



# Creating the 21st Century Spatial Ecosystem



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Introducing FF2020

## URBAN AIR MOBILITY ON THE RISE

Flying Forward 2020 is a 3-year collaborative research project that will develop a new Urban Air Mobility (UAM) ecosystem by incorporating UAM within the geospatial data infrastructure of cities. FF2020 offers a state-of-the-art geospatial UAM ecosystem which includes:

- Governance model and framework
- Regulatory framework
- Geospatial digital infrastructure
- Identity of Things (IDoT) scheme
- Interoperability frameworks





Introducing FF2020

# MULTI-LAYERED APPROACH

## LIVING LABS

High Tech Campus  
Eindhoven

University of  
Oulu

Tartu Science  
Park

Ospedale San  
Raffaele

Ayuntamiento  
de Zaragoza

## TECHNOLOGY AGNOSTIC SERVICE LAYER

Plug and Play  
Integration  
and  
Upscaling

## FRAMEWORKS

Regulatory  
Framework

Governance  
Framework

Geospatial  
Digital  
Infrastructure

Governance  
Model

Interoperability  
Frameworks

IDoT Scheme

## DEMONSTRATORS

Drone  
Infrastructure

Autonomous  
Monitoring

Last Mile  
Delivery





## Partners

# CONSORTIUM PARTNERS IN PURPOSE

The FF2020 2020 consortium consists of partners from different sectors and backgrounds, experiences and skills. By combining these qualities, we are able to deliver state-of-the-art technology and a best-in-class approach in order to solve the current UAM challenges.

We believe that being successful means having a positive impact on the daily lives of all people in Europe. We also believe that the way forward lies in creating sustainable partnerships and we welcome you to join us on our wonderful journey.



Partners

## CONSORTIUM PARTNERS IN PURPOSE !





Partners

## SUPPORTING PARTNERS

AIRMAP



SOROS  
GABINETE

LUMO  
LABS



NOKIA



Hepta



## Challenges

# THE CHALLENGES OF URBAN AIRSPACE

- 1. Creating an appropriate infrastructure and how to upscale it**  
How do we integrate UAS into the overall transport infrastructure network of a city with guidance from city planners and transportation experts?
- 2. Regulating an entirely new industry**  
E.g.: How to automate procedures adaptively, making it easy to apply and compliant with current legislation?
- 3. Overcoming psychological barriers and social acceptance**  
How do we gain the acceptance and trust in the technology from our society?
- 4. The complex stakeholder value chain for implementation and market uptake**  
How do we make a close collaboration possible between multiple stakeholders across industries?

OVERCOMING URBAN AIRSPACE CHALLENGES WILL PROPEL UAM TO THE NEXT LEVEL





## Vision & Objectives

# VISION

FF2020 aims to incorporate UAM within the geospatial data infrastructure of cities. This will allow us to address the current challenges by supporting the introduction of cost-effective transport transformation with a technology agnostic solution.

As a result, aircraft designers will have unlimited freedom to develop their respective solutions. Additionally, a citizen-centred approach is ensured by creating an adaptive digital infrastructure, supported by a sustainable business model for cities.





## Vision & Objectives

# OBJECTIVES

1. Ease the integration in the legal regulatory framework
2. Enable a geospatial digital UAM infrastructure interoperable across cities
3. Ensure control with the provision of a governance model, interoperability frameworks and an IDoT scheme
4. Facilitate the implementation of UAM services based on European principles in cities and ecosystems
5. Identify strategies and foster replicability and scalability
6. Promote and provide the scientific community and industry with a better understanding of the project outcomes and overcoming current challenges

OUR VISION RELIES ON HOW NEW DIGITAL TECHNOLOGIES CAN  
HELP CREATE A NEW BALANCE BETWEEN AIR AND GROUND MOBILITY



## Work Packages

# WORK PACKAGES

### Work Package 1

#### Project Management

WP1 is responsible for the operational management and technical vitality of the FF2020 project encompassing management components on contractual, financial, legal, technical, administrative and ethical levels.

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij

### Work Package 2

#### Technology Agnostic Service Layer

WP2's main objective is to implement the Digital Toolbox as a plug and play solution within cities. It is technology agnostic and makes it possible for businesses and government to work together and foster innovation.



### Work Package 3

#### European UAM Governance Framework

WP3 heads the implementation of the UAM interoperable Governance Model, interoperability frameworks and IDoT scheme that will allow the FF2020 Digital Toolbox to be replicable and scalable cross-border. Their focus lies on legal, organisational, semantic and technical interoperability.





Work Packages

## WORK PACKAGES

### Work Package 4

#### European UAM Governance Framework

WP4 is responsible for the implementation of the regulatory framework that will allow FF2020 Digital Toolbox to be replicable and scalable cross-border in terms of regulations, directives and standards compliance.



### Work Package 5

#### Geospatial Digital Infrastructure

WP5's main objective is to implement a modular digital infrastructure.



### Work Package 6

#### Case Studies and Benchmarking

WP6 is in charge of developing, implementing and validating the outlined demonstrators.







## Work Packages

# WORK PACKAGES

### Work Package 7

#### Awareness-raising Activities and Business Development

WP7 is responsible for executing supporting activities such as exploitation, branding, communication, dissemination, standardisation and training.



**WP1:** Project Management (BRAIN)

**WP2:**  
Technology  
Agnostic  
Service  
Layer  
(SER)

**WP3:** The European UAM  
governance framework (DIG)

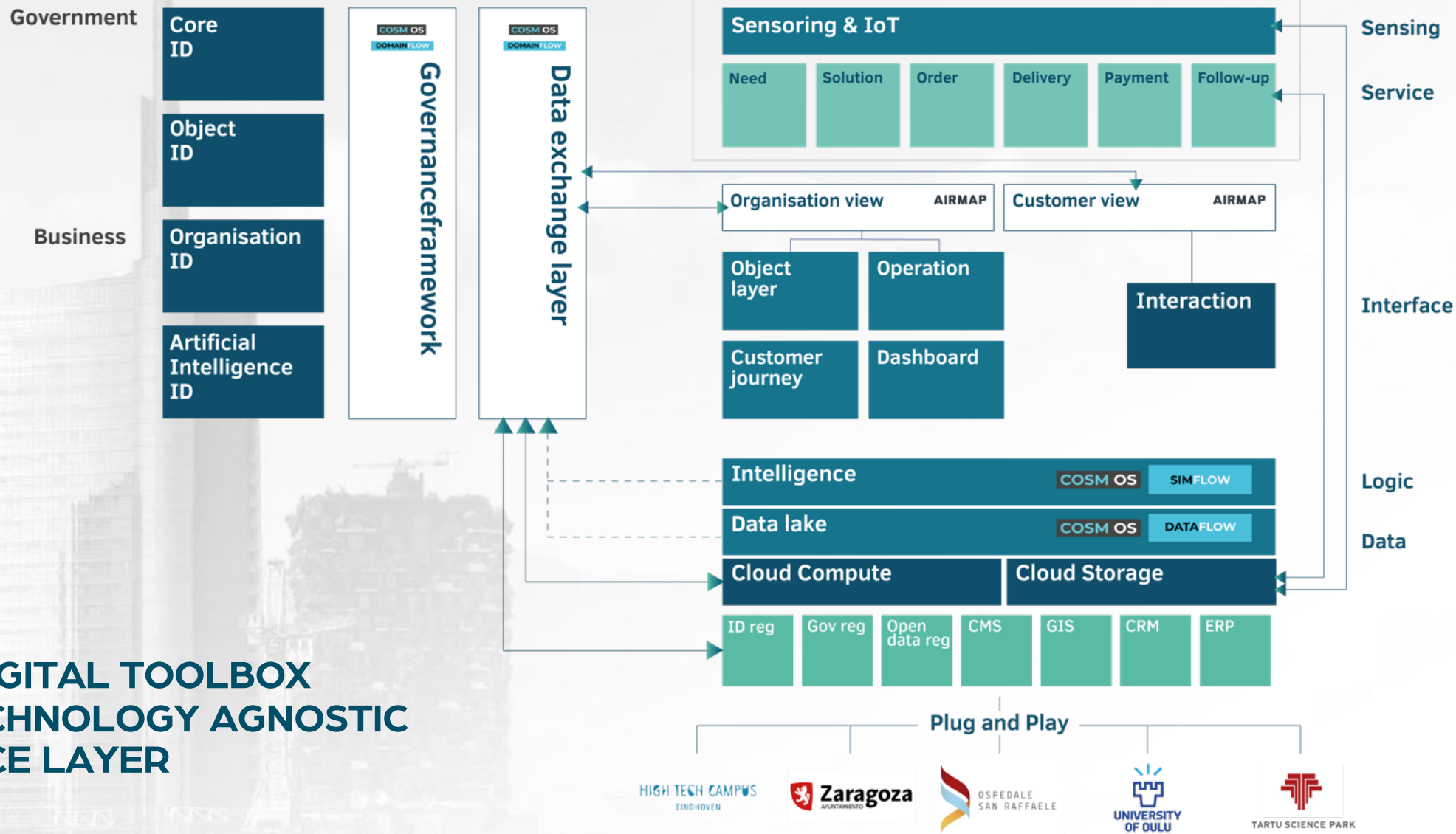
**WP4:** The European  
UAM regulatory  
framework (UM)

**WP5:** The  
geospatial  
digital infrastructure (VERSES)

**WP7:** FF2020 awareness-raising activities and  
business development (DIG)

**WP6:**  
UAM  
services case  
studies,  
specifications  
and  
benchmarking  
(HSR)

*Work Packages Interactive Approach*



## THE DIGITAL TOOLBOX AS TECHNOLOGY AGNOSTIC SERVICE LAYER



## Deliverables

# DELIVERABLES

### Deliverable 1

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij

**Deliverable 1.1**  
Project handbook

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij

**Deliverable 1.2**  
Risk management and  
quality plan

### Deliverable 2

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij

**Deliverable 2.1**  
Digital toolbox  
specifications and  
workflow

 serendipity

**Deliverable 2.2 – 2.5**  
A digital toolbox for  
cities and ecosystems

### Deliverable 3



**Deliverable 3.1**  
A UAM  
interoperability  
governance model



**Deliverable 3.2 – 3.4**  
A UAM legal,  
organisational,  
semantic, technical  
interoperability  
governance  
framework



## Deliverables

# DELIVERABLES

### Deliverable 4



#### Deliverable 4.1

Regulatory framework MVP (Minimum Viable Product)



#### Deliverable 4.2 – 4.4

Semantic ontology



#### Deliverable 4.5 – 4.7

Interpretation framework

### Deliverable 5



#### Deliverable 5.1

Digital geospatial infrastructure requirements



#### Deliverable 5.2 – 5.5

Digital geospatial infrastructure MVP

### Deliverable 6



#### Deliverable 6.1

A UAM interoperability governance model



#### Deliverable 6.2 – 6.5

System under test requirements and certification



#### Deliverable 6.2 – 6.6

Evaluation and regulatory assessment results

## Deliverables

# DELIVERABLES

### Deliverable 7



#### Deliverable 7.1

Web presence, press and periodic updates

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij

#### Deliverable 7.2

Data management plan (DMP)



#### Deliverable 7.3 – 7.5

Report on exploitation, standardisation, dissemination and communication in period 1, period 2, and final report

### Deliverable 7

**BRAINPORT DEVELOPMENT**  
economische ontwikkelingsmaatschappij



#### Deliverable 7.6

Training strategy and plan

#### Deliverable 7.7

Training materials



**WHAT EXACTLY  
DO WE DELIVER?**

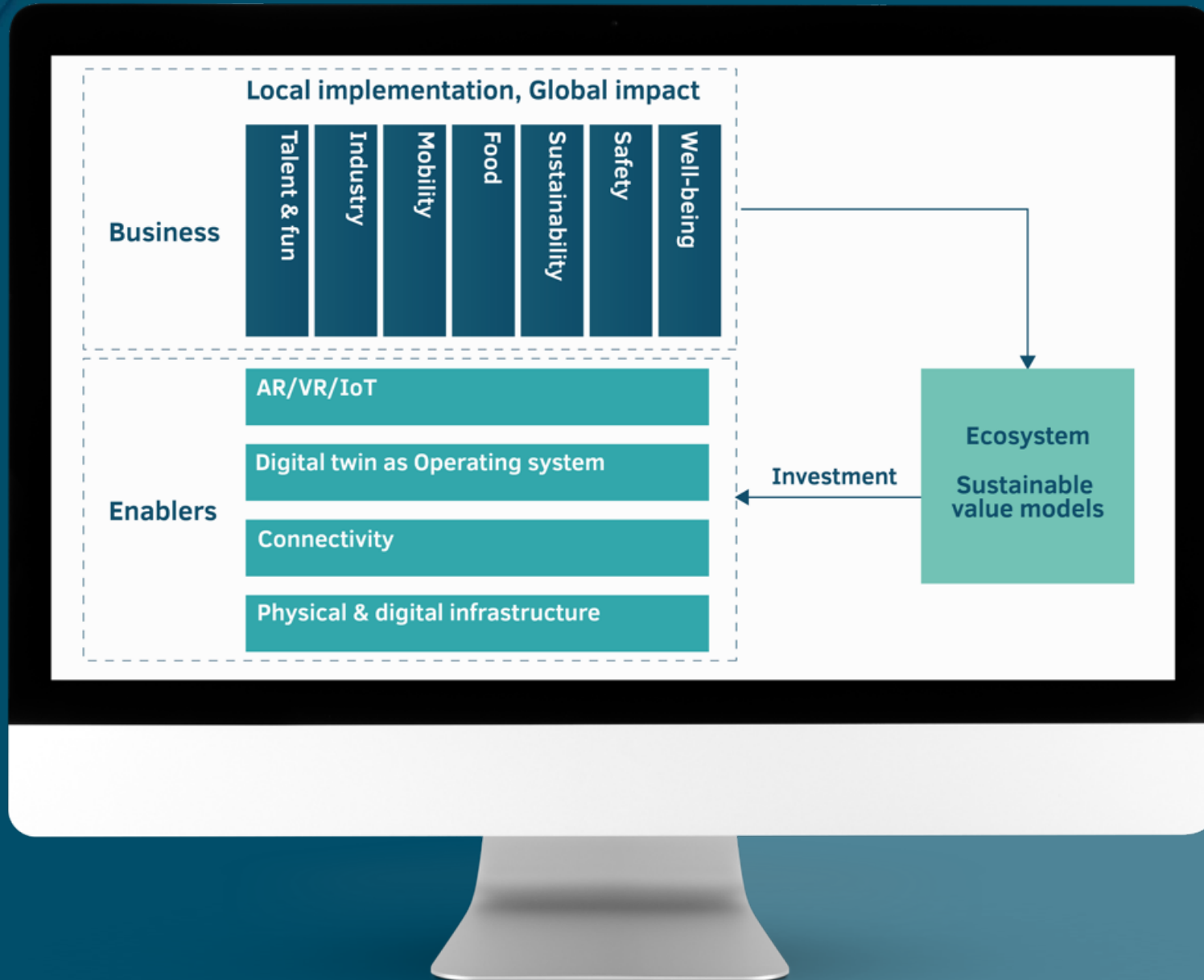




# The Adaptive Infrastructure IMPLEMENTATION TOOLBOX FOR CITIES

The Digital (Agnostic) Toolbox





# The Adaptive Infrastructure IMPLEMENTATION TOOLBOX FOR CITIES

The Sustainable Business  
Model for Cities





The Adaptive Infrastructure

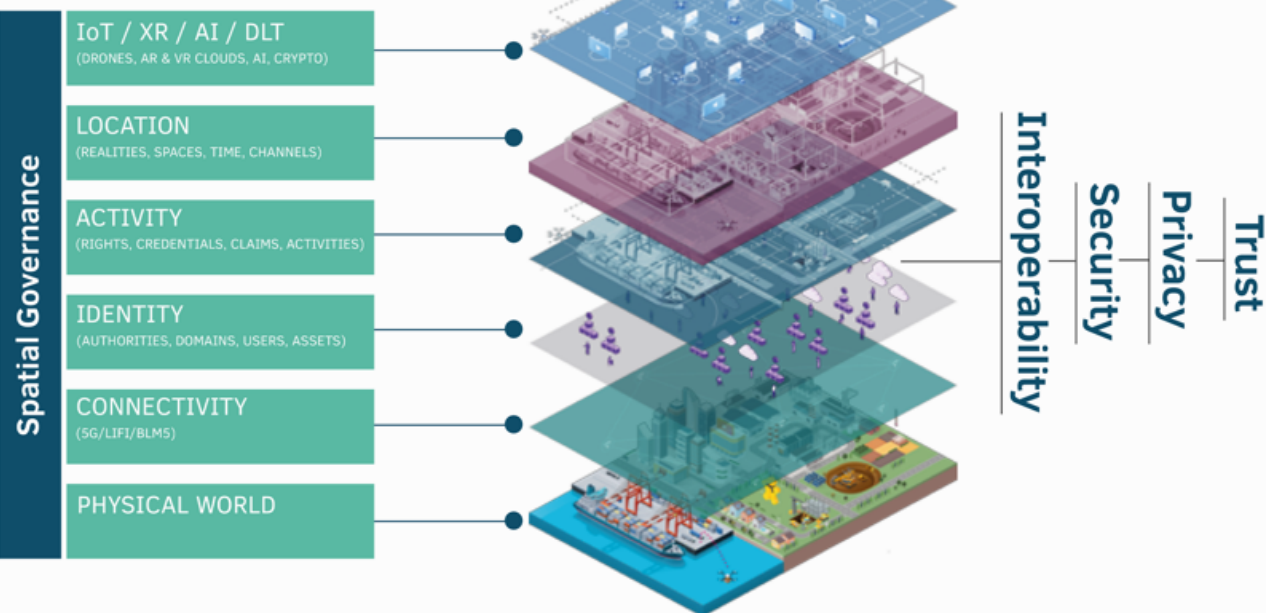
# THE DIGITAL INFRASTRUCTURE OF THE FUTURE

Geospatial Digital Infrastructure





## FF2020 Universal GEO-Spatial Digital infrastructure



The Adaptive Infrastructure

# THE DIGITAL INFRASTRUCTURE OF THE FUTURE

Regulatory & Governance Framework



Urban Air Space Toolkit

# THE URBAN AIR SPACE PRODUCTS & SERVICES

Drone infrastructure



Autonomous monitoring



Last mile drone delivery







Living Labs

## DEMONSTRATING THE FUTURE

To validate the FF2020 solutions and approach we will test 10 demonstrators in collaboration with 5 Living Labs across Europe (Eindhoven, Milan, Tartu, Oulu, Zaragoza).

We have defined the following three stages of development:

**Stage 1:** Regulatory, governance and technology R&D and technical integration

**Stage 2:** Experimentation and validation

**Stage 3:** Regulatory, governance and technology integration propel scalability and sustainability





Living Labs

## DEMONSTRATING THE FUTURE

To ensure a successful deployment of our technologies in the Living Labs, tests will be performed in Eindhoven, Tartu, Oulu, Milan and Zaragoza. The Living Labs have been selected because they possess attributes typical to big cities.

Under the UAM initiative in the Living Labs, local stakeholders gather the best practices to experiment and contribute to the development of the local UAM infrastructure that may be referenced, replicated and scaled in other cities and communities.





Living Labs

## DEMONSTRATORS

Through demonstrators we determine the requirements to successfully implement our solutions and approach.



### Demonstrator 1

#### Flying Forward 2020

Defining requirements for a standardised Urban Air Mobility infrastructure

### Demonstrator 2



#### University of OULU

5G/6G networks  
infrastructure adaptations

### Demonstrator 3



#### Ayuntamiento de Zaragoza

Autonomous monitoring of massive events within a city to ensure safety and emergency operation

### Demonstrator 4



#### Tartu Science Park

Autonomous monitoring and predictive interventions of critical infrastructures in Tartu Science Park and the city of Tartu





Living Labs

## DEMONSTRATORS

Demonstrator 5



### Ospedale San Raffaele

Autonomous monitoring and predictive interventions of critical infrastructures within a hospital

Demonstrator 6



### High Tech Campus Eindhoven

Autonomous monitoring and predictive interventions of critical infrastructures within the High Tech Campus in Eindhoven

Demonstrator 7



### High Tech Campus Eindhoven

The future last mile and emergency delivery on campuses



Living Labs

## DEMONSTRATORS

Demonstrator 8



**University of OULU**

Multi-purpose and specific service drones

Demonstrator 9



**Ospedale San Raffaele**

Precision logistic services for air transport of critical medical and pharmaceutical material

Demonstrator 10



**Tartu Science Park**

Last mile delivery of medications and food for the elderly in social care programmes





# DEMONSTRATORS VISUALISATION

| Domain  | Demonstrator    | Description  | Living Lab | Differentiator  |
|---|-----------------|--|------------|---|
| Infrastructure                                  | Demonstrator 1  | Uam infrastructure to be in place as standard (defining requirements)  | All        | Infrastructure  |
|   | Demonstrator 2  | 5G/6G networks infrastructure adaptation   | Oulu       | UAM key enabler   |
| Monitoring, sustainability and surveillance     | Demonstrator 3  | Autonomous monitoring of massive events within a city to secure safety and emergency actuation                           | Zaragoza   | Scenario planning, Safety and security                          |
|   | Demonstrator 4  | Autonomous monitoring and predictive interventions of critical infrastructures within the Living Lab area                | Tartu      | Weather conditions  |
|   | Demonstrator 5  | Autonomous monitoring and predictive interventions of critical infrastructures within a hospital                         | Milan      | Safety and security   |
|   | Demonstrator 6  | Autonomous monitoring and predictive interventions of critical infrastructures within the Hight-Tech Campus in Eindhoven | Eindhoven  | Sustainability  |
| Last-mile and emergencies air delivery services | Demonstrator 7  | The future last mile and emergency delivery of campuses  | Eindhoven  | Emergency delivery  |
|   | Demonstrator 8  | Multi-purpose and specific service drones in OULU  | Oulu       | UAS urban services<br>Weather conditions                        |
|   | Demonstrator 9  | Precision logistics services for air transport of critical medical and pharmaceutical material                           | Milan      | Health/medicine   |
|   | Demonstrator 10 | Last-mile delivery of medications and food for the elderly in social care programme                                      | Tartu      | Health/medicine<br>Weather conditions<br>Long distande delivery |



## Sibling Projects

# SIBLING PROJECTS

### AiRMOUR

<https://airmour.eu/>

AiRMOUR is a research and innovation project supporting sustainable air mobility via emergency medical services. The project focuses on the research and validation of novel concepts and solutions to make UAM safe, secure, quiet and green, yet also more accessible, affordable and publicly accepted. The project will test both manned and unmanned drones in real-life conditions in 2023.

### AURORA

*Website coming soon*

AURORA is a cross-disciplinary project aiming at linking aeronautical, smart mobility, intelligent systems, urban planning, and citizens' engagement with industry, authorities and citizens' perspectives to foster the adoption of UAM. AURORA focuses primarily on emergency-related applications.



**Thank you for your attention.  
We'd love to hear from you!**

For additional information,  
contact us via [www.ff2020.eu/contact](http://www.ff2020.eu/contact)

