

Demonstrating U-space services in an airport environment – DOMUS project

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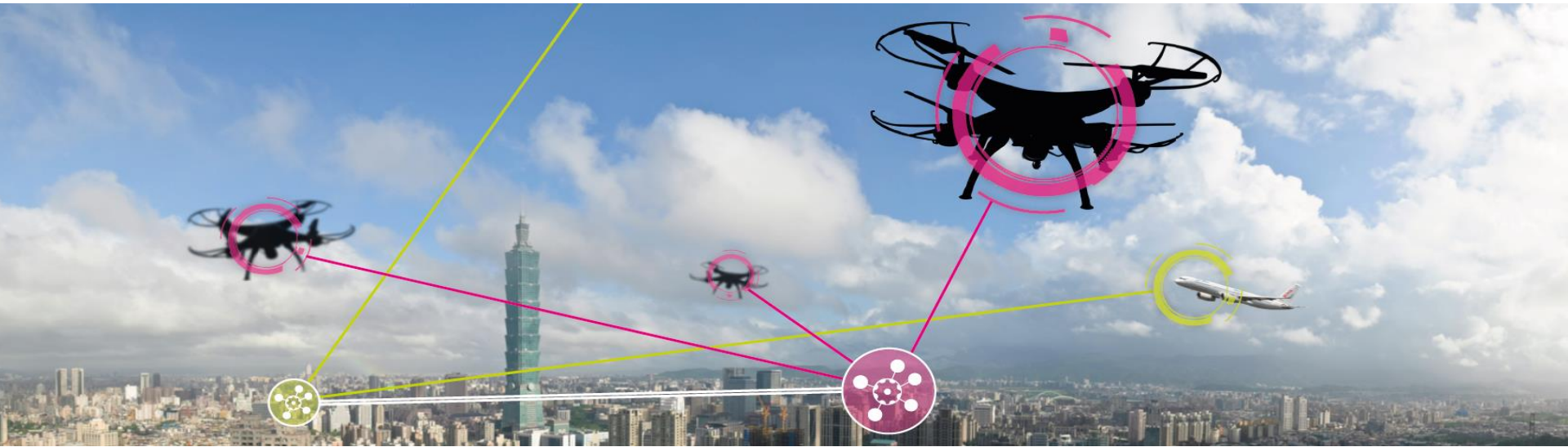






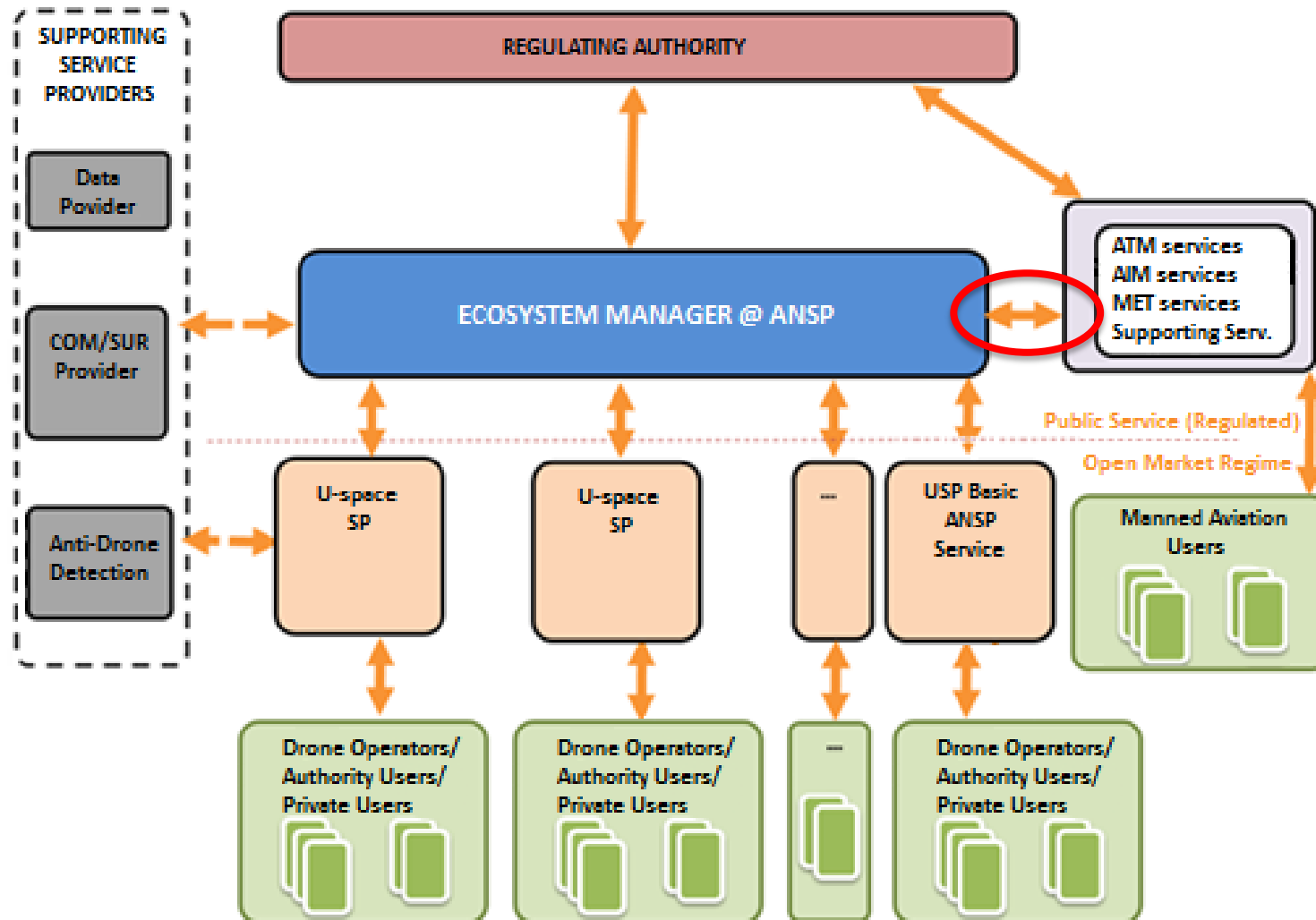


Key points for ATM-UTM integration

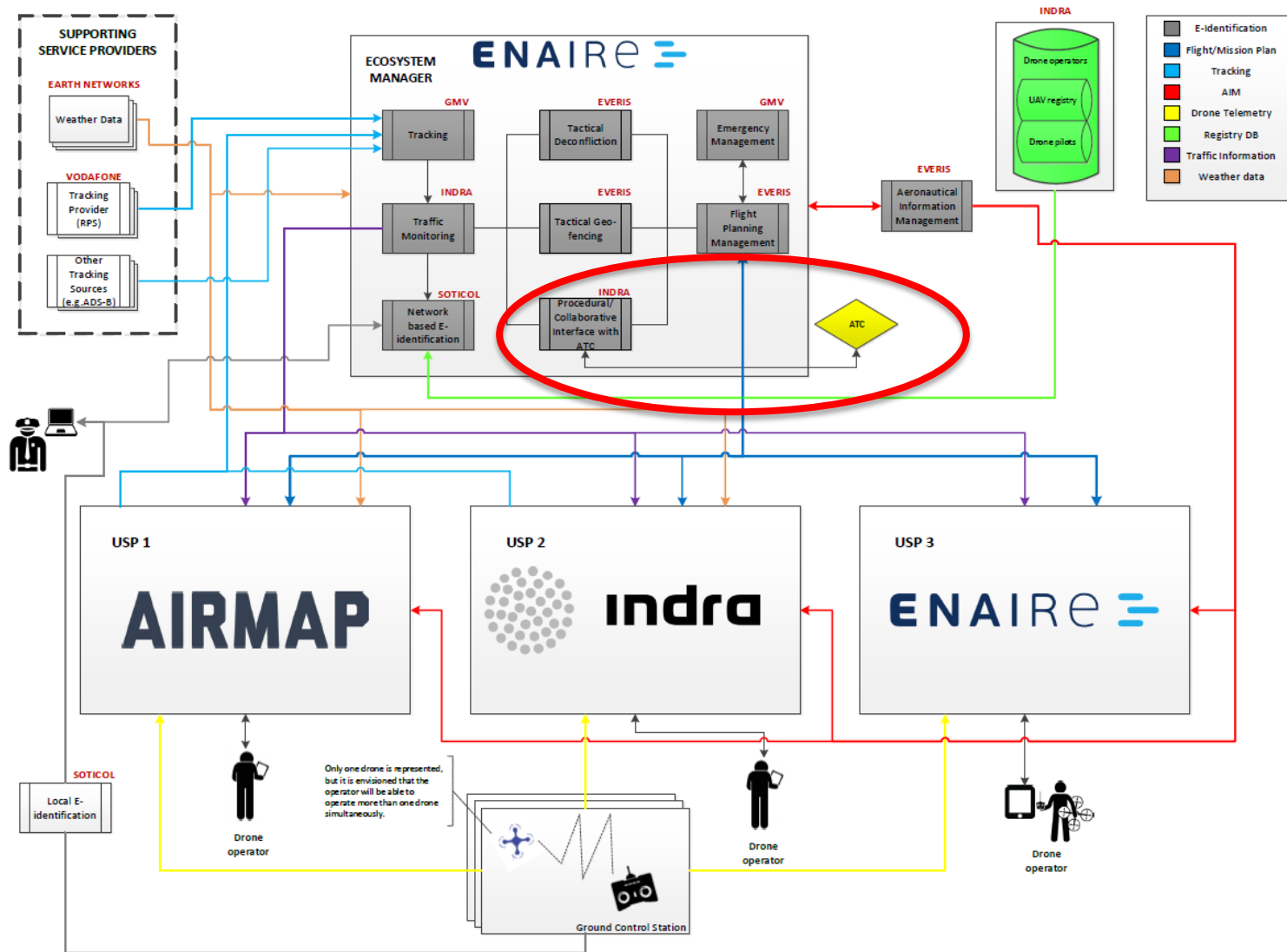


- Integration of manned and unmanned traffic (specially in critical situations) in a **unique display** is essential to increase the **situational awareness**. Only relevant information from UTM is displayed in ATM systems, for example in case of alerts/emergencies close to airports or controlled airspace, in order to minimize the impact on the operation, in particular workload for the ATCO in operation.
 - This information can be initially shown in an **auxiliary display** and later can be incorporated in current positions of supervisors or controllers.
- This integration is made **minimizing changes in ATM**, to reduce costs and maintain safety
- The first centers affected will be the **Towers**, to avoid incidents and allow airport drone operations

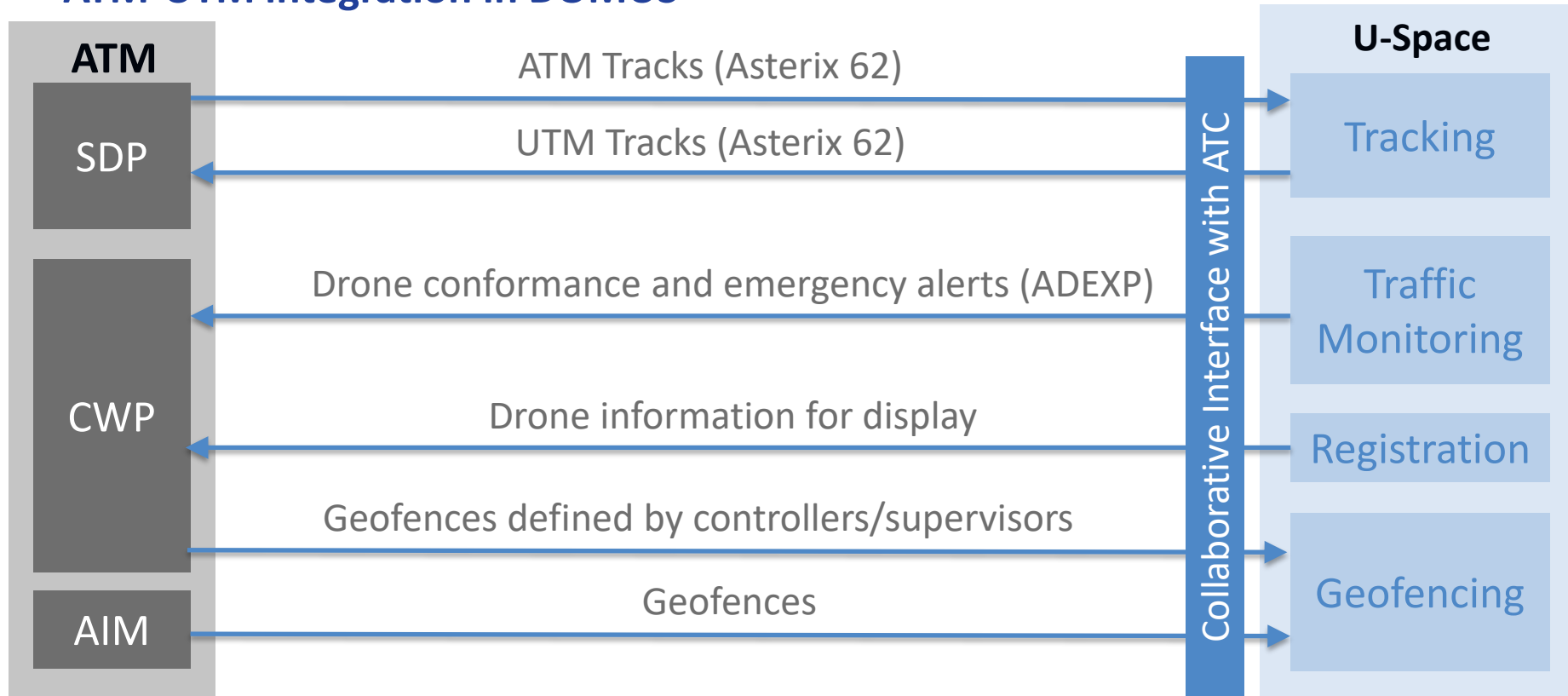
DOMUS Architecture



DOMUS Architecture




ATM-UTM integration in DOMUS




- Minimum changes in ATM are required:
 - UTM is considered as an external surveillance provider
 - CWP is slightly modified to display and filter the information



**The diagram has been simplified*

UTM Display


indra

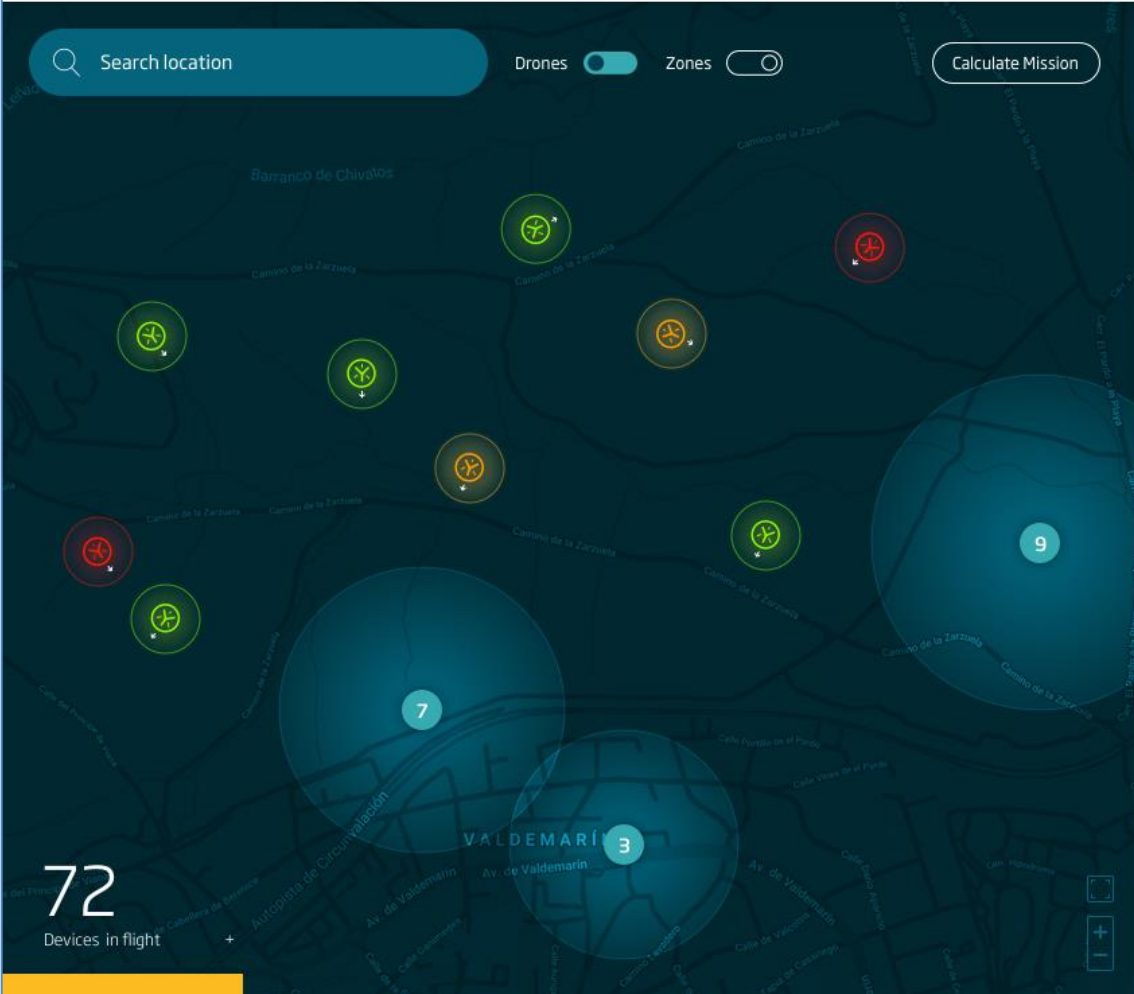
09:25 Monday 8th Nov 2018


Max. 28° Min. 12°

Drones ☒ Zones ☐

Calculate Mission







72
Devices in flight




MISSIONS

ID	Description	Status
2367	Taking photo & video footage	Executing
1065	Recreational flight	Executing
6578	The priority has been set for surveillance...	Executing
2367	Security flight	Completed

ALERTS

Level	Description	Time
	Security and surveillance control	09:11
	AESA Maintenance	11:20
	Hard wind	12:45
	Rain	16:05

PILOTS & DRONES

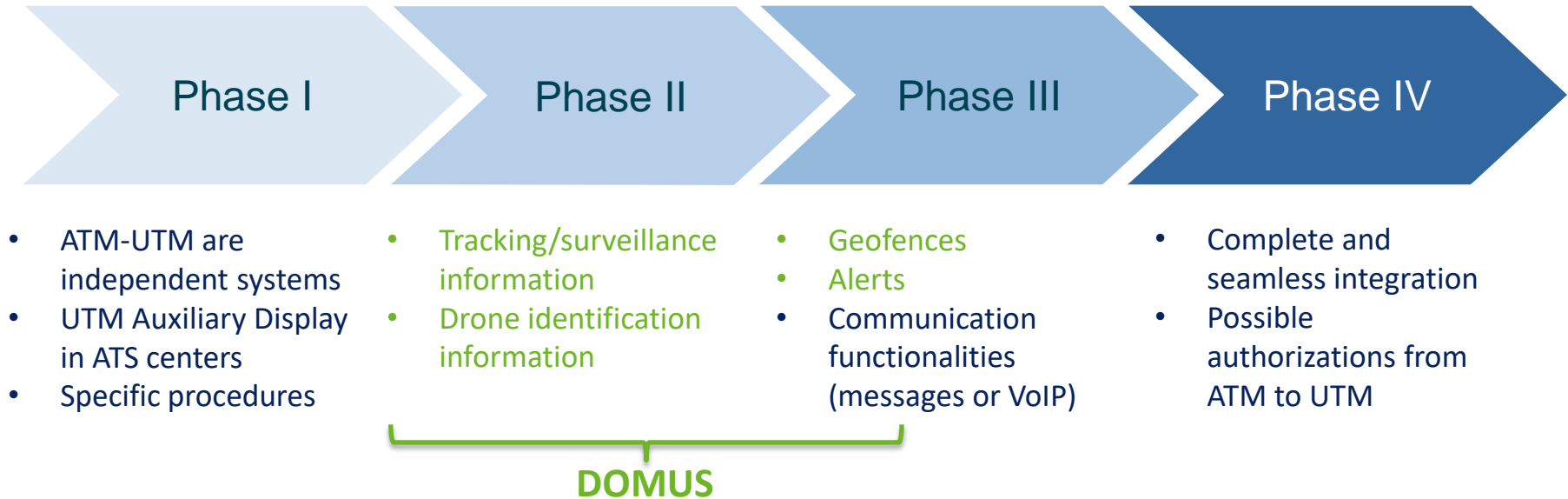
Pilot	Drone	Battery
 Ritika Singh Development	DRO-001 DJI Pro	80 % Bat 001
 Ganesh Field Recreational	DRO-002 Karma	92 % Bat 002
 Uma Ram Testing	DRO-003 DJI	20 % Bat 003

ATM Display



**The image is illustrative*

ATM-UTM integration next steps



Open questions for next steps:

- Should the drone pilot receive voice communications from ATC?
- Should the controller be able to give commands to drone pilots (or in the future even to the drone directly) from ATM? In this case, what is the liability schema?
- Should both systems converge to an unique more automatized system?

Projects as **DOMUS** are key to answer these questions and to define the requirements for the safe integration of drones in the airspace, allowing new operations (for example in airports)

Integrating drones in airports

- DOMUS demonstration about ATM-UTM integration **will help to allow safe drone operations in airports:**
 - Drones flying VLL and outside the designated protected areas won't be shown in ATM systems
 - In case of alert or infringement the drones will automatically be displayed in Tower systems, guaranteeing the situational awareness
 - A specific procedure put in place is followed by the ATCO helped by automation as necessary which could lead to stop operations if as long as safety is compromised
 - Controllers have the power to stop drone operations at any moment in airports.



Integrating drones in airports

- Example of designated protected areas

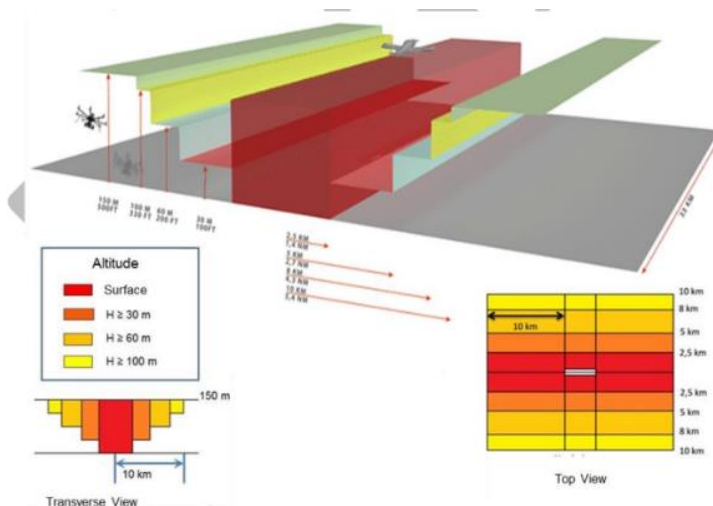


Figure 2, Example of French ANSP definition of an Airport environment

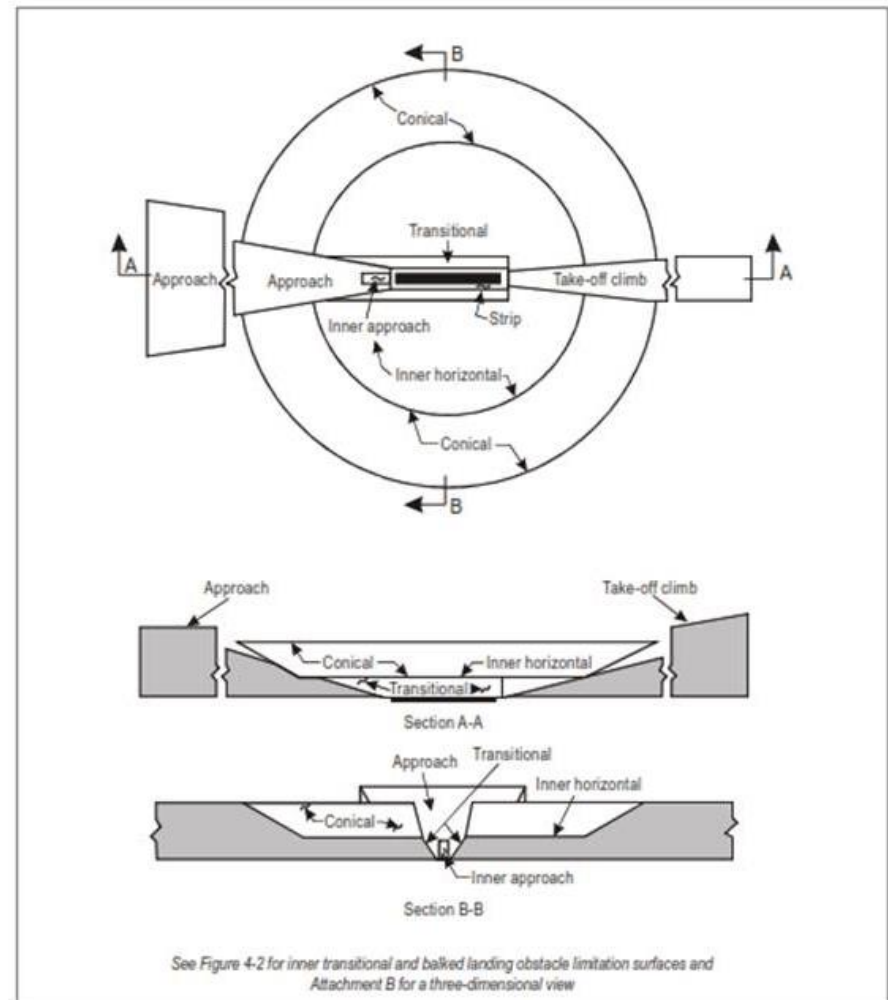


Figure 4-1. Obstacle limitation surfaces

CONCLUSIONS

- It is undeniable that drones are the **future** in many activities and works, and this is applicable to **airports**, such as pavement, terminal and illumination tower visual inspection, surveillance, nav aids calibration, etc.
- DOMUS wants to prove that drones can work **without being noticed by ATC** if it is not necessary from a safety and operational efficiency point of view.
- U-Space definition and deployment is the paramount importance to **integrate** the drone operation in airports in a safety and efficient manner.
- DOMUS will have:
 - U-Space → ATM case: drone surveillance & alerting to ATC, operator info.
 - ATM → U-Space case: Surveillance data & geofencing an area for emergency.
- DOMUS expects to deliver results in the **Final Report: Dec 2019**

Thank you very much!!

DOMUS Project



 U-space

