Smart Mobility in Smart Cities

WALK. RIDE. DRIVE. FLY

Dr Vassilis AGOURIDAS
UAM Initiative Leader (AIRBUS)

Intelligent Transport Systems in Greece:
Latest developments

Athens, ITS HELLAS 4th Conference 2018
18th December 2018

Contact: vassilis.agouridas@airbus.com
Reminder: The EIP-SCC (European Innovation Partnership – Smart Cities and Communities)

Set up by the European Commission, the EIP-SCC is a marketplace platform to **accelerate innovation uptake** by:

- **a)** pushing for the set-up of demonstrator projects in European cities;
- **b)** cooperate horizontally by breaking silos across main stakeholders (operators, infrastructure, cities, etc.) on such projects;
- **c)** to address public acceptance and adoption;
- **d)** share findings of studies across sectors and countries;
- **e)** facilitate access to EU funding.
The EIP-SCC Action Cluster Sustainable Urban Mobility brings together cities and regions with companies to show-case innovative mobility solutions and support their replication at scale in key market segments.

It aims to become the leading platform for understanding (and documenting) city needs, bringing stakeholders together, building the tools that support an innovation pipeline, and directly supporting individual networks and projects that are en-route to realisation.
Smart Cities are leading the transformation of mobility

Smart Mobility aims at reduced **traffic congestion** and **CO₂ emissions** from mobility.

Smart mobility is the application of **native digital applications** *(digital technology and business models)* to improve the efficiency and effectiveness of transportation in smart cities.
Mobility Solutions in Smart Cities

The motto of the UAM initiative:

Smart Mobility in Smart Cities:

WALK. RIDE. DRIVE. FLY.

Typical multimodal mobility solutions in megacities do not consider air mobility.

Source: Reuters
Ever-increasing ‘drone-taxi’ concepts worldwide

Number of articles in mainstream news outlets primarily discussing eVTOL over time (quarterly tracked)

1st media hype on eVTOL in Q4/2014 and Q1/2015
2nd hype fully kicking in from Q1/2017 onwards

Leading eVTOL/air taxi startups based on Venture Capital received

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Name</th>
<th>Country</th>
<th>City</th>
<th>Total Funding Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Joby Aviation</td>
<td>United States</td>
<td>Santa Cruz</td>
<td>$115.50M</td>
</tr>
<tr>
<td>2</td>
<td>Lilium Aviation</td>
<td>Germany</td>
<td>Gilching</td>
<td>$101.40M</td>
</tr>
<tr>
<td>3</td>
<td>Ehang</td>
<td>China</td>
<td>Guangzou</td>
<td>$52.05M</td>
</tr>
<tr>
<td>4</td>
<td>Volocopter</td>
<td>Germany</td>
<td>Bruchsal</td>
<td>$36.84M</td>
</tr>
<tr>
<td>5</td>
<td>Terrafugia</td>
<td>United States</td>
<td>Woburn</td>
<td>$6.80M</td>
</tr>
<tr>
<td>6</td>
<td>Kitty Hawk</td>
<td>United States</td>
<td>Mountain View</td>
<td>$6.50M</td>
</tr>
<tr>
<td>7</td>
<td>Aeromobil</td>
<td>Slovakia</td>
<td>Bratislava</td>
<td>$3.51M</td>
</tr>
<tr>
<td>8</td>
<td>Hoversurf</td>
<td>United States</td>
<td>San Francisco</td>
<td>$2.40M</td>
</tr>
</tbody>
</table>

Source: Lufthansa Innovation Hub, Quid

Source: Lufthansa Innovation Hub, Pitchbook, Crunchbase
Five factors influence drone services growth

What is needed to support current and proposed applications?

Infrastructure development, such as the construction of landing facilities and charging hubs, is essential to many uses.

Urgent need for an integrated approach to ITS (ground + air)

What is the timeline for more applications to reach maturity?

Regulations will continue to determine the viability of different applications.

Improved technological capabilities will enable new drone applications.

Which applications merit investment?

Public acceptance will increase investment in drones, especially if companies address safety concerns.

Economic drivers will determine whether the applications will have a viable customer base.

Adapted from: McKinsey Analysis
Illustration of an urban mobility ecosystem

Source: TfL, Transport for London
Scope of the UAM Initiative

Steering its activities on smart mobility initiatives interfacing, or enabling UAM by addressing topics around the following four parallel thematic pillars:

1. **UAM interfaces with public transport***

2. **Mobility as a Service**

3. **Ground infrastructure for UAM (e.g. real estate stakes to support UAM (e.g. dedicated UAM landing pads and integration to multimodal networks hubs, electric charging infrastructure, inter-operable data (e.g. traffic) communications and V2V, V2I, V2x)**

4. **ATM/UTM concepts for UAM** in accordance with the U-Space framework

* Or other interfaces: e.g. logistics platform, emergency services hubs, etc.

City-centric & Citizens-driven
Cities and a wide spectrum of stakeholders

Cities are more than **customers** and **users** of UAM solutions; they are **partners**.

- Cities **own and regulate** transportation infrastructure
- Cities **own and control** traffic and transport data
- Smart cities have the **digital infrastructure backbone** for managing and sharing real-time traffic and transport data

- **Integrated mobility** solutions (e.g. ground + air)
- **Demonstrable benefits** to citizens (e.g. time, comfort, value)
- **Socially & environmentally acceptable** solutions (e.g. security, noise)

**EIP-SCC**

[Source: http://www.rinnovabili.it]
# ROADMAP: Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Phase</strong></td>
<td>Inform about &amp; Engage on demonstration projects</td>
</tr>
<tr>
<td>(Q4, 2017 – Q2, 2018)</td>
<td></td>
</tr>
<tr>
<td><strong>Second Phase</strong></td>
<td>Define &amp; Prepare demonstration projects</td>
</tr>
<tr>
<td>(Q2, 2018 – Q1, 2019)</td>
<td></td>
</tr>
<tr>
<td><strong>Third Phase</strong></td>
<td>Run &amp; Conclude demonstration projects</td>
</tr>
<tr>
<td>(Q1-Q4, 2019)</td>
<td></td>
</tr>
<tr>
<td><strong>UAM Initiative Dissemination Events</strong></td>
<td>Achievements &amp; Way Forward</td>
</tr>
<tr>
<td>(in Q1, 2020)</td>
<td></td>
</tr>
</tbody>
</table>

**Key Outputs:**
- Manifestos of Intent
- If GO - Memorandums of Understanding
- EIP-UAM Initiative Demonstrators
- Dissemination & Documentation

**Focus Areas:**
- Integrated Infrastructure Planning
- Citizens Engagement
- Raising Investments

---

11th ITS Hellas Conference 2018, - Hellenic Ministry of Infrastructure & Transport, Athens 18-19 December

---

Smart Mobility in Smart Cities: WALK, RIDE, DRIVE, FLY...
Key steps and evolution of membership & status

- **FrontRunners**
  - Manifesto of Intent
  - Key Output: EIP-UAM Initiative Demonstrators
  - Key Output: Dissemination & Documentation

- **Demonstration Project Proposal**
  - MoU

- **EU Network of U-Space Demonstrators**
  - UAM Pioneers

- **Fellows**
  - Statement of Intent
EU Urban Air Mobility

FrontRunners [●] 12 demonstrator projects (incl. 2 Cross-border) / 17 cities

Fellows [●] (7 cities / regions so far; deadline by 28 Feb 2019)
Madrid (SP), Oxfordshire County (UK), County Durham (UK), Amsterdam (NL), Turin (IT)
(as of 11th Dec 2018)

Recent additions:
• Ionian Islands Region (GR),
• Region of Peloponnese (GR)

More than 500 diverse stakeholders mobilised across Europe to work on bringing urban mobility to the 3rd dimension

Deadline: 28Feb2019

A total of 24 cities/regions
(as of 17 Dec. 2018)

The 2018 FrontRunner & Cities / Regions and Fellows
JOIN US to...

Innovate & Invest in UIC²

UAM Initiative Cities Community

EU Urban Air Mobility
FrontRunners [1] 12 demonstrator projects incl. 2 Cities/Regions / 17 cities

More than 500 diverse stakeholders mobilised across Europe to work on bringing urban mobility to the 3rd dimension

A total of 24 cities/regions

UIC² UAM Initiative Cities Community

The 2018 FrontRunner & Fellow Cities / Regions and Ambassadors

Smart Mobility in Smart Cities: WALK. RIDE. DRIVE. FLY.
4th ITS Hellas Conference 2018
Hellenic Ministry of Infrastructure & Transport, Athens, 18-19 December

Smart Mobility in Smart Cities: WALK. RIDE. DRIVE. FLY.

Dr Vassilis AGOURIDAS
UAM Initiative Leader (AIRBUS)

Contact: vassilis.agouridas@airbus.com
Drone system uses fall into five general categories:

3 kinds of applications leveraging on drones & digitalisation:

1. Situational awareness
   - Descriptive

2. Prognostics
   - Predictive analytics

3. Real-time optimisation
   - Prescriptive

<table>
<thead>
<tr>
<th>Uses</th>
<th>Description of use</th>
<th>Impact</th>
<th>Estimated time to maturity, years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveillance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a Short-range surveillance</td>
<td>Conducting short-range surveillance, image capture, and analytics</td>
<td>High</td>
<td>Already mature</td>
</tr>
<tr>
<td>1b Long-range surveillance</td>
<td>Conducting long-range surveillance, image capture, and analytics</td>
<td>Medium</td>
<td>2-5</td>
</tr>
<tr>
<td>1c Photo/video</td>
<td>Using photo and video applications without analytics</td>
<td>Low</td>
<td>Already mature</td>
</tr>
<tr>
<td>Operations</td>
<td>Facilitating labor-intensive or difficult tasks</td>
<td>High</td>
<td>Already mature</td>
</tr>
<tr>
<td>Entertainment/advertising</td>
<td>Leveraging drones to entertain or advertise</td>
<td>Medium</td>
<td>Already mature</td>
</tr>
<tr>
<td>Signal emission</td>
<td>Providing multimedia bandwidth by emitting signal/video/sound</td>
<td>Low</td>
<td>1-3</td>
</tr>
<tr>
<td>Movement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Transportation</td>
<td>Moving people</td>
<td>High</td>
<td>10-15</td>
</tr>
<tr>
<td>5b Delivery</td>
<td>Moving objects</td>
<td>Medium</td>
<td>5-10</td>
</tr>
</tbody>
</table>

Source: McKinsey Analysis
U-Space: SESAR JU funded projects

U-space demo coverage
# U-Space: SESAR JU funded projects

## U-space demo coverage

<table>
<thead>
<tr>
<th>Project</th>
<th>Country</th>
<th>Environment</th>
<th>Area survey</th>
<th>Parcel delivery</th>
<th>Linear survey</th>
<th>Point survey</th>
<th>UAM</th>
<th>Leisure</th>
<th>Emergency / SAR</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIODE</td>
<td></td>
<td>Rural - Sub-urban - Airport</td>
<td>Agriculture - Archaeo - Road traffic</td>
<td>Ad-hoc</td>
<td>Electricity rail</td>
<td>- On airport - Photography</td>
<td>n/a</td>
<td>Yes</td>
<td>- Firefighting - SAR</td>
<td>- Manned a/c - ATC - V21</td>
</tr>
<tr>
<td>DOMUS</td>
<td></td>
<td>Rural - Urban - Maritime - Airport</td>
<td>Terrain - Construction - Road traffic - Maritime patrol</td>
<td>- Medical - Urgent delivery</td>
<td>n/a</td>
<td>- 3D modelling - Building inspection</td>
<td>n/a</td>
<td>Yes</td>
<td>- Firefighting - Road traffic accident</td>
<td>- Manned a/c - ATC - V21</td>
</tr>
<tr>
<td>EuroDRONE</td>
<td></td>
<td>Urban - Airport</td>
<td>No</td>
<td>- Commercial</td>
<td>- Long distance utility</td>
<td>- On airport</td>
<td>n/a</td>
<td>Yes</td>
<td>n/a</td>
<td>- V2V - V21 - ATC</td>
</tr>
<tr>
<td>GOF</td>
<td></td>
<td>Urban - Maritime - Forestry - Airport</td>
<td>- Drone fleet management</td>
<td>- International parcel delivery</td>
<td>- Long-range sensory data collection 100km+</td>
<td>- Drone fleet management</td>
<td>Air taxi from airport to city centre</td>
<td>Yes</td>
<td>- Maritime traffic surveillance - SAR - Police</td>
<td>- Manned a/c - ATC</td>
</tr>
<tr>
<td>SAFIR</td>
<td></td>
<td>Urban - Airport</td>
<td>- Inspection for Port Authorities</td>
<td>- Commercial - Medical</td>
<td>- Oil spill - High tension line</td>
<td>- Line incident intervention and Pylon inspection</td>
<td>n/a</td>
<td>Yes</td>
<td>- Port inspection on criminal offenses</td>
<td>- Manned a/c - ATC - V2V - V21</td>
</tr>
<tr>
<td>VUTURA</td>
<td></td>
<td>Rural - Urban</td>
<td>- Agriculture</td>
<td>- Commercial</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Yes</td>
<td>- Drone interception - Firefighting - Police</td>
<td>- Manned a/c - ATC</td>
</tr>
<tr>
<td>GEOSAFE</td>
<td></td>
<td>Rural - Urban</td>
<td>- Agriculture</td>
<td>- Commercial</td>
<td>n/a</td>
<td>- On airport - Security surveillance</td>
<td>n/a</td>
<td>Yes</td>
<td>- Police</td>
<td>- ATC - V2V - V21</td>
</tr>
<tr>
<td>PODIUM</td>
<td></td>
<td>Rural - Urban - Airport</td>
<td>- Agriculture</td>
<td>- Commercial - Urgent delivery</td>
<td>n/a</td>
<td>- On airport - Security surveillance</td>
<td>n/a</td>
<td>Yes</td>
<td>- Police - SAR</td>
<td>- Manned a/c - ATC</td>
</tr>
<tr>
<td>SAFEDROME</td>
<td></td>
<td>Rural - Sub-urban - Airport</td>
<td>- Agriculture - Drone fleet management</td>
<td>- Commercial</td>
<td>n/a</td>
<td>- Drone fleet management</td>
<td>n/a</td>
<td>Yes</td>
<td>n/a</td>
<td>- Manned a/c - ATC - V2V - V21</td>
</tr>
</tbody>
</table>
EU Urban Air Mobility

FrontRunners [●] 12 demonstrator projects (incl. 2 Cross-border) / 17 cities

Fellows [●] (7 cities / regions so far; deadline by 28 Feb 2019)
Madrid (SP), Oxfordshire County (UK), County Durham (UK), Amsterdam (NL), Turin (IT)
(as of 11th Dec 2018)

Recent additions:
- Ionian Islands Region (GR),
- Region of Peloponnese (GR)

More than 500 diverse stakeholders mobilised across Europe to work on bringing urban mobility to the 3rd dimension

UIC²
UAM Initiative Cities Community

The 2018 FrontRunner & Fellow Cities / Regions and Ambassadors

A total of 24 cities/regions
(as of 17 Dec. 2018)