, and finally a series of analyses were presented to give the conclusions of each of them.

These analyses were presented during the final event of the project to the rest of the consortium, where a round table discussion was established with the opinions of the rest of the consortium and final conclusions were drawn regarding both the technology developed for the project and its future application to the different use cases identified.

## 3 DESCRIPTION OF WORK & MAIN ACHIEVEMENTS

To put this in context, the following goals were established in the Commercialization Plan of the Labyrinth project:

- Development of new business models that allow replication of the different pilot scenarios simulated in future commercial applications for commercialization in public and private entities.
- Modeling and description, among other dimensions, of the project's value propositions and core capabilities, target customers, delivery models, billing/sales models, relationships with customers and partners.
- Development of business models based on a standard market development framework, to be tested and validated with potential customers and end users.
- Adaptation and feasibility studies of the developed drone air traffic control station to other domains beyond the application to civil transport traffic.
- Analysis and study of the potential public financial support for the future commercialization of the projected new business models.
- Conducting a continuous competitive assessment to ensure that any technological development, market trend, legislative change is detected and



incorporated into the competitive intelligence process. These goals should reach the end users identified throughout the project.

It should be noted that Labyrinth is a product that has good expectations for the future, it is expected that in the coming years there will be an exponential market when airspace regulations begin to enter and the paradigm on the U-space and UTM begins to be resolved through technology such as that offered by Labyrinth.

It should be noted, that at this time, the regulations and their final implementations are not yet clear enough to have a definitive solution. Labyrinth is working on helping to implement these regulations and must also be very attentive to any changes in them, in order to implement those changes in the solution as soon as possible.

Given this perspective, there is a great limitation in terms of taking the Labyrinth project to TRLs close to market, so first, it must overcome a series of technological and especially regulatory barriers to reach a potential market in the future, which, on the other hand, seems very hopeful and necessary.

During the project application and its subsequent implementation, Labyrinth has focused on addressing the technology developed in 4 specific cases:

- Road transport
- Air transport
- Emergency
- Waterborne transport

But Labyrinth's technology can be used in many other cases, such as those discussed in deliverable 10.5: delivery of goods, surveillance, inspections, agriculture, filming and photography, border control, etc.

Therefore, during the presentation of the final results, Labyrinth has been given the importance it deserves to build a new U-space regulatory framework that encompasses all the technical aspects developed during the proposal.



## 4 DEVIATIONS FROM THE WORKPLAN

This deliverable has been delivered in due date in accordance with the GA and there have been no deviations from the project objectives.





## 5 CONCLUSIONS

**Regulations and Policies:** Clear regulations and policies addressing safety, privacy, air traffic management, and legal liability are crucial as UAM continues to evolve. International standards and norms should be established to enable safe and efficient operation of drones in urban environments.

**Air Traffic Management and U-space:** Implementing an adequate air traffic management system is essential for the safe and efficient integration of drones into urban airspace. The development of U-space, a dedicated air traffic management system for drones, will play a vital role in coordinating and communicating among drone operators, authorities, and other relevant stakeholders.

**Infrastructure:** Adequate physical infrastructure is fundamental for UAM. Helipads, landing platforms, and drone charging stations need to be created at strategic locations within cities. Additionally, the development of efficient and accessible recharging infrastructure for drones will be crucial to ensure continuous and sustainable operation.

**Technology and Autonomy:** Advancements in drone technology and autonomy are key to improving UAM. Progress is needed in areas such as flight autonomy, battery endurance, collision management, and obstacle detection to ensure safe and reliable operation in complex urban environments.

**Integration with Ground Transportation:** UAM has the potential to enhance urban connectivity and transportation efficiency. To achieve this, it is important to consider the integration of drones with existing ground transportation. This involves implementing logistics and fleet management systems that enable efficient delivery of goods and services, as well as integration with public transportation systems and multimodal route planning.

In summary, improving UAM related to drones and U-space will require clear regulations, the development of adequate air traffic management systems, the creation of physical and recharging infrastructure, advancements in drone technology and autonomy, as well as integration with existing ground transportation. These aspects will work together to enable safe, efficient, and successful implementation of UAM in cities in the coming years.