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Drone Enable/2 Symposium

ATM & UTM INTEGRATION

INDRA VISION

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INDRA: GLOBAL ATM LEADING COMPANY

4000
facilities

over
160
countries

-  ATC Partners for ACC/APP
-  TWR, COM, NAV and SUR Partners

Automation/simulation
400 systems

Nav aids
2800 systems

Surveillance
400 systems

Communications
550 systems

Aeronautical Info.
100 systems

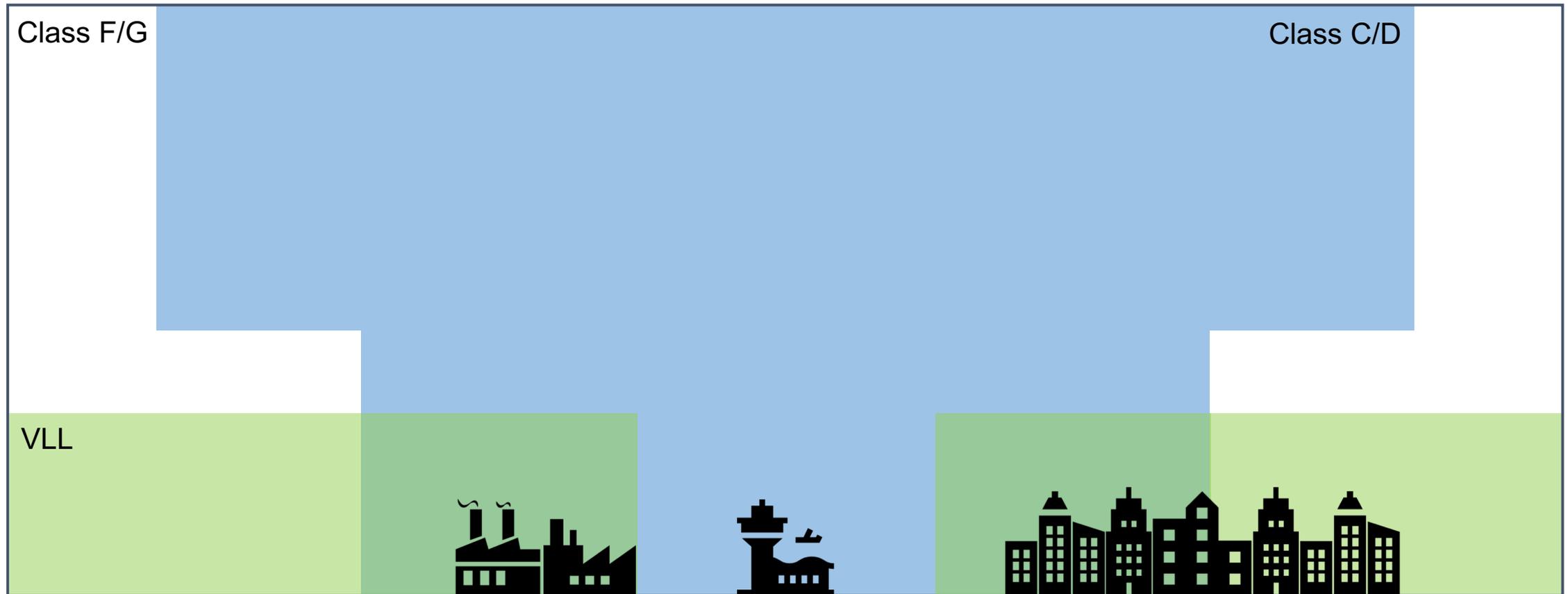


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ATM-UTM BOUNDARIES



- To boost the economic potential of drones, VLL airspace may overlap with airspace C/D.
- It will be necessary to redefine airspace structure (in the long term) and define clear priorities.
- In the short-medium term an integration ATM-UTM is essential.

UTM-ATM INTEGRATION

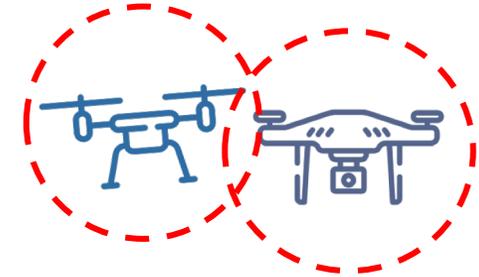
Assumptions



The target of this integration are drones flying in **VLL and classes F/G close to controlled airspace**



Drones flying in controlled airspace (**'IFR like'**) are considered as manned aircrafts.



The **drone pilot** is responsible of keeping **separation with other vehicles**

Key points



Minimize changes to ATM systems:

- Safety
- Money



Compatible with **U-Space Roadmap**



Gradual integration in **4 phases**, considering the growth of the drone fleet.

UTM-ATM INTEGRATION. PHASE I

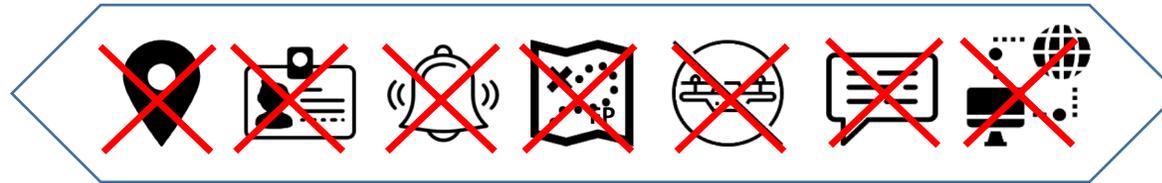
PHASE I

PHASE II

PHASE III

PHASE IV

ATM



UTM

- ATM and UTM systems are independent.
- The main problem is in the vicinity of airports, so the first ATS centers affected are TWRs and TMAs.

- UTM Auxiliary Display in ATS centers
- Inclusion of drone models in simulation for controller training
- Deployment of counter-drone solutions

The isolation between ATM and UTM is the current situation in most countries. Phase I is only a temporary solution to increase safety, especially close to airports. Phase II has to be deployed as soon as possible.

UTM-ATM INTEGRATION. PHASE II

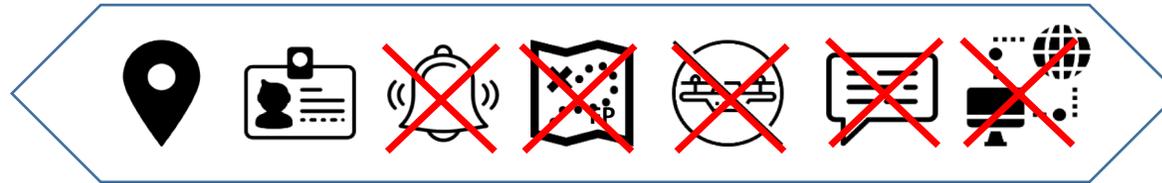
PHASE I

PHASE II

PHASE III

PHASE IV

ATM



UTM

Information exchanged:

- Tracking/surveillance information: Enhanced Asterix 62
- Identification information (drone and operator data)

- In ATS centers the complete picture of air traffic situation is available, including drones.
- Controllers can contact the drone operator manually using the identification information.

Phase II increases situation awareness providing a complete air situation picture, including drone data and operator contact information. The Phase II will be completed in 2020.

UTM-ATM INTEGRATION. PHASE III

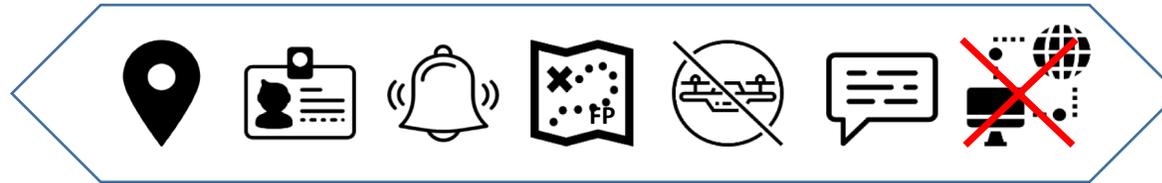
PHASE I

PHASE II

PHASE III

PHASE IV

ATM



UTM

Information exchanged:

- Same as Phase II
- Drone Flight Plan (FIXM)
- Alerts (Asterix 4)
- Geofence information
- Communication functionalities (messaging or VoIP)
- In ATS centers the complete information about drone traffic is available.
- The controller can contact the drone operator automatically through messages or VoIP

Phase III achieves a complete situation awareness, knowing where the vehicles are and its planned mission. The information is filtered and only the essential one is shown in ATC systems. Phase III will be deployed in 2025.

UTM-ATM INTEGRATION. PHASE IV

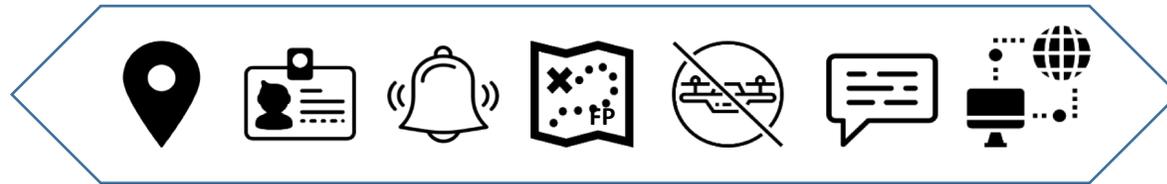
PHASE I

PHASE II

PHASE III

PHASE IV

ATM



UTM

Information exchanged:

- Seamless integration between ATM-UTM systems
- Silent Coordination
- Authorizations from ATM to UTM (exceptional cases)

Phase IV reaches a complete integration between both systems. From ATM system special clearances can be transmitted to drone operators through the UTM system. This phase shall be deployed with U3 services.

European R&D and Demonstrations Projects

- **SAFEDRONE Project** (CALL H2020-SESAR-2016-2):
 - Led by Indra
 - U-Space demonstrations
 - Integration ATM-UTM: Phase II
- **DOMUS Project** (CALL CEF-SESAR-2018-1 U-SPACE):
 - Led by Enaire (Spanish ANSP)
 - U-Space demonstrations: 'Ecosystem Manager'
 - Integration ATM-UTM: Initial Phase III



International Internal Projects

- **ATM-UTM Integration Pilot Program** with some customers
- **International ATM-UTM Integration Survey:**
 - Objective: To define the information relevant for ATM users (Controllers, Supervisors) from the UTM system and improve the Phased Approach
 - Target group: International ANSPs
 - Surveys Launch: End 2018
 - Expected results publication: 1st quarter 2019
 - If you want to participate, contact me: phervias@indra.es



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Thank you for your attention

谢谢

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