



U-space : état d'avancement et perspectives

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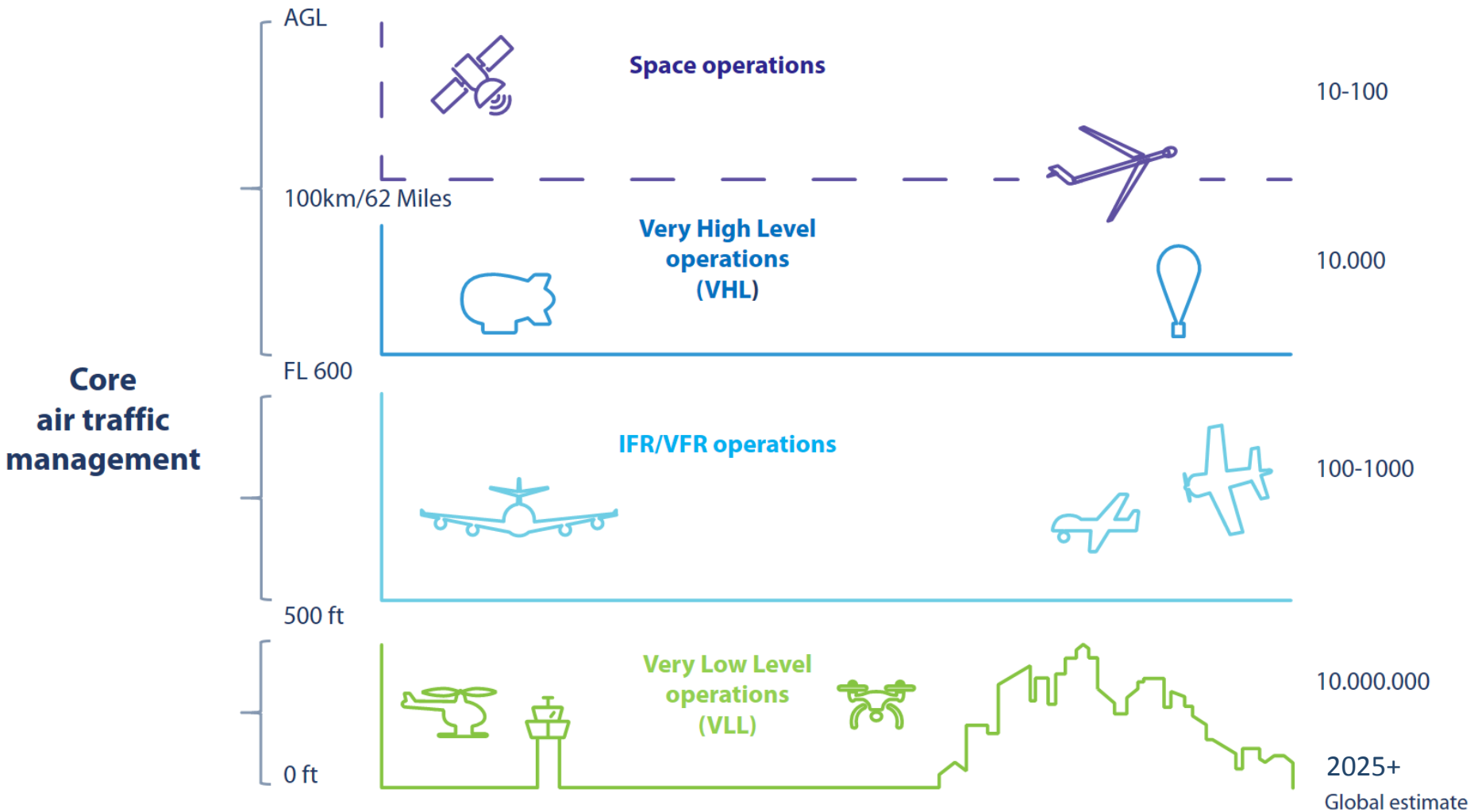
Paris, 9 July 2019



Founding Members



L'espace aérien et les nouveaux entrants



Vers l'intégration des drones dans l'espace aérien



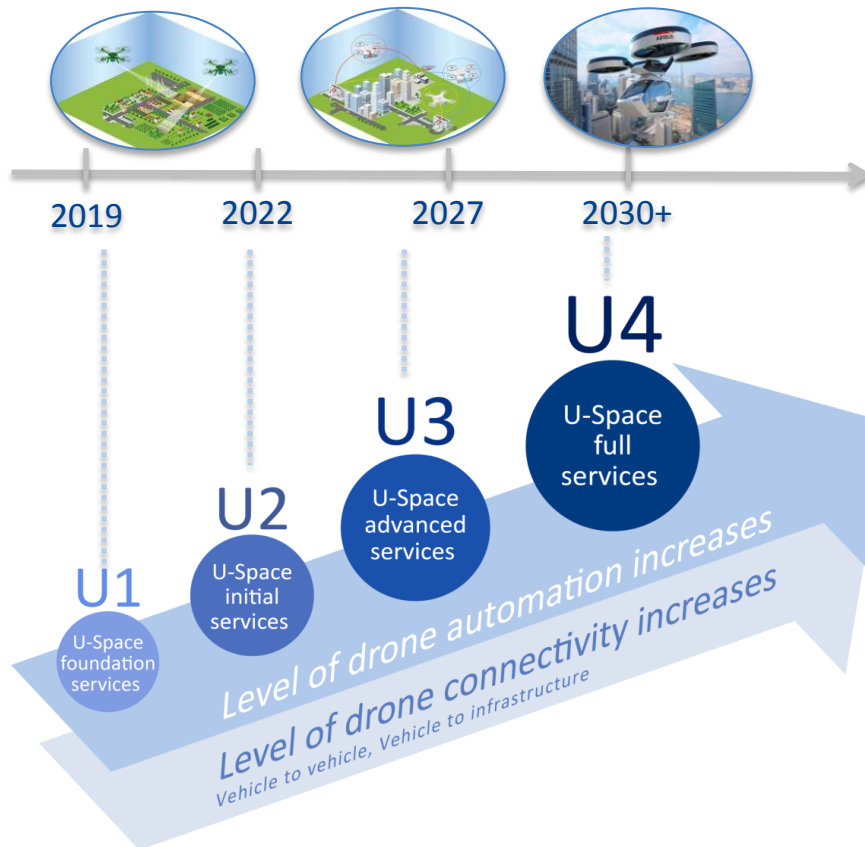
European ATM Master Plan:
Roadmap for the safe integration of drones
into all classes of airspace



U-space



U-space



U1

Foundation

- e-registration
- e-identification
- geofencing

U2

Initial

- planning & approval
- tracking
- airspace dynamic information
- procedural interface with ATC

U3

Enhanced

- capacity management
- assistance for conflict detection

U4

Full

- integrated interfaces with manned aviation
- additional new services

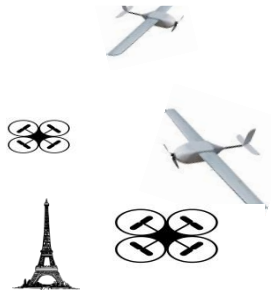
Project	Country	Environment	Area survey	Parcel delivery	Linear survey	Point survey	UAM	Leisure	Emergency / SAR	External
DIODE		-Rural -Sub-urban -Airport	-Agriculture -Archaeo -Road traffic	Ad-hoc	Electricity rail	-On airport -Photography	n/a	Yes	-Firefighting -SAR	-Manned a/c -ATC -V21
DOMUS		-Rural -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
GEOSAFE		-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

PODIUM

Proving Operations of Drones with Initial UTM



BRETIGNY – enhancing business operations



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

ODENSE – Regular drone usage and interoperability with manned aviation



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

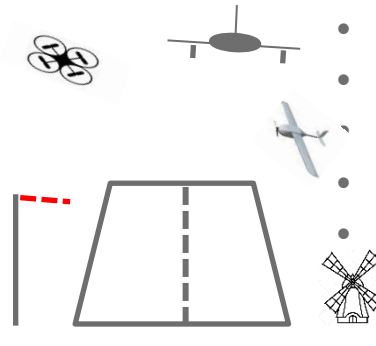
Commercial,
urgent
delivery &
agricultural
missions

RODEZ - entering/exiting CTR, ATCO interactions



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

MARKNESSE & EELDE – “unexpected” scenarios



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

AIRBUS



INTEGRA

DELAIR












NAVIAIR

UNIFLY





 Environment	 Area survey	 Parcel delivery	 Linear survey	 Point survey	 UAM	 Leisure	 Emergency / SAR	 External
-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

The project aims to demonstrate services with a special focus on **e-identification** and **registration, surveillance** and **tracking, scheduling**, and **dynamic airspace management** (including generation and management of no-fly/restricted zones).

The main demonstration objective is to show the services are capable to support all **BVLOS operations**, all EASA's categories of drones, and **all population densities**.

THALES



ALTA METRIS



GeoSAFE

GEOfencing for Safe and Autonomous Flight in Europe

U2

U3

GEOSAFE



To establish state-of-the-art of existing geofencing solutions regarding the 3 U-space level:

- **Pre-tactical geofencing**
- **Tactical geofencing**
- **Dynamic geofencing**



- 290 tests (rural and urban environments) near restricted areas/within a geofenced volume/in degraded environment
- 16 drones
- 18 mission planners
- 7 objectives to test

Next demo - 24 September

Contact : Communication.AVS-FLX@fr.thalesgroup.com



THALES

SPHENGINEERING
SMART PLANES & HELICOPTERS



GEOSAFE

AEROMAPPER
GEOGRAPHY FOR YOUR BUSINESS

techsys
DRONES & AVIATION SYSTEMS

AIRMAP

VUTURA

Validation of U-space by tests in urban and rural areas

The demonstration is showing **multiple U-space service providers** can cooperate in a same geographical area.

Missions:

- Agricultural surveillance
- Surveillance of a nuclear power plant
- Leisure
- Package delivery
- High priority **drone for medical emergency delivery**



GOF USPACE

Finnish-Estonian "Gulf of Finland" very large U-space demonstration

U2

U3



The demonstration is showing that a **federation of U-space service provider micro-services** is relevant to collectively manage all drone traffic in the same geographical region

Aims to establish **architecture** test-beds capable of integrating existing commercial-off-the-shelf UTM components



Demonstration series will be completed by an urban Volocopter **air taxi flight** from the Vantaa international airport in **Q3 2019**



Urban drone fleet ops in Helsinki with Police intervention



Co-operation with Search and Rescue forces and general air traffic (GA)



Maritime traffic surveillance combined with border guards over Gulf of Finland



International parcel delivery between Helsinki and Tallinn



Urban drone fleet ops in Tallinn in controlled airspace

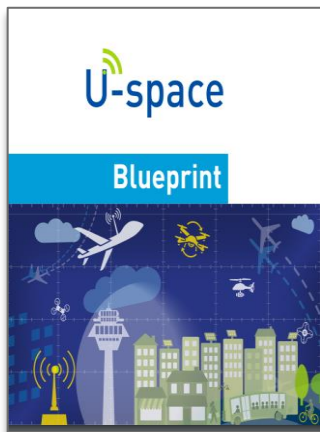


100km+ inspection flights in forestry and utility inspection

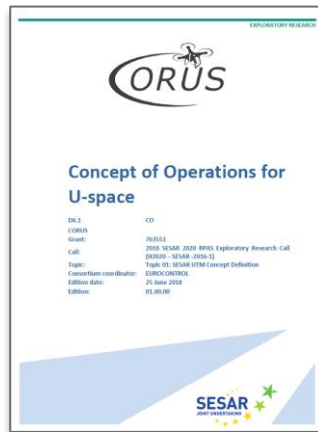


Urban Air Mobility flight from Helsinki-Vantaa airport to downtown Helsinki

2019, une année importante pour le U-space



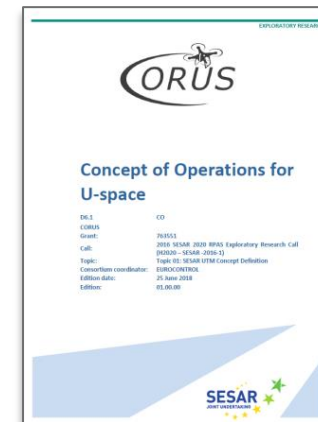
June.2017



2nd edition-Feb.2019



Draft public-Feb 2019



3rd edition - end 2019

Programme consolidation
(up to Feb. 2020)

Demonstrations prepaion (U1-U2)
10 projects

Flight trials

Conclusions

Other U-space projects deliveries (U3+)
9 projects, more than 100 technical deliverables



Guidance Material (GM), Acceptable Means of Compliance (AMC)

2018

2019

Oct.

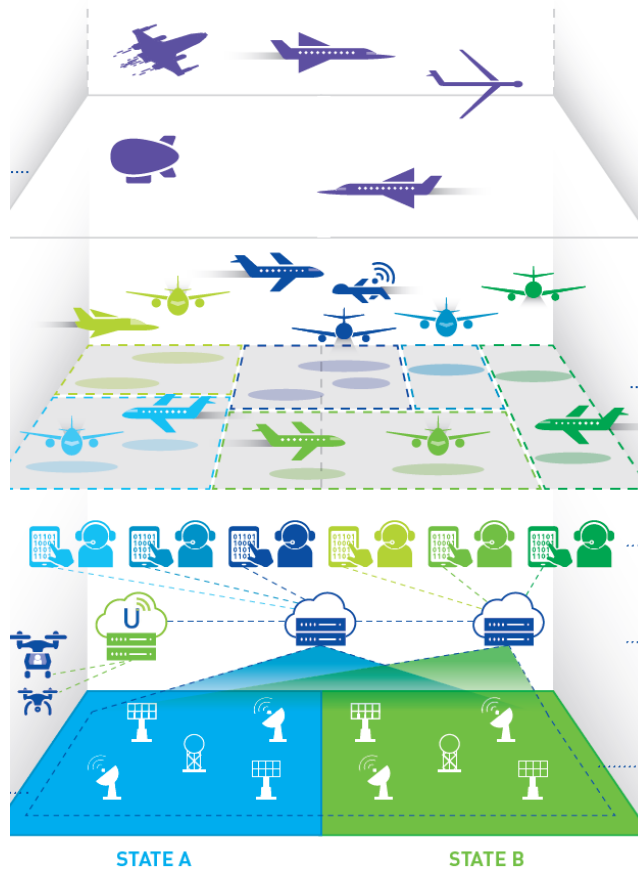
Jan.

Apr.

Jul.

Oct.

Vers un ciel européen "digital"



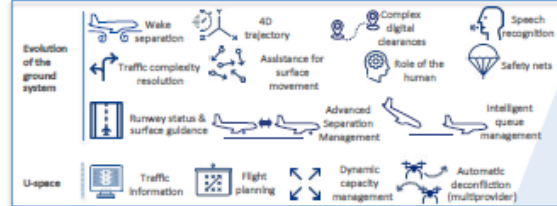
SESAR Solutions (delivered/in the pipeline)

Future innovations

Airborne automation



Ground automation



Automation levels

Progressive levels of automation

Virtualisation



Connectivity



Data sharing



New standards for safety and security



Thank you very much
for your attention!



Founding Members



EUROPEAN UNION



EUROCONTROL