



What is the EU doing to deliver the U-Space?

Joachim Lücking,
Head of Unit Aviation Safety
DG MOVE
Madrid, 13 March 2019

"The views expressed are purely those of the speaker and may not in any circumstances be regarded as stating an official position of the European Commission."



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Mobility and
Transport

Drones are digital...



Ø Drones = combination of digital technologies– especially smart phone features (battery, sensors...).

Ø **Digital** technologies develop **FAST**



European
Commission

... and developing quickly (?)

Easter morning 1900: 5th Ave, New York City. Spot the automobile.



Source: US National Archives.

Easter morning 1913: 5th Ave, New York City. Spot the horse.



Source: George Grantham Bain Collection.



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Mobility and
Transport

The EU regulatory framework



	Drone rules	Drone airspace rules	U-Space
	(Airworthiness, Competence, Operations)	(Types of airspace and modalities)	(Access to airspace)
Legal Basis	EASA basic regulation 11/09/2018	EASA basic regulation	EASA basic regulation
Implementing rules	Drone operating Regulations May 2019	Rules of the Air Mid 2020	U-Space Regulation Mid 2020
Compliance	Standards / AMC	Standards / AMC	Standards / AMC
Principles	Operation Centric Approach	Adapt to local characteristics	Fair access to airspace



Drone rules

- Ø EU rules reflect “Operation centric approach”
 - Ø Open category: buy and fly – strict limits
 - Ø Specific category: assess the risk
 - Ø Certified category: traditional certification

What's next? U-Space!

- Ø Work towards more complex operations...
- Ø Keep operations safe, secure & green
- Ø Integrate the urban dimension....



CREATING A DRONE SERVICES MARKET

What is the problem?

ØTake a leap:

Now – by 2035:
30k flights – 20k flights
in EU - over 1 city
per 24 h – per 1 h



**We need a digital system automating
air navigation service provision**

CREATING A DRONE SERVICES MARKET

What is the solution? U-Space!

A digital system

Providing services

In a designated volume of airspace

To keep operations safe/secure/green/privacy



Objective: create a competitive U-Space services market

How will we get there?



EC: provide policy direction and adopt rules

EASA: prepare implementing rules

SESAR: R&D projects, including on U-Space
Demonstrators

EUROCONTROL: support for the
European U-Space Demonstrator Network

Concrete next steps?

- Ø Learn from expertise in EU Network of U-Space demonstrators
- Ø Elaborate EASA opinion by end 2019
- Ø Adopt a U-Space Regulation in 2020





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SESAR and demonstrating U-space

Full speed in 2019

Ludovic Legros
SESAR JU Programme Manager

SESAR & U-space



Why do
we do
what we
do?

- We believe U-space will support the safe integration of drones in Europe and **we want to make it happens.**

How do
we do
what we
do?

- We set up a **R&D programme that mixes exploration and demonstration** of this future

What do
we do?

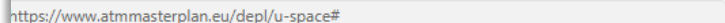
- **We develop the U-space services & capabilities** definition, requirements and recommendations for standardization & regulation.

U-space

SEFUL

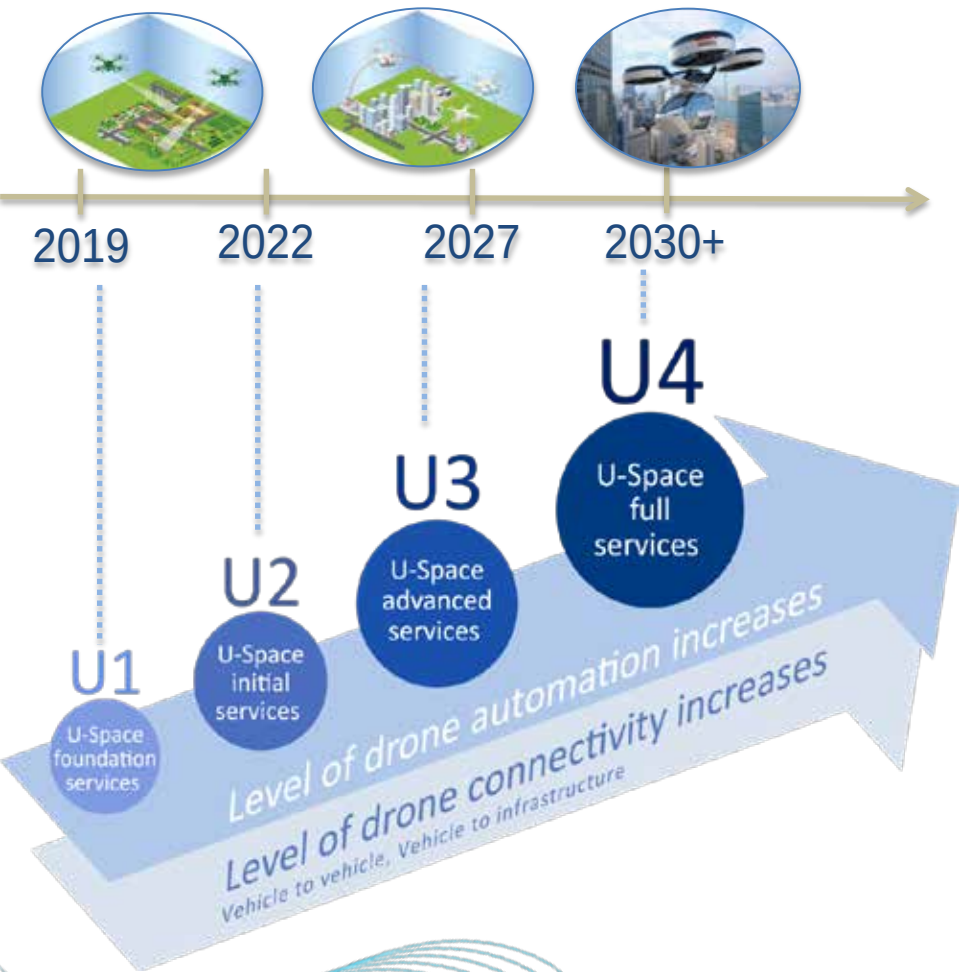


monstrators

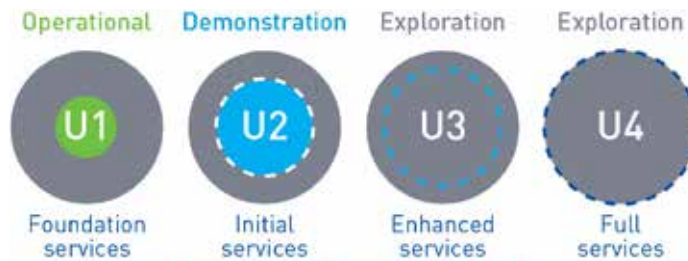


<https://www.atmmasterplan.eu/depl/u-space#>

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U-space in 2019



U-space roll-out by 2019

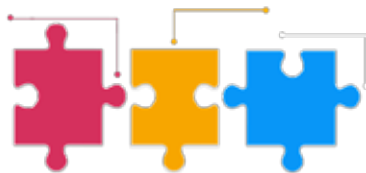


EASA
Opinion
to EC

**Outcomes of
demonstration
activities**

Full speed in 2019

U-space architecture



Prepare the demonstrations
10 projects

Programme consolidation

(up to Feb. 2020)

Flight trials

Conclusions

Other U-space projects deliveries
9 projects, more than 100 technical deliverables

2018

Oct.

Jan.

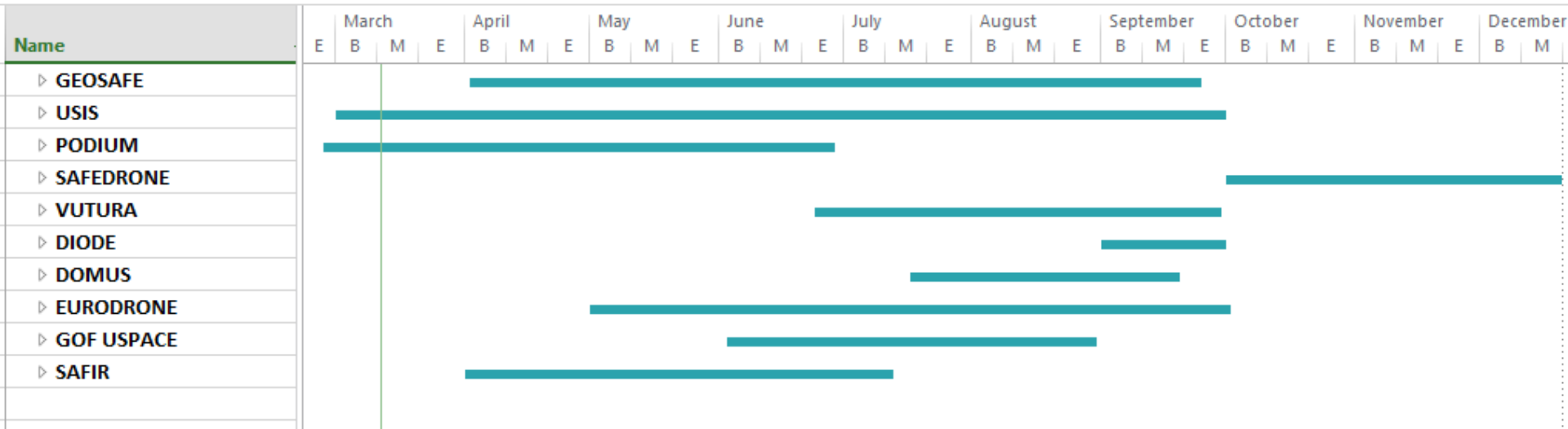
Apr.

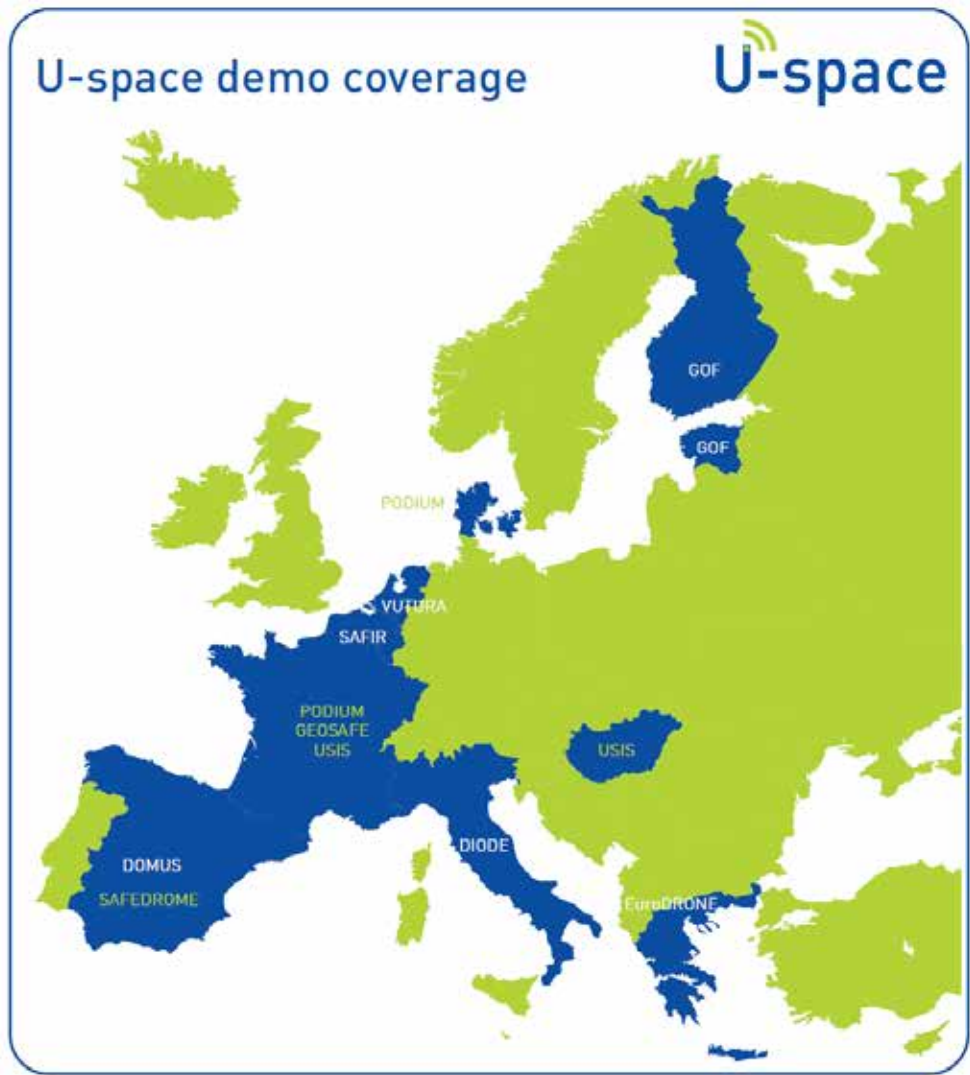
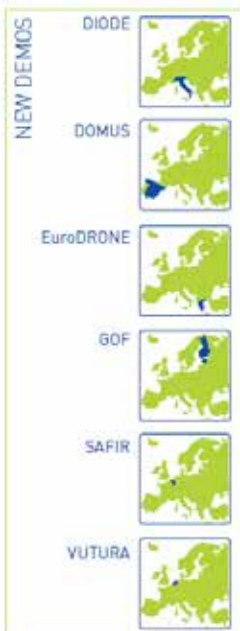
Jul.

Oct.

2019

SESAR Demonstration timeline





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

This project demonstrates a multi Service Providers architecture for various drone operations, and integration with manned aviation operations.

The demonstration will take place in Belgium at three locations: City of Antwerp, Port of Antwerp and a DronePort Test Facility in Sint-Truiden.

Key Milestones:

- | | |
|-------------------------------------|-------------------|
| ✓ Study Plan | 03-2019 |
| • Trials and Demonstration Campaign | 06-2019 – 09-2019 |
| • Initial Study Report | 09-2019 |
| • Final Study Report | 02-2020 |

Project consortium

- Coordinator : Unifly
- Other members: Belgocontrol, Amazon EU S.a.r.l., DronePort, Proximus, Havenbedrijf Antwerpen NV van publiek recht (APA), Helicus BVBA (Helicus Air), S.A.B.C.A. (SABCA), ELIA SYSTEM OPERATOR, High Eye B.V., C-ASTRAL Proizvodnja zračnih in vesoljskih plovil d.o.o. (C-ASTRAL), TEKEVER II AUTONOMOUS SYSTEMS, LDA, Aveillant.

Grant information

- Framework : CEF-SESAR
- Status: ongoing project
- Start date : 1 October 2018
- End date: 31 March 2020
- Overall Budget : 3 837 780 euros
- EU Contribution : 1 328 441 euros



U2

U3

Demonstrator

SAFIR

Safe and flexible integration of Initial U-space services in a real environment



Interfaces with ATC, dynamic geo-fencing and tactical deconfliction will be implemented to support this demonstration.

- BVLOS Oil spill inspection
- Parcel delivery, medical parcel delivery
- High tension line mapping/inspection during construction, overhead line incident intervention and Pylon inspection
- Port inspection on Criminal offenses, Inspection container terminal for Port Authorities
- Monitoring cooperative and non-cooperative drones
- GA activities, Leisure drone activities
- Telecommunication network tests



Live trials campaign in the port of Antwerp

This project is focused on the geo-fencing services and capabilities. It establishes the state of the art geo-fencing solutions from technical, operational, and regulatory perspective.

The demonstration will take place in France (Pourrières, Bordeaux area, Montmagny area, Valence area)

Key Milestones:

- | | |
|------------------------------|-------------------|
| ✓ Demo plan | 02-2019 |
| • Demonstration flight tests | 04-2019 – 06-2019 |
| • Final demonstration | 06-2019 – 09-2019 |
| • Final Study Report | 10-2019 |

Project consortium

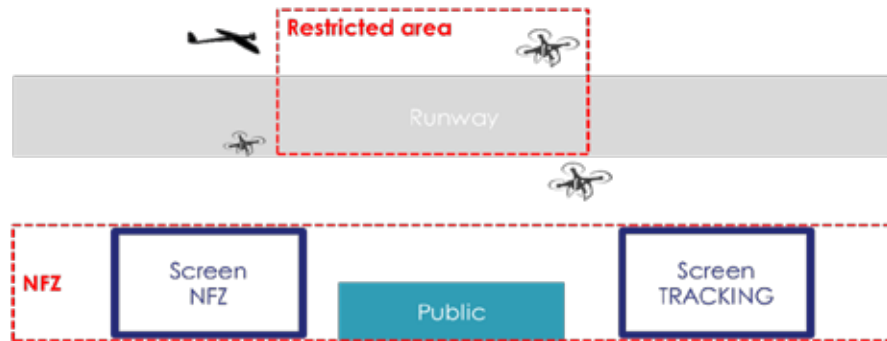
- Coordinator : THALES AVS
- Other members: AirMap, AEROMAPPER, SPH Engineering, Air Marine, ATECHSYS

Grant information

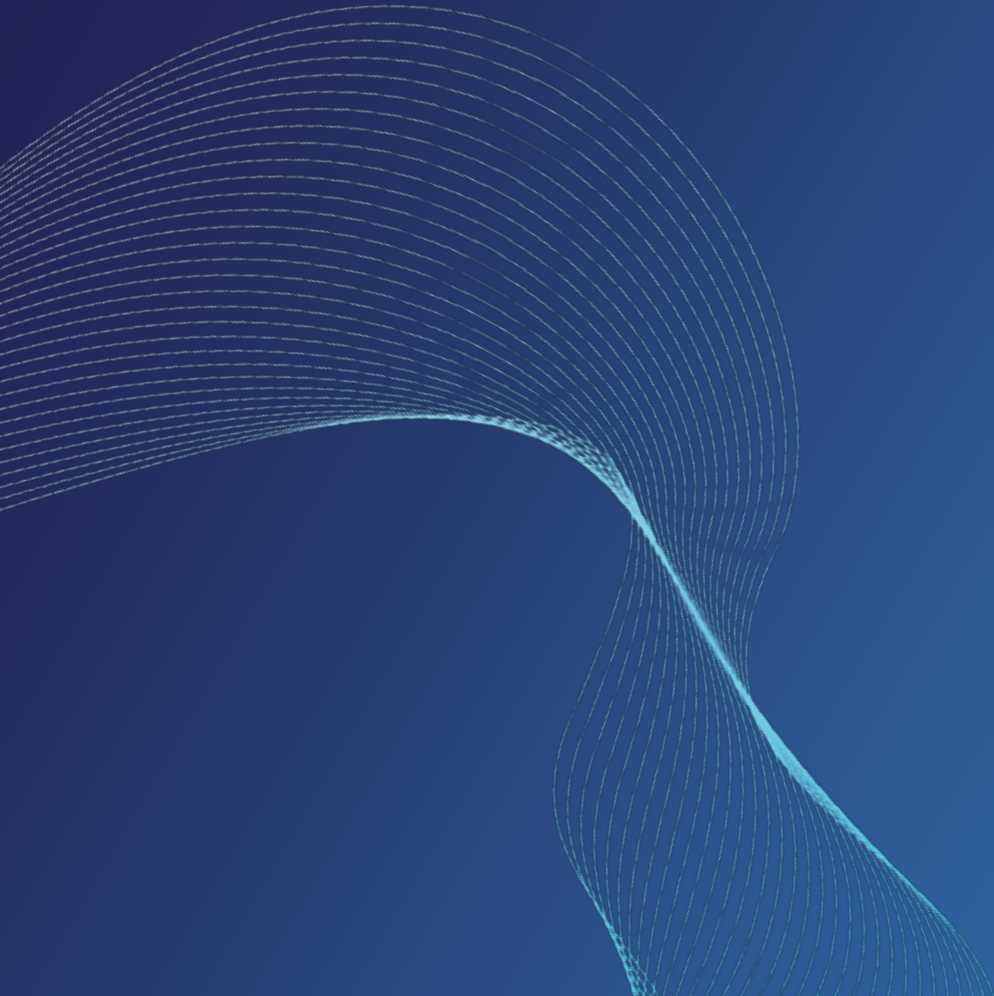
- Framework : SESAR-2017-1
- Status: ongoing project
- Start date : 01 July 2018
- End date: 30 December 2019
- Overall Budget : 500 000 euros
- EU Contribution : 497 402,46 euros



- Demonstrate a number of commercially available representative Geo-fencing solutions, to assess drone behaviors in different situations.
- Evaluation of the influence of the navigation system performance on the efficiency of the Geo-fencing.
- Covers the three drone segments: consumer/ prosumer/ professional
- Uses more than 14 drones using different geo-fencing strategies
- Technical analysis and evaluation of the navigation solutions and cybersecurity part
- Specific real-life use cases



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European U-space Demonstration Network

World ATM Congress, Madrid, Mar 19



Paul Bosman
Head of Aviation Co-operation and Strategies Division, EUROCONTROL

Launch of U-space Demonstrators Network

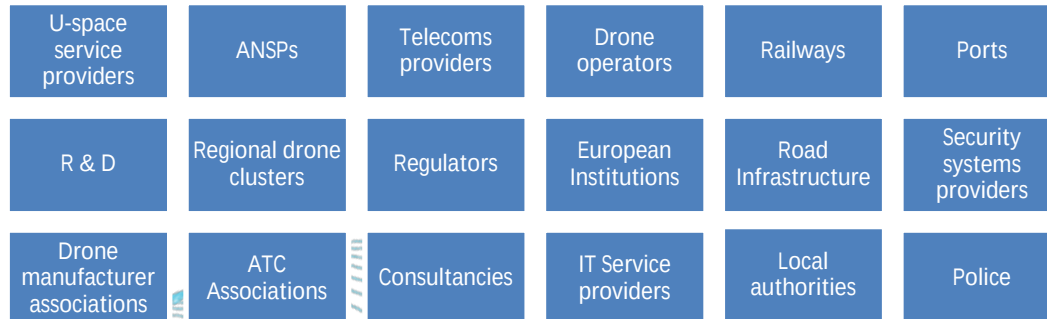
European Commissioner of Transport, Ms. V. Bulc
Oct 2018, Antwerp (BE)



https://ec.europa.eu/transport/modes/air/news/2018-10-19-network-u-space-demonstrators_en

Already 100+
members signed up

Manifesto of Intent



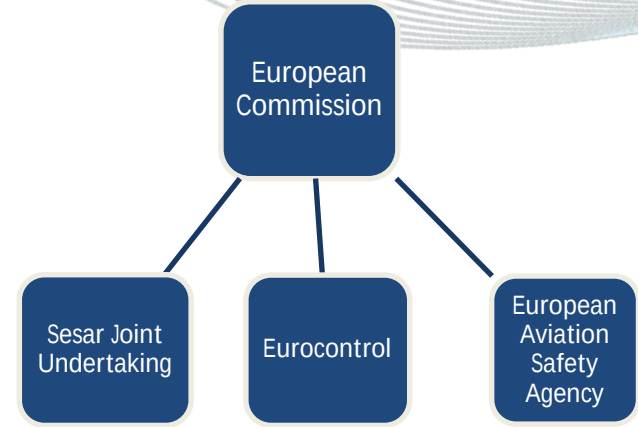
Why the U-space Demonstrator Network?

- Reduce red tape
 - De-risk implementations
 - Accelerate lead time to market
 - Share lessons learned / best practices
- Provide platform for public authorities & industry

A partnership between the institutional bodies and the drone Community to develop a safe, sustainable/competitive and citizen oriented drone business

Unique Partnership

- Led by European Commission: DG MOVE
- Support cell to assist EC by acting as
 - Catalyst for improvement
 - Facilitate generation of guidance & advice
 - Develop and maintain Web Portal
 - Arrange meetings with Network members



By European Institutions for European industry

The first steps

- U-space online web based platform <https://www.atmmasterplan.eu/depl/u-space>
- Lessons learned / best practices sharing
- Further strengthened in Amsterdam High Level Drone Conference 2018 declaration



5. Developing communication and promotion material for information campaigns to all drone users and other actors involved in drone operations such as local authorities;
6. Further enhancing the European U-space Demonstrator Network to speed up the opening of the drone services network;
7. Investing in the necessary research and development activities that are a key enabler for the growth of safe, secure and green drone operations in Europe.

A special focus on UAM

Medical-related use cases are predominant across all UIC² even if not being identified as the initial and primary mobility need.

Why? Simply because social benefits are self-evident

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), Ionian Islands Region (GR), Region of Peloponnese (GR)

Iss. of 21st Jan 2019

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



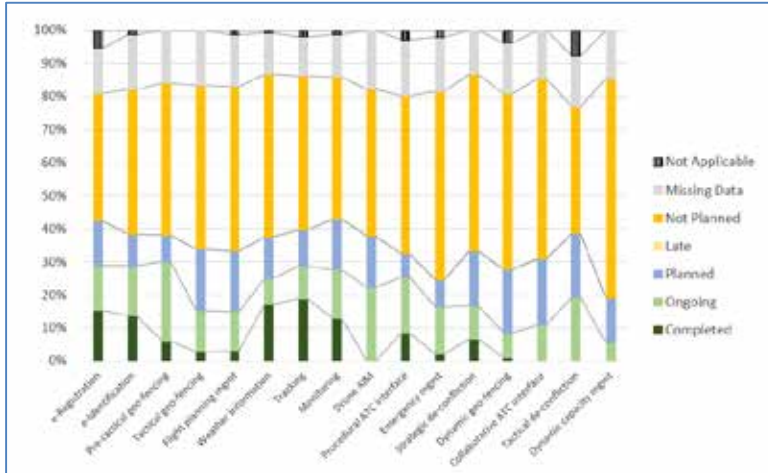
UIC²
UAM Initiative
Cities Community

The 2018-19 FrontRunner & Fellow
Cities / Regions and Ambassadors Footprint

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Deliverables of the Network

- **U-space maturity**



- **Guidance**

- Rules of the air
- Common altitude reference system
- UAS ATM operational concept
- UAS ATM Airspace Assessment, ...



- **Coming soon**

- Open UTM API Inventory -> SWIM-UTM
- Catalogue of Demonstrators (through a standard template)
- Standard scenarios
- Guidance material on Regulations and Standards
- ...
- Workshops / Webexes / ... !



U-space Service (manufacturing) Providers

An emerging market



- Rapidly growing number of USSPs (60+) within Europe
- Around 10% of existing providers have capability to provide an extended set of U-space services
- Detailed information of USSPs service capabilities not easily available
- Lack of interoperability between USSPs
- Lack of standardised approach to implement U-space services

Final words

**Lets all work together to make the economical
and societal promises of U-space a reality**

For further information U-space.network@eurocontrol.int



U-space developments – state of play

WAC March 13th 2019

GOF USPACE

Finnish-Estonian Very Large U-space demonstration 2019

March 13rd, 2019



GOF USPACE – International consortium with 19 members



• U-SPACE INFRASTRUCTURE MEMBERS (8)

- ANSP
 - **EANS** (*Coordinator*)
 - **ANS Finland**
- UTM vendors
 - **AirMap**
 - **Altitude Angel**
 - **Unifly**
- FIMS coordination and implementation
 - **Frequentis**
- Dense urban fleet management & drone operator
 - **Fleetonomy**
- Use case coordination
 - **Robots Expert**

OPERATOR/OTHER MEMBERS (11)

- § Drone Mfrs/Operators (7)
 - § **Avartek (FIN)**
 - § **BVdrone (FIN)**
 - § **Hepta Airborne (EST)**
 - § **Police of Helsinki (FIN)**
 - § **Police and Border Guard (EST)**
 - § **Threod Systems (EST)**
 - § **VideoDrone (FIN)**
- § General Aviation Operators (1)
 - § **The Finnish Air Rescue Society**
- § Drone Taxi Operator (1)
 - § **Volocopter (Urban Air Mobility)**
- § Other (2)
 - § **CAFA Tech (EST)**
 - § **The Transport and Communications Agency**

The GOF USPACE project at a glance

Flight Information Management System (FIMS), supports also cross-border drone operations

- ø Integration of UTM and ATM systems
- ø Cross-agency / country drone (UAV) information management system
- ø Accessibility of a Common operational picture
- ø Enable Joint Operations / authority collaboration

Large scale demonstration

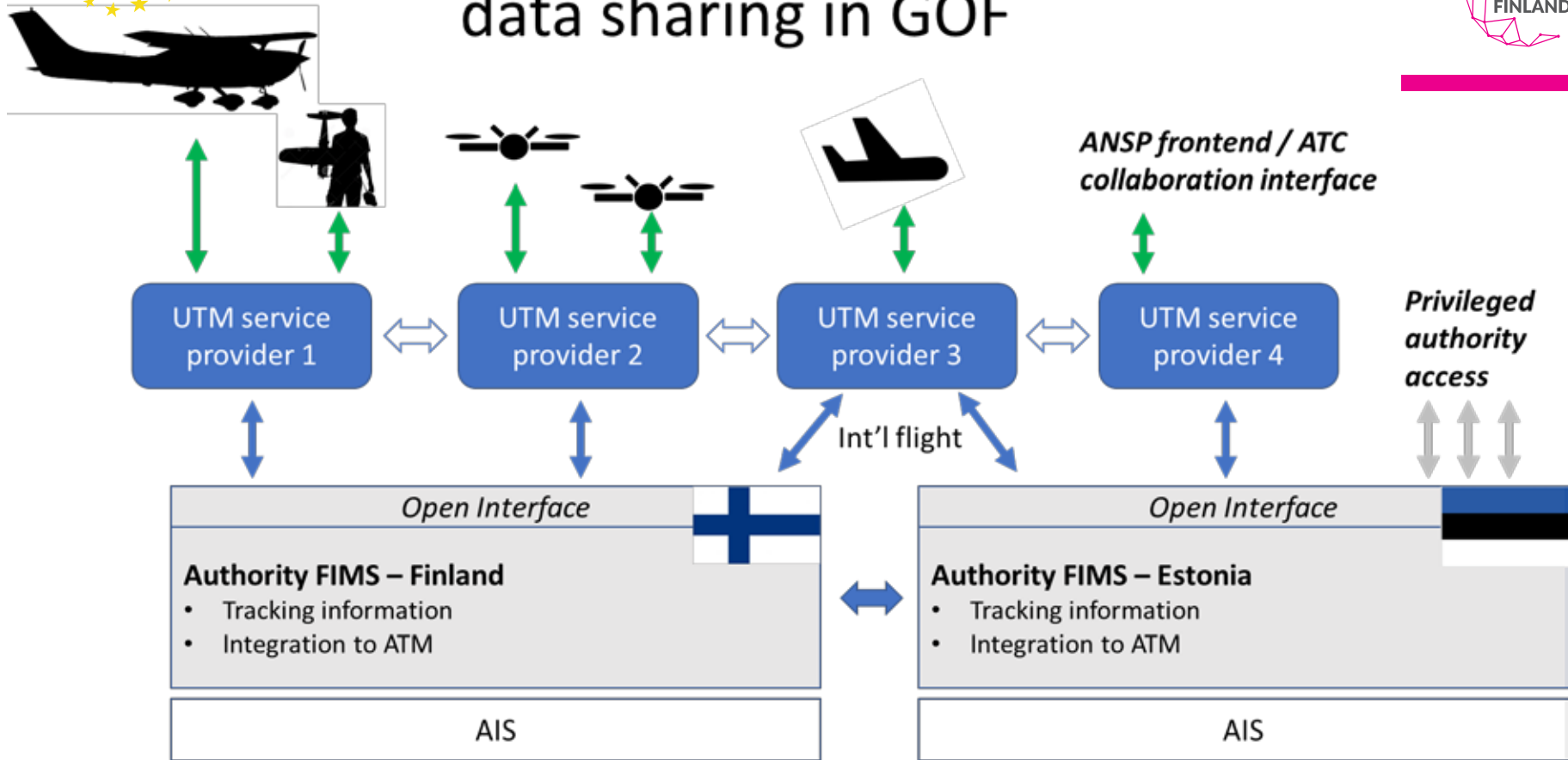


Use-cases demonstrate integrating manned and unmanned aviation



All use cases demonstrate actual operational needs

Top-level architecture and data sharing in GOF



GOF design: Authority FIMS at the core of interoperability

- Create architecture for and implement pre-operational authority Flight Information Management System (FIMS), operated as an ANS covering the FIR
 - Serves and integrates UTM Service Providers (USP) – creates a liberal market regime
 - Supports adding commercial off the shelf UTM components, e.g. precision weather, 3D mobile coverage charts, dynamic charts on aggregation of people, ...
 - Provides real-time situational awareness to all airspace users – supports privileged access
 - Supports FIMS to FIMS connections enabling cross-border and FIR to FIR operations
- Create standard protocols to connect UTM services from different USP's to FIMS
 - Build on other work: GUTMA, inter-USS, existing UTM API's, ...
 - Create Service Description Documents for SWIM information exchange services (USP-FIMS)
 - The value of standard protocols will be demonstrated by mixing services from different UTM vendors during the demonstration

ANS Finland vision on UTM

- Need for one national UTM service provider as an “umbrella organization”
 - All other UTM service providers can join via open API`s
 - Shared information on drones and their intentions
 - Same data for all (air space model, air space reservations, airport OPS hours, other traffic)
 - Traffic information on all traffic
 - Static data, Dynamic data, Dynamic Dynamic data (real time air space reservations)
- ANSP has all the information needed
 - Capability to act as national UTM service provider
 - Not as a monopoly, but enabler
 - Real time data for all, same level service = equal service
 - Via digital solution open interface for business use and for authority and officials
 - Digital platform, cloud services, micro services
 - Flight Information Service, Aeronautical Information Service
 - ANSP`s task in ATM, very strong link also in UTM

Drone detection
Drone
identification

Drone RWY
inspection

5G connection between

- Drones and Airport
- Airport and ROT Center
- Drones and FMI

Drone ILS
measurement

Drone Airport area
inspection

ROT Center with
Drone connection



Several different drones



Threod StreamC, 35kg, 6h+ endurance



DJI Mavic Pro,
900g, 30min
endurance



Avartek ARX30, 20kg, 40min endurance



Hepta FH50, 20kg, 3h+ endurance



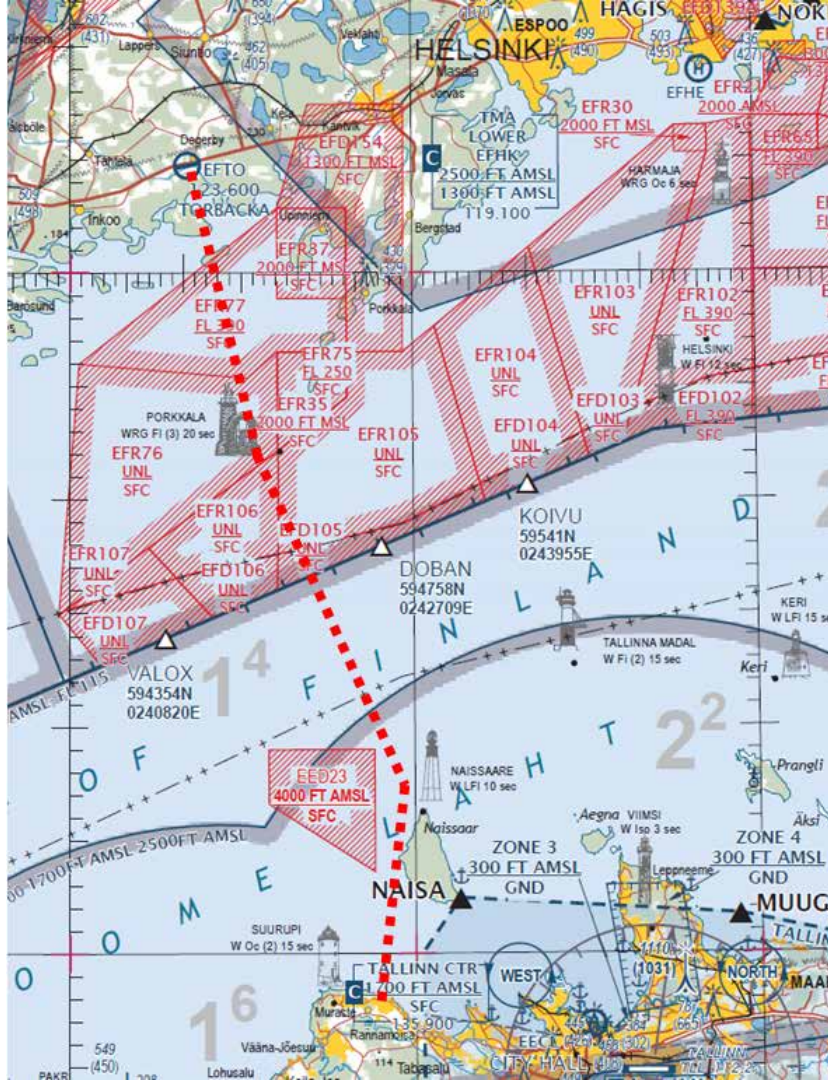
VideoDrone X4S, 6kg, 60min endurance



Threod EOS, 7kg, 2h endurance

International parcel delivery flights

- Three different drones
- ~80km flight route
- Cruise altitude 1000-4000 feet
- Flown TSA/D airspace
- Take-off in one end and landing in the other
- Direct radio links, mobile network trackers



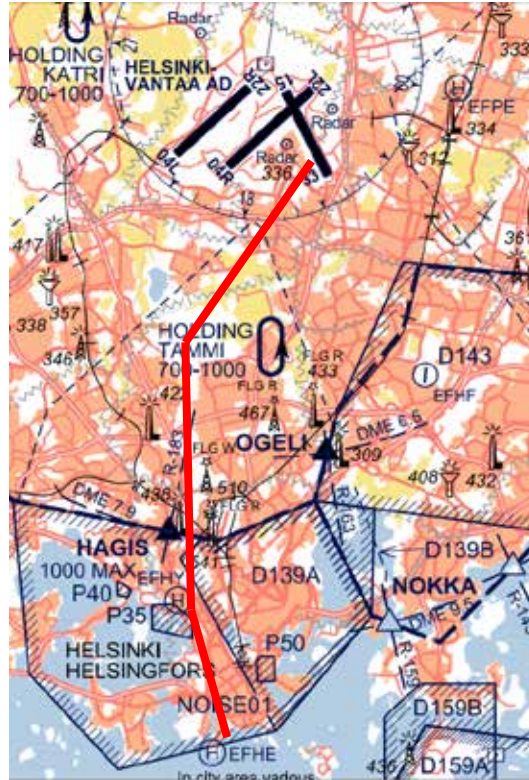
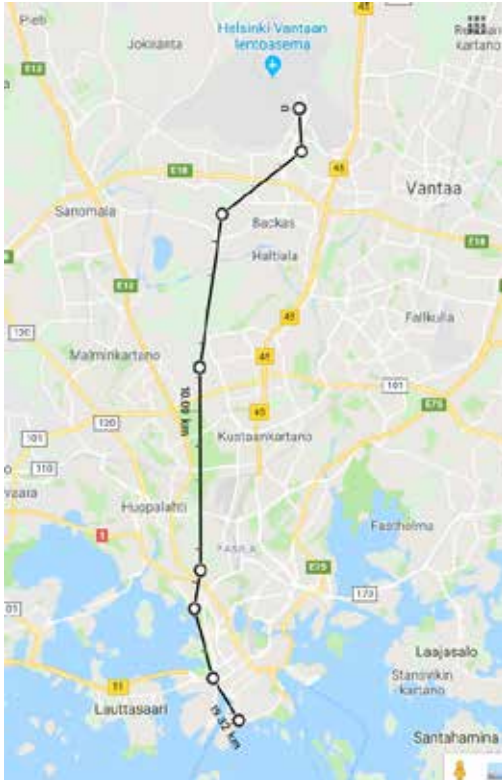
FINLAND



FIMS handover at FIR border

ESTONIA

Manned AirTaxi flight from EFHK CTR to Helsinki city



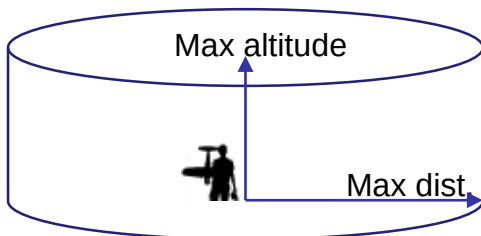


Tracking both drone position (safety) and operator position (security)

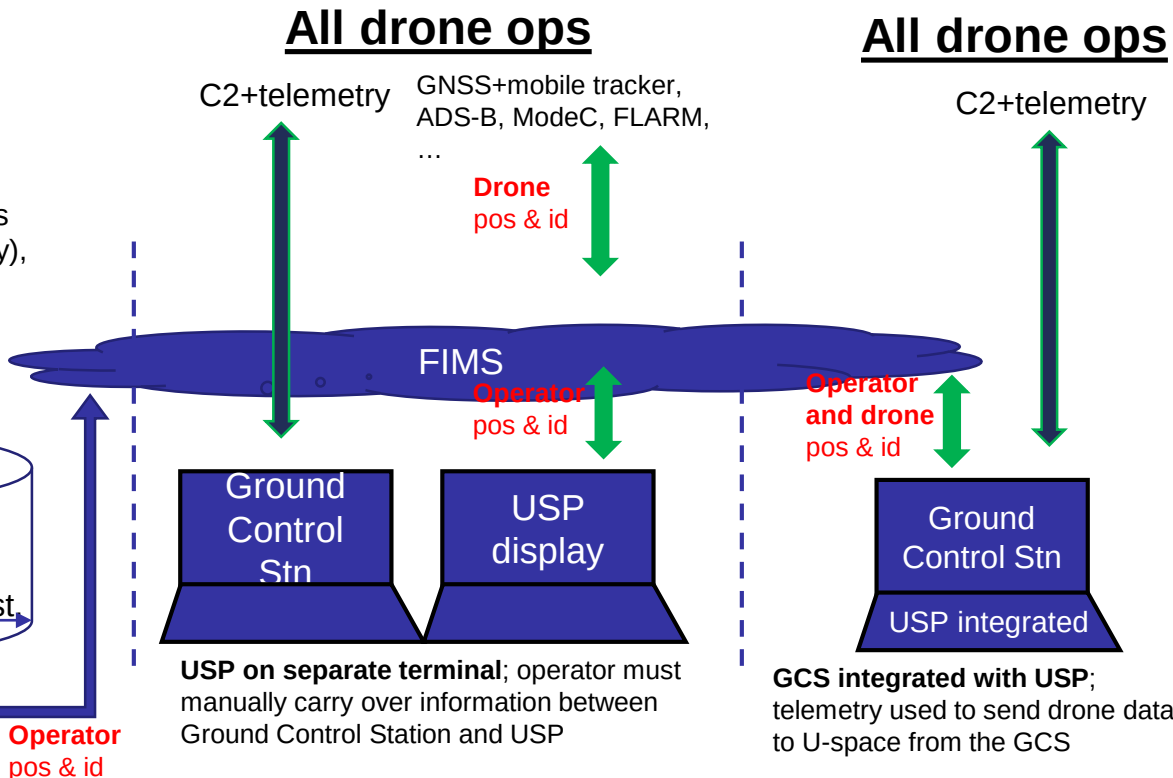
VLOS only

Drone position not visible in U-space

- Open Drone ID –type solutions (no safety impact; security only), or
- No connectivity (Model Club airfields)



USP on mobile device
"I stand here and fly VLOS"





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Engaging stakeholders to
demonstrate U-space!



Peter Alty – Project Coordinator
13MARCH2019

PODIUM aims:

- **Demonstrate** U-space services, procedures and technologies at Odense in Denmark, Bretigny and Rodez in France, and Eelde in the Netherlands until mid 2019
- Provide agreed **conclusions** on the maturity of U-space services and technologies – backed by evidence on flight efficiency, safety, security and human performance metrics etc. – when used in defined operational scenarios and environments
- Provide **recommendations** on future deployment and for regulations and standards

Managing expectations!!

6 weeks preparation for a 10-minute flight!

The power of unofficial data!

We can't see the drones!

Fire! I need a protected fly zone now!

Avoid multiple systems!

What's the big (U-space) picture?

Return to home in a CTR!

Can a machine understand our drone rules?

Frequencies approved?

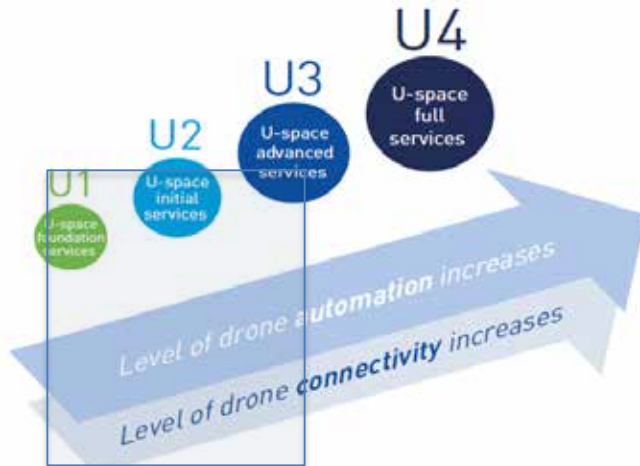
That tracker isn't certified!

BVLOS? In a CTR? >45m?



See & Avoid?





- Operator, supervisor...roles
- registration & identification
- No-fly zones generation
- automatic flight plan validation
- automatic & manual flight permission
- drone location & tracking
- conflict detection/alerting

- Airspace, legislation data
- Automated, web-based core..
- Fusion, air picture, CWP
- Secure gateway, Access Point Network
- Tracking: GSM, ADS-B/1090 MHz, UNB/L-band

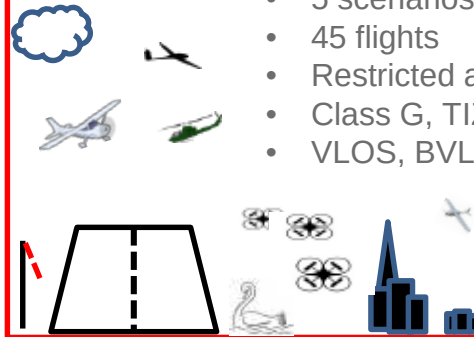
BRETIGNY – enhancing business operations

- 5 scenarios
- 100+ flights
- Reserved Zone
- CTR vicinity
- VLOS, BVLOS



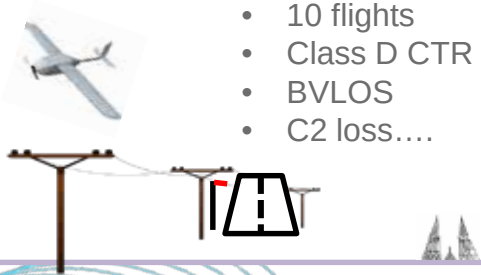
ODENSE – enhancing drone interface with aviation environment

- 5 scenarios
- 45 flights
- Restricted airspace
- Class G, TIZ, AFIS
- VLOS, BVLOS



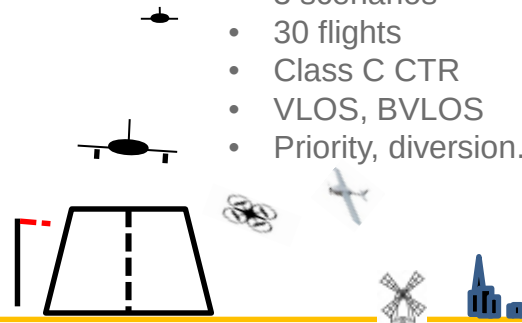
Rodez - entering/exiting CTR, ATCO interactions

- 5 scenarios
- 10 flights
- Class D CTR
- BVLOS
- C2 loss....



EELDE – “unexpected” scenarios

- 3 scenarios
- 30 flights
- Class C CTR
- VLOS, BVLOS
- Priority, diversion..

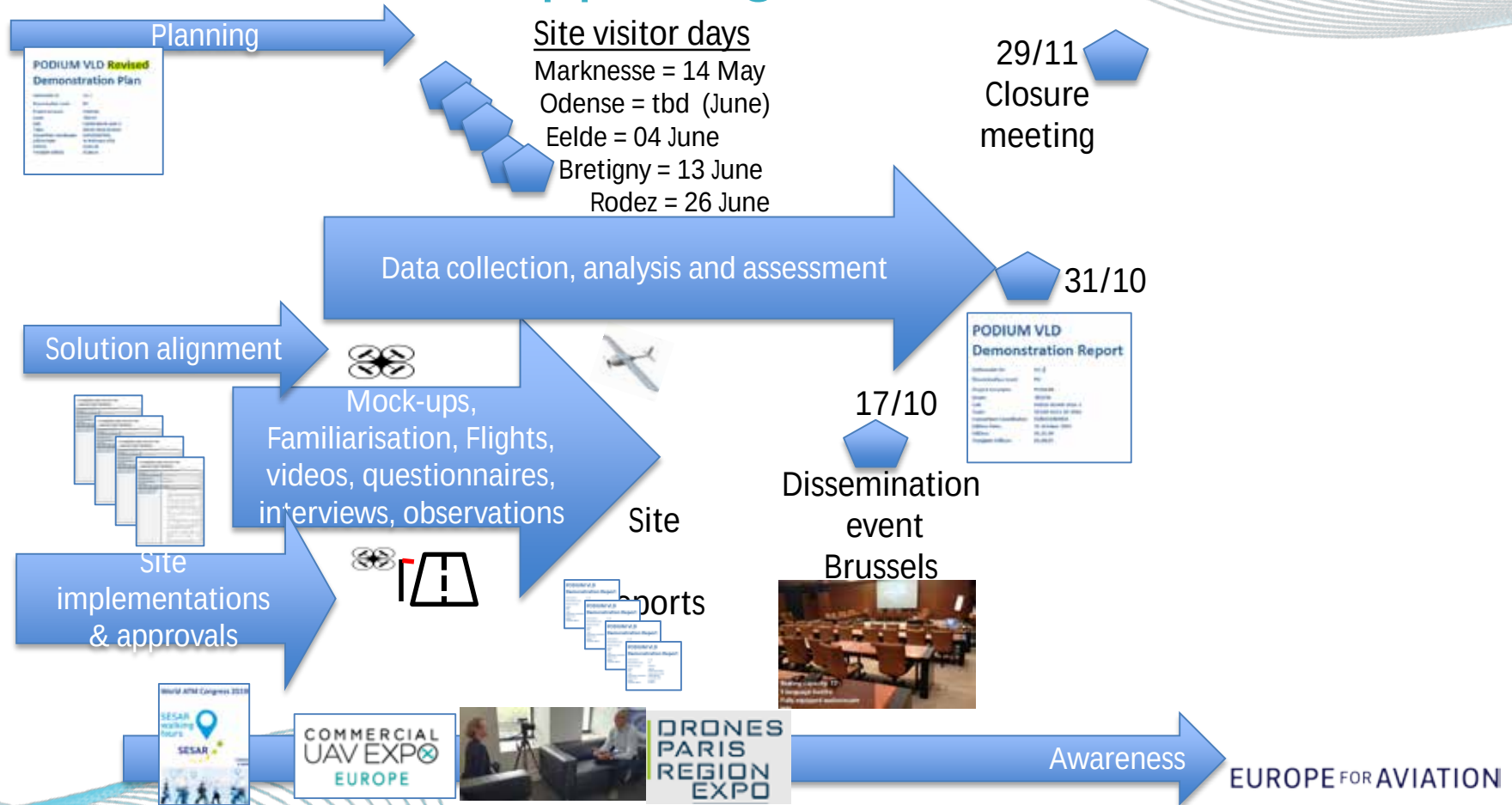


Mock-ups!



**Hands-on
engagement J L**

What is happening in 2019!



PODIUM in the Big U-space picture?



- CORUS U-space CONOPS
 - *Feedback & alignment*
- European U-space Demonstrator Network
 - *Contribution to...*
 - *EASA U-space regulatory framework?*

Pushing European interoperability



Engage!

AIRBUS



INTEGRA

DELAIRTM
AERIAL INTELLIGENCE

DRONES
PARIS REGION

NAVIAIR

UNIFLY



DSNA

U-space PODIUM



171 followers
2w • Edited

What will happen in 2019! Lively **U-space PODIUM** consortium meeting today planning the flights, videos, interviews, questionnaires and observations leading up to the visitor days at Odense, Bretigny, Eelde and Rodez before end June ...see more





Drones for maritime surveillance

Developments of the U-Space Madrid 13 March 2019

Helena Ramón Jarraud
Head of Unit
Maritime Surveillance

Oil spill
response

Emission
monitoring

Anti
Piracy

Fishery
control

Search
and
rescue

Border
control

Trafficking

§ Safety of Navigation

- § Traffic separation schemes
- § Search & Rescue (SAR)
- § Maritime accidents & disasters

§ Logistics & Customs

§ Pollution:

- § Oil Spills
- § Air Emissions (Sox)

§ Security & threat of terrorism

§ Piracy & armed robbery

§ Migration & people trafficking

§ Trafficking of contraband, weapons, or narcotics

§ Fishing:

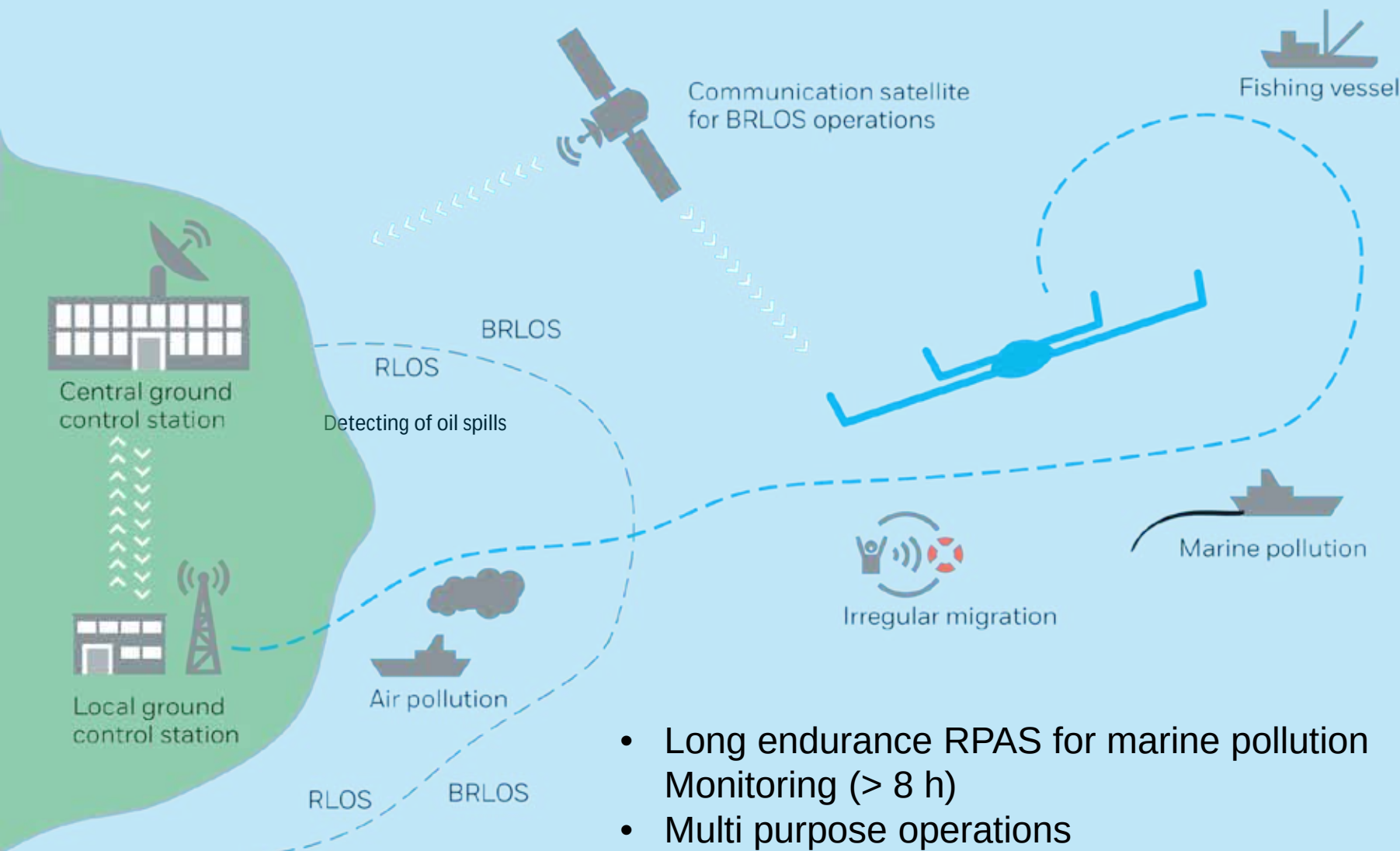
- § Illegal, Unreported, Unregulated



MEMBER
STATES



EMSA RPAS: Multi-Mission Capability



- Long endurance RPAS for marine pollution Monitoring (> 8 h)
- Multi purpose operations
- Beyond radio line of sight operations
- RPAS capable to resist harsh environments

4 RPAS operations ongoing since 2018

8 additional ones launched in 2019

Operation	Start of Service	End of service	Users
Portugal, Algarve Maritime surveillance and law enforcement	12/09/2018	May	FRONTEX/ GNR/ Portuguese Air Force/ Fisheries
Croatia Maritime surveillance	29/09/2018	April	Ministry of Sea, Transport and Infrastructure, MRCC Rijka, Split harbour master, Split VTS
Spain, Atlantic Maritime surveillance	04/10/2018	Ended 29 February	Customs, Sasemar, Fisheries authorities
Greece, Gulf of Piraeus Emission monitoring	15/10/2018	June	Hellenic Coast Guard National Laboratory



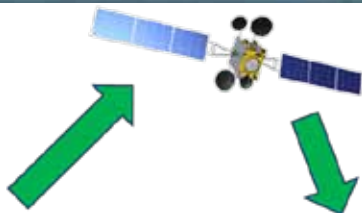
2016 contracts



Main Service	Endurance	Size	Lift-off	Particularities
Maritime surveillance	8-10 h	150 kg	Runway	EO/IR, AIS, EPIRB Satcom, Maritime Radar
Maritime surveillance	>7 h	110 kg	Runway	EO/IR, AIS, EPIRB (Satcom)
Emissions / Maritime Surveillance	6 h	25 kg	Runway (Catapult)	EO/IR, AIS, EPIRB (SOx)
Emission monitoring	6 h	30 kg	Runway (Catapult)	EO/IR, AIS, SOx sensor

RPAS portfolio

2018
contracts

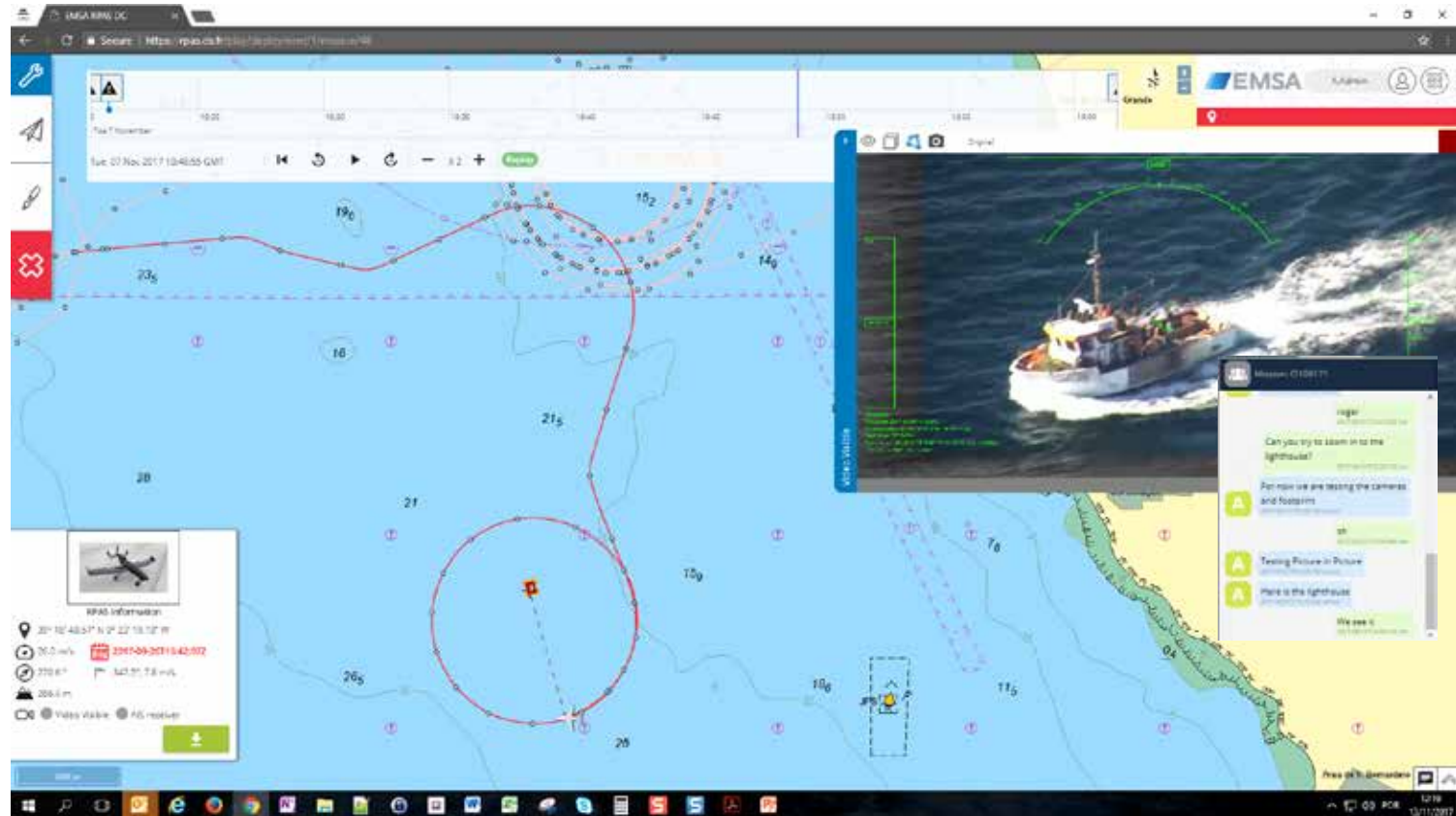


Main Service	Endurance	Size	Lift-off	Particularities
Maritime surveillance	Up to 18 h	1150 kg	Runway	EO/IR, AIS, EPIRB Satcom, Maritime Radar
Maritime surveillance	>4 h	>150 kg	VTOL (From vessels)	EO/IR, AIS, EPIRB
Emissions / Maritime Surveillance	>4 h	>150 kg	VTOL	EO/IR, AIS, SOx/NOx sniffer
Pollution response	>20 min	<25kg	VTOL (From vessels)	EO/IR (not via RPAS-DC)
SATCOM services to support RPAS				RPAS to ground Ground to ground (3 contracts)

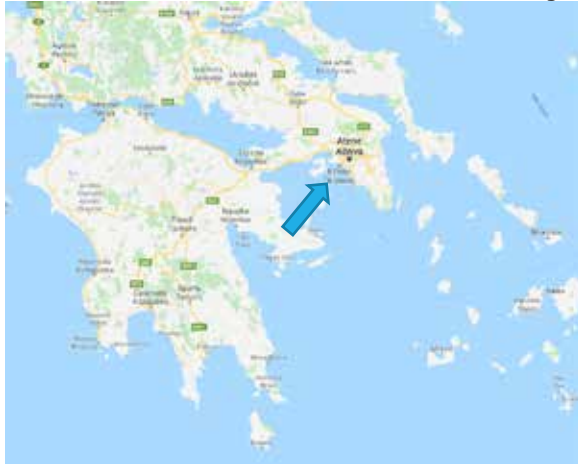
- q Common visualization and command interface for all RPAS operations;
- q Integration of RPAS data into existing EMSA Maritime Picture
- q Real-Time Local Situational Awareness
- q Mission Command by User

Features:

- Live Video;
- Map view;
- Live Chat with Operators;
- Draw locations/areas of interest on the map and communicate with Operators;
- Export of mission data during and post mission;
- Full mission replay.



Permit to Fly in Greece for RPAS Emission monitoring operations with Altus



- PtF released on 29 August 2018 for Ournaos platform (less than 25kg – Class C) operated by Altus certified operators (Pilots and Class C instructors)
- Documents requested for the PtF: Risk analysis, flights profile, certifications of the pilots and insurance.
- Conditions for the flight:
 - Maximum Flight Height up to **120 meters (400ft MSL)**
 - Flight is forbidden over people – people gathering and such facilities and it is necessary to take all security measures (Insurance Policy, etc.)
 - Flight is forbidden half an hour before sunrise and beyond half an hour of sunset
 - Prior to the flights, it is necessary to inform the Athens Approach Air Traffic Directorate for the start and end of the flight
- The Airspace was not segregated (No NOTAM)



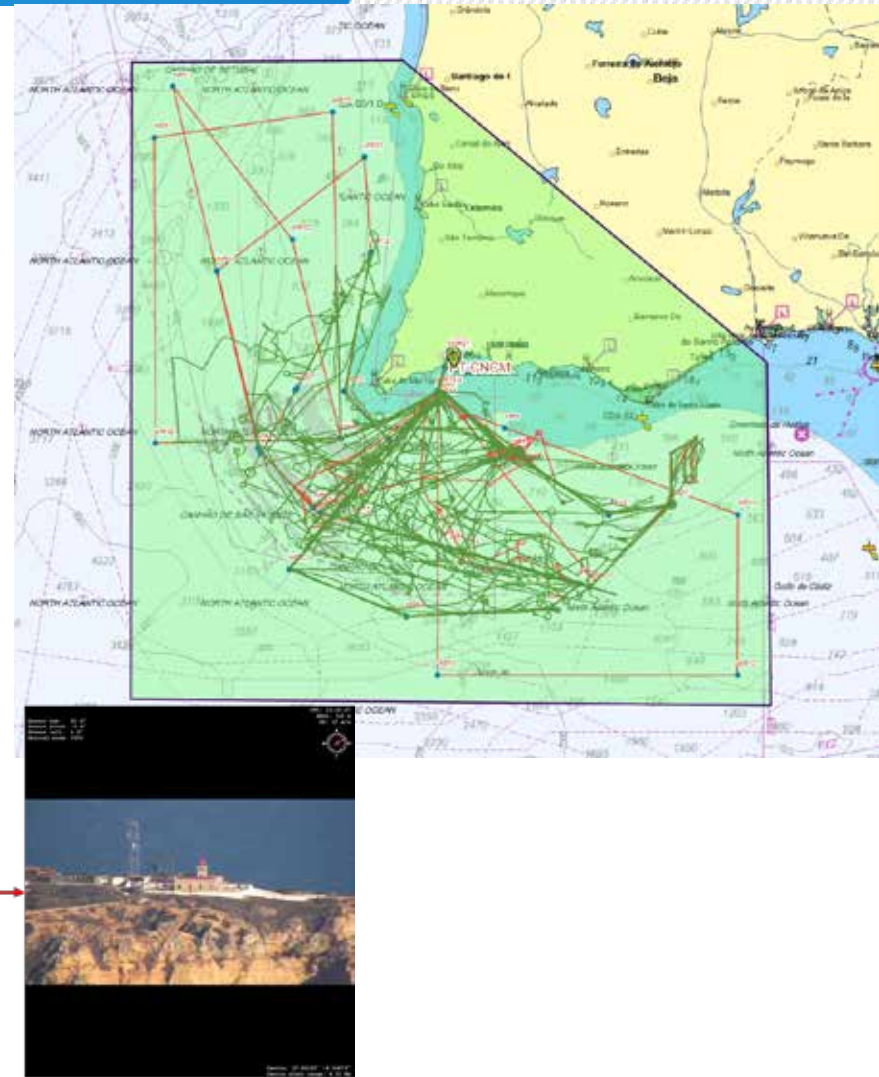
Example Portugal

Segregation of Airspace per areas plan

Aviation transponder Segregation of Airspace per areas planned weekly with NOTAMs

- **LISBON**
 - Deployment Manager (PoAF)
 - End-users (Data Center – DGRM, COMAR, CA, GNR/UCC, PJ, SEF, ASAE, DGAIEC, ASN, etc)
- **LAGOS Airfield**
 - Runway and hangar
 - Alternate Ground Control Station (GCS)
- **PONTA DA PIEDADE Lighthouse**
 - Main Ground Control Station (GCS)
 - Communication antennas
 - Mission Manager (PoAF)

11.300 nm²



Example Spain

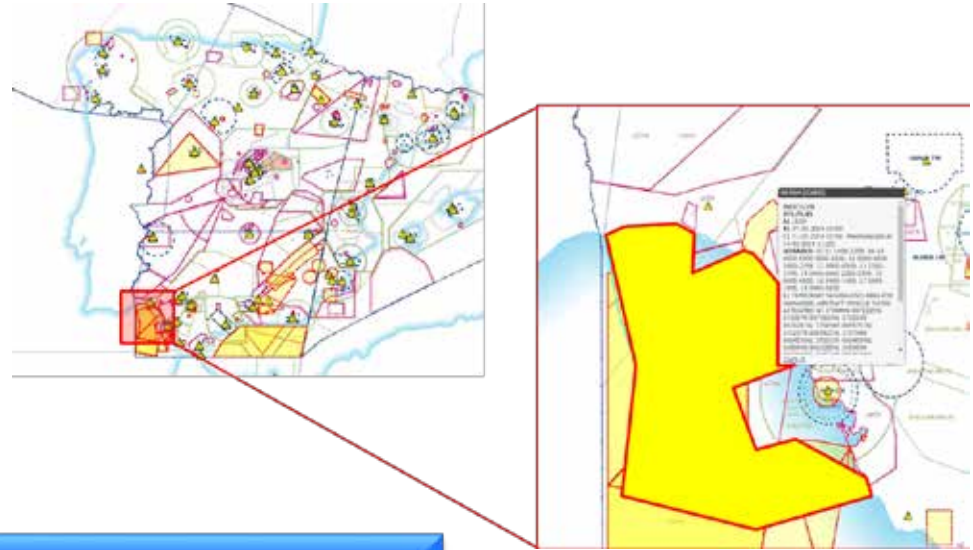
Segregation of Airspace in low traffic density area

1. Air Space Management:

- Regulation: segregation of airspace corresponding to the area of interest
- Feasibility study: safety assessment and impact on other airspace users
- NOTAM request: 15 days in advance
- Take off clearance request: 30 minutes before T-O
- Operations conducted in day and night time conditions

2. Area of operations:

- Base: Almonte Aerodrome (unpaved runway) with low density traffic
- Maximum range: 100 km (limited due to runway constraints)
- Operational area: Gulf of Cadiz



Model: REACT AR5
Twin engine configuration
MTOW – 150 kg
Endurance – 8 h
Communication: LOS and SATCOM



EO/IR cameras
Maritime radar
AIS receiver
Distress sensor (EPIRB)
Laser Illuminator

Example Croatia

Dynamic segregation of Airspace

Air space segregation concept: dynamic activation of temporary restricted areas (11 TRAs)
Operational range: 50 km (red circle in image below)

Classe-I (Ogassa)
MTOW – 35 kg
Payload – 5/6 kg
Endurance – 8 h
Min Altitude – 1.000 ft
Max Altitude – 3.000 ft
(altitude limitations are ATC restrictions)



Gimble (EO, IR)
Recetor AIS
Transpondr
Recetor EPIRB



- q **RPAS is confirmed to be a very promising tool for maritime surveillance complementing other surveillance means (manned aircraft, Earth observation through satellites, reporting from vessels...)**
- q **New RPAS operations in 2019 in Iceland, Denmark, France, Greece, Croatia, ...**
- q **Continued cooperation with National Civil aviation authorities and EASA to obtain permits to fly.**
- q **Integrating of the RPAS flights with as less interference as possible to manned air traffic is critical to have the service fully operational in the civil domain.**



Thank you – Questions?

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