



Deconfliction and Separation

Drone dynamic Demand & Capacity Balance

Presented by: **MARTA SÁNCHEZ CIDONCHA**

with the support of



Spanish General Directorate of
Civil Aviation (DGAC)



ICAO's DRONE ENABLE/3

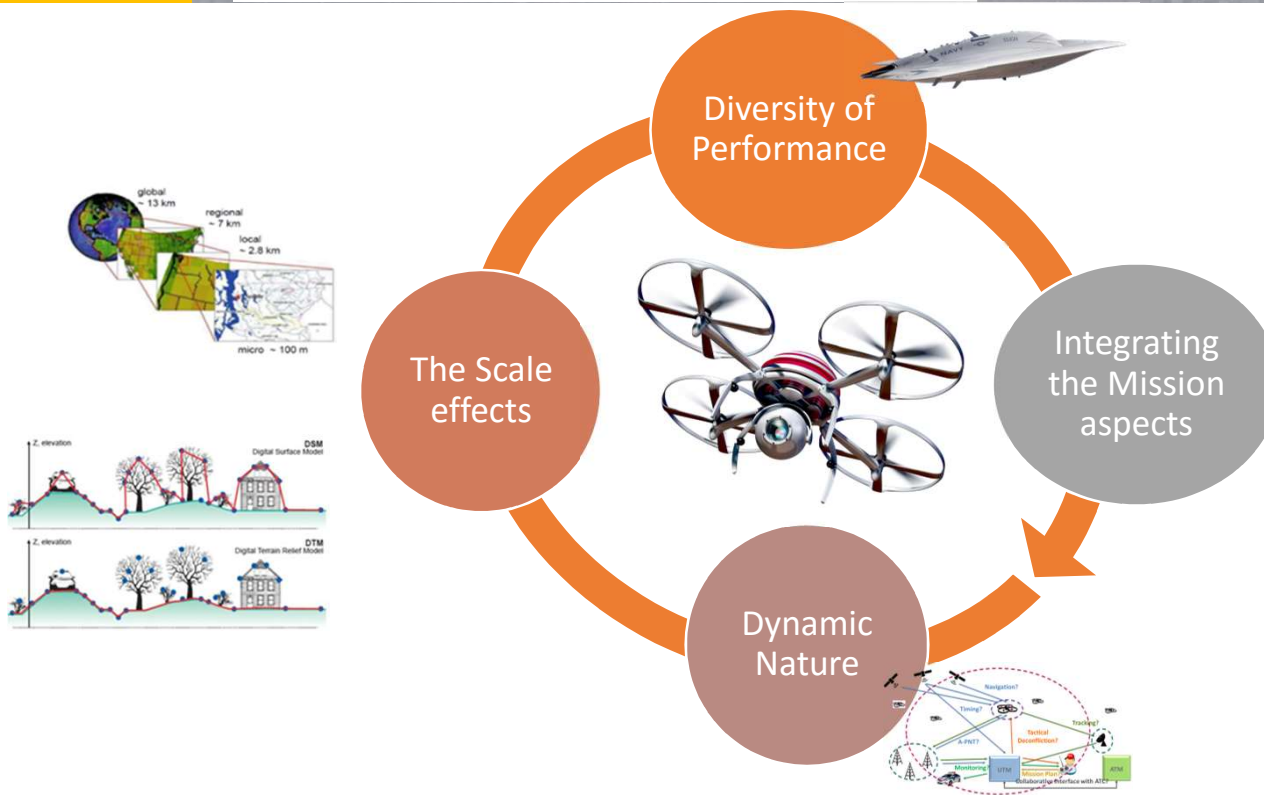
"Facilitating Future Innovation"

Montreal, 13th November 2019



Separation standards?

Drone specificities and their impact

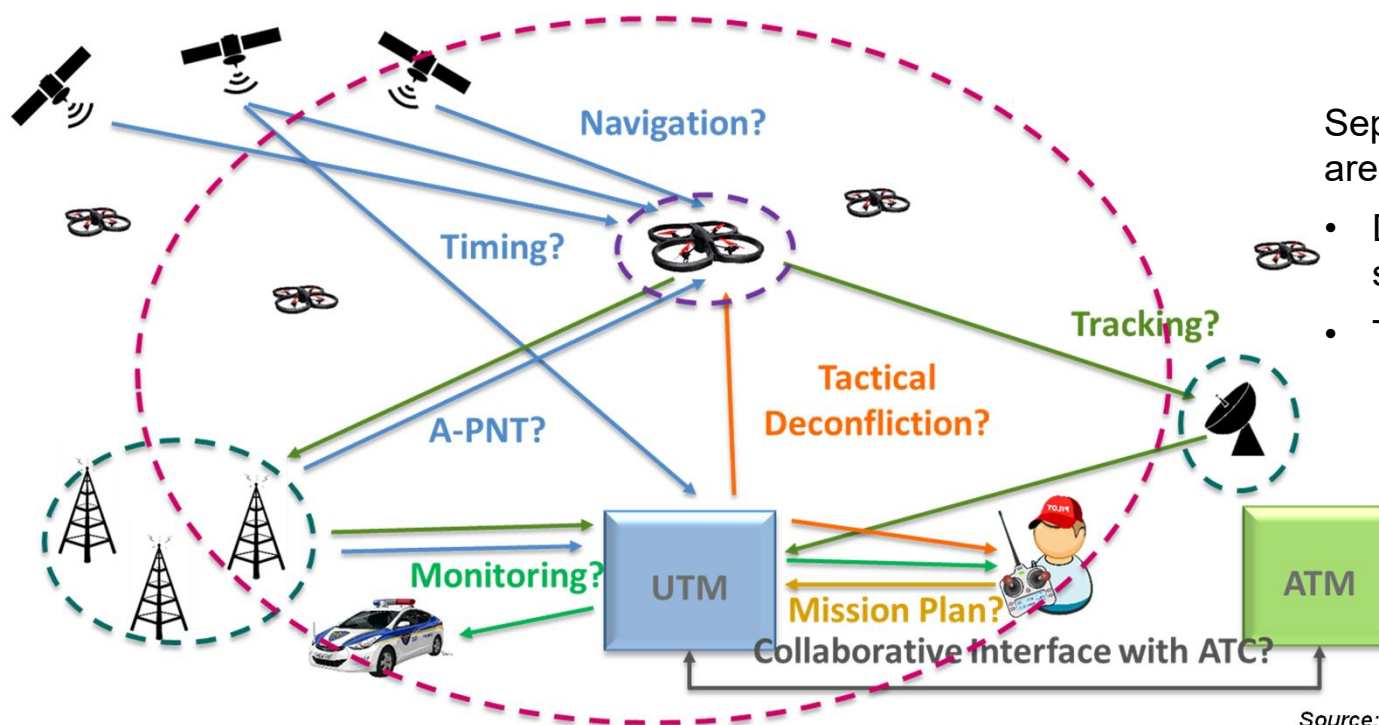


Flight plan execution
linked to mission tasks:

- Trajectory execution uncertainty;
- Drone swarms executing a single mission.

CNS Technologies

Their required performances



Separation standards
are dependant on:

- Dynamic CNS system performance;
- The environment.

Source: TERRA project, SESAR JU

CNS Technologies

Their required performances

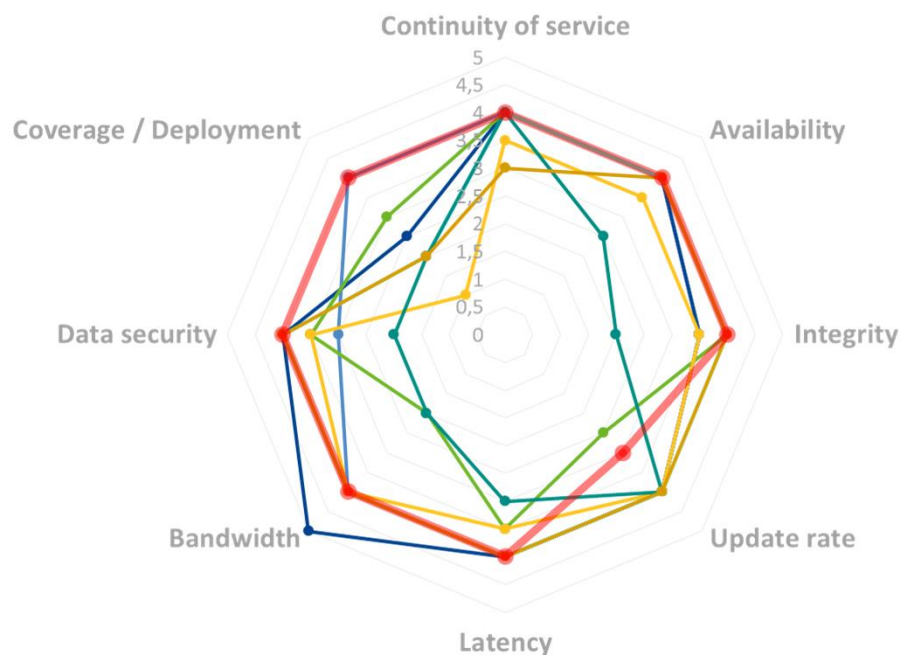


Urban Delivery – Type Z

— LTE — 5G — LoRA — L-DACS — EAN — V2X — WIMAX — Delivery

Gap analysis for A/G
communication
technologies:

- Requirements per
environment,
versus
- Technologies
performances.



LTE – Long Term Evolution

5G – Future 3GPP technology

LoRA – Long Range WAN

L-DACS - L-band Digital Aeronautical
Communications System

EAN - European Aviation Network

V2X – Vehicle to X

WIMAX – standard IEEE 802.16E



Source: TERRA project, SESAR JU

Deconfliction & Separation

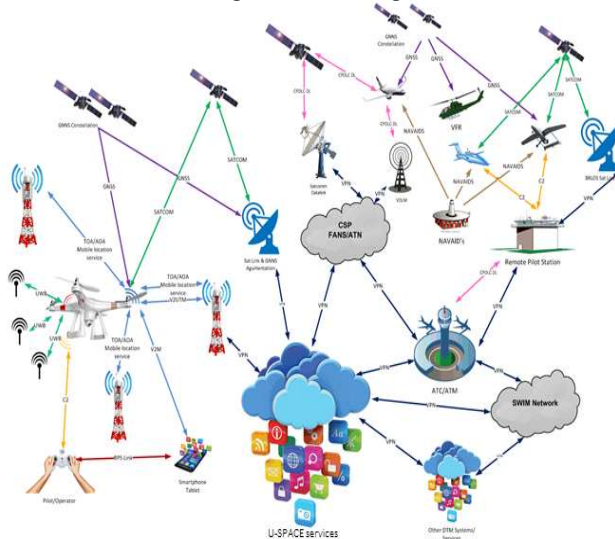
Drone dynamic Demand
and Capacity Balancing

CNS Technologies

Recommended architecture & manned
aviation access to UTM



Navigation technologies



Source: TERRA project, SESAR JU

The **manned aviation** challenges:

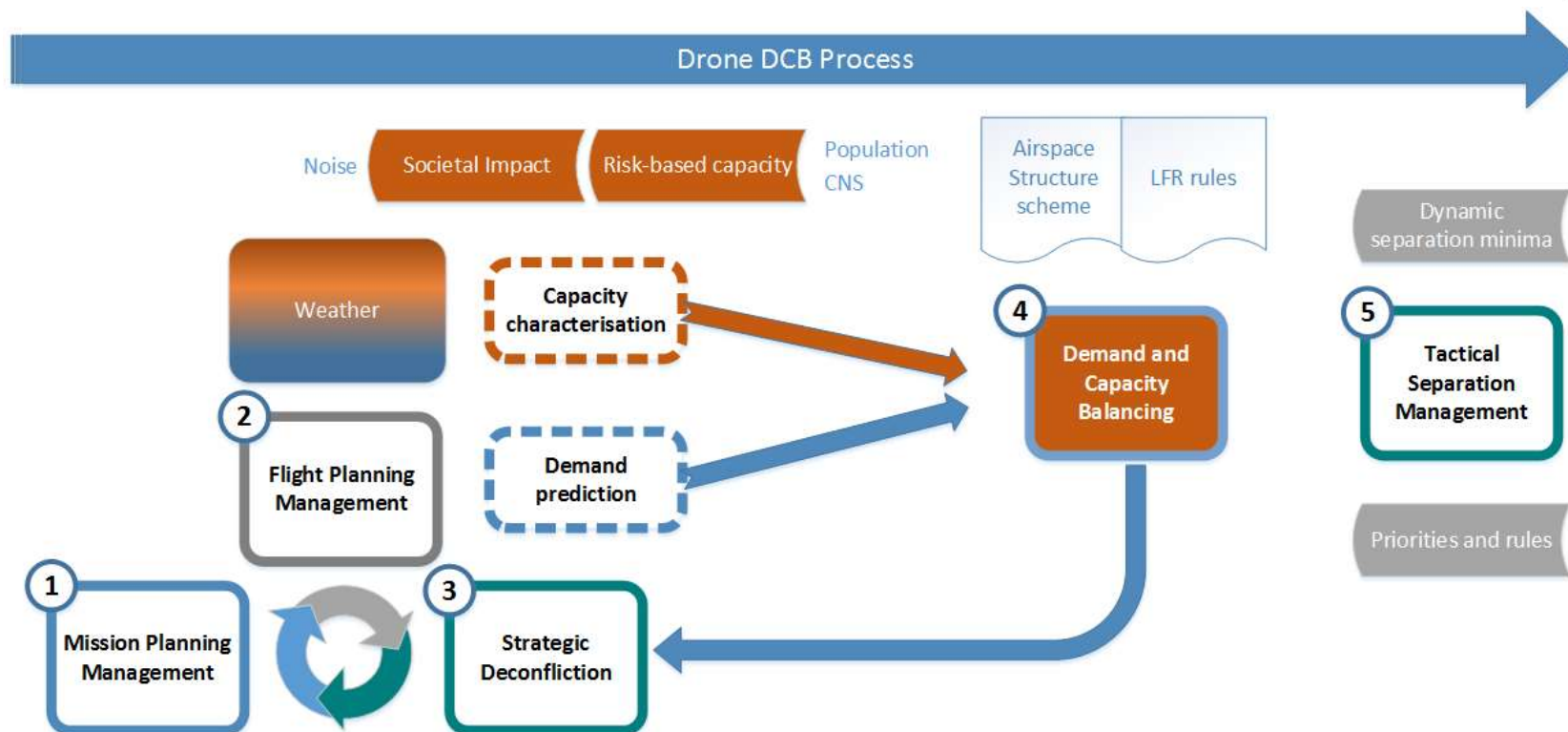
- Not all users make themselves “visible”;
- Interoperability of systems for UTM and ATM management;
- Low-level Flight Rules (LFR) and manned traffic managed by UTM in VLL:
 - Electronic conspicuity;
 - Use of UTM Traffic Information service for situational awareness;
 - Submit operational declaration/ flight plan.



DRONE ENABLE/3 “Facilitating Future Innovation” - DAY 2

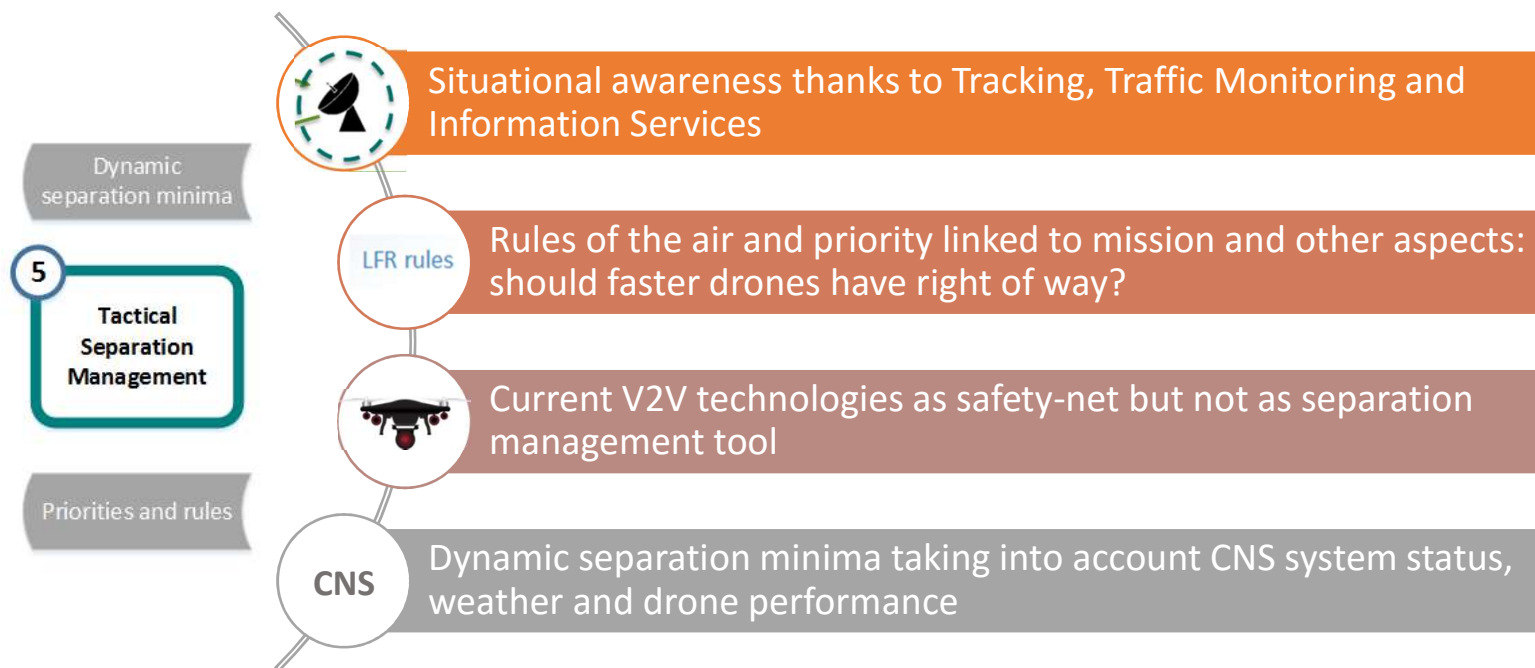
Strategic Deconfliction

A step in drone DCB



Tactical Separation

Enablers of separation management



Separation Standards

Inputs from modelling and simulation

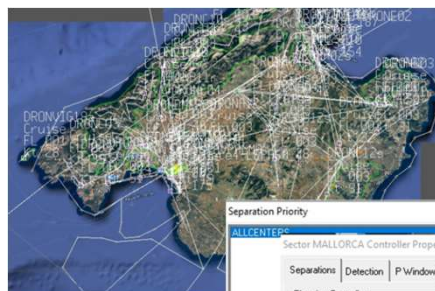


Fast Time Simulations

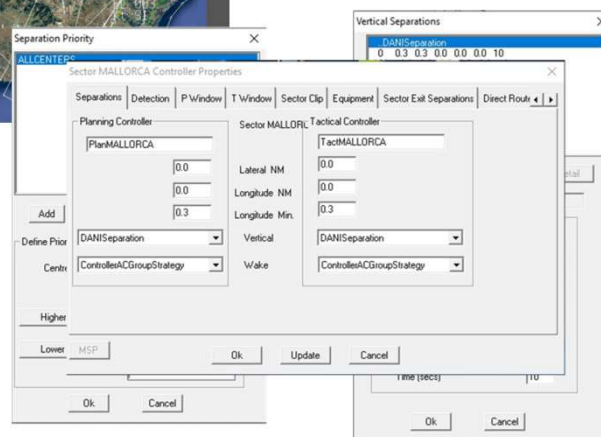
CNS architecture
and nominal
performance

Traffic Mix

Environment and
possible non-
nominal situations



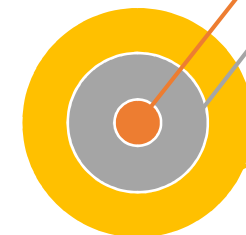
- Separation minima criteria (time based);
- Test CNS degraded conditions.



Target level of safety:
residual risk of conflict

Capacity

Time
efficiency





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