European Commission

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EU Drone Days

Launch of the European Drone Strategy 2.0

SESAR U-space Showcase

Brussels, 29-30 November 2022

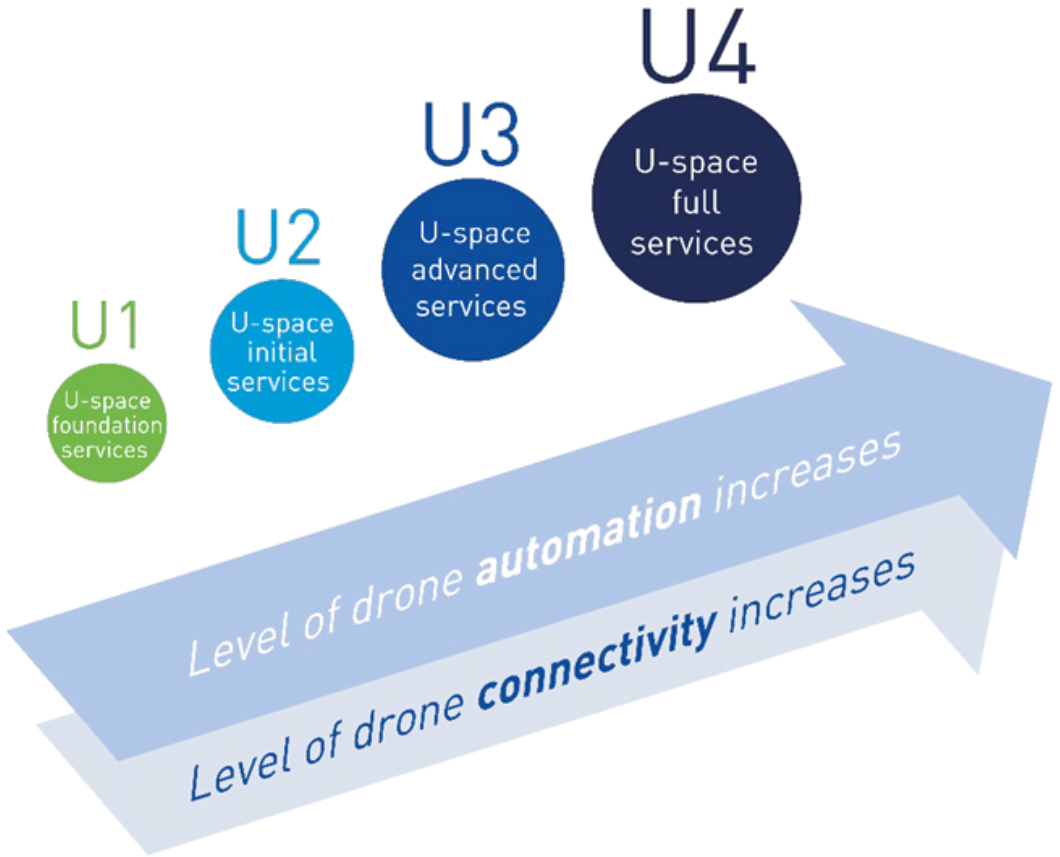
#EUDroneDays

The U-space Concept of Operations
Where we are & what is next

Andrew Hately, EUROCONTROL &

U-space history

- 2015: Riga declaration on remotely piloted aircraft (drones) “Framing the future of aviation"
- 2016: SESAR Drones Outlook Study
- 2016: Warsaw declaration for unmanned aerial vehicles, adopted at the end of "Drones as a source of jobs and growth" conference
- 2017: SESAR launches 10 research projects on UAS traffic management
- 2017: Helsinki declaration on drones
- 2017: U-space Blueprint



- U-space has been described as a set of services
- These services are clustered into 4 “U levels”

U-space history

- 2018: SESAR "Roadmap for the safe integration of drones into all classes of airspace"
- 2018: SESAR launches 9 demonstrations of U-space technology
- 2019 U-space concept of operations published by CORUS project (SESAR)
  - Explains the Airspace, the Services and how they are used
  - Provides a common language and understanding for research, regulation and deployment

CORUS airspace designations X Y Za Zu

U-space history

- 2019: EU “drone” regulations
  - 2019/947 on the rules and procedures for the operation of unmanned aircraft
  - 2019/945 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems
- Supported by amendments to other aviation regulation

- Divided operations by risk
- Provide the means to create airspace structures to enable or limit UAS flight

U-space history … and future

- 2021: EU “U-space” regulations
  - 2021/664 on a regulatory framework for the U-space
  - 2021/665 & 2021/666 amending…
- 2021: SESAR awards six projects to demonstrate U-space applied to Urban Air Mobility

What is Urban Air Mobility?

- Higher risk.
- There will be passenger carrying vehicles
  - Safety of life: Every accident potentially fatal
  - Higher standards required
- There will be non passenger carrying vehicles in the same airspace
  - The same high standards apply

Why apply U-space to UAM?

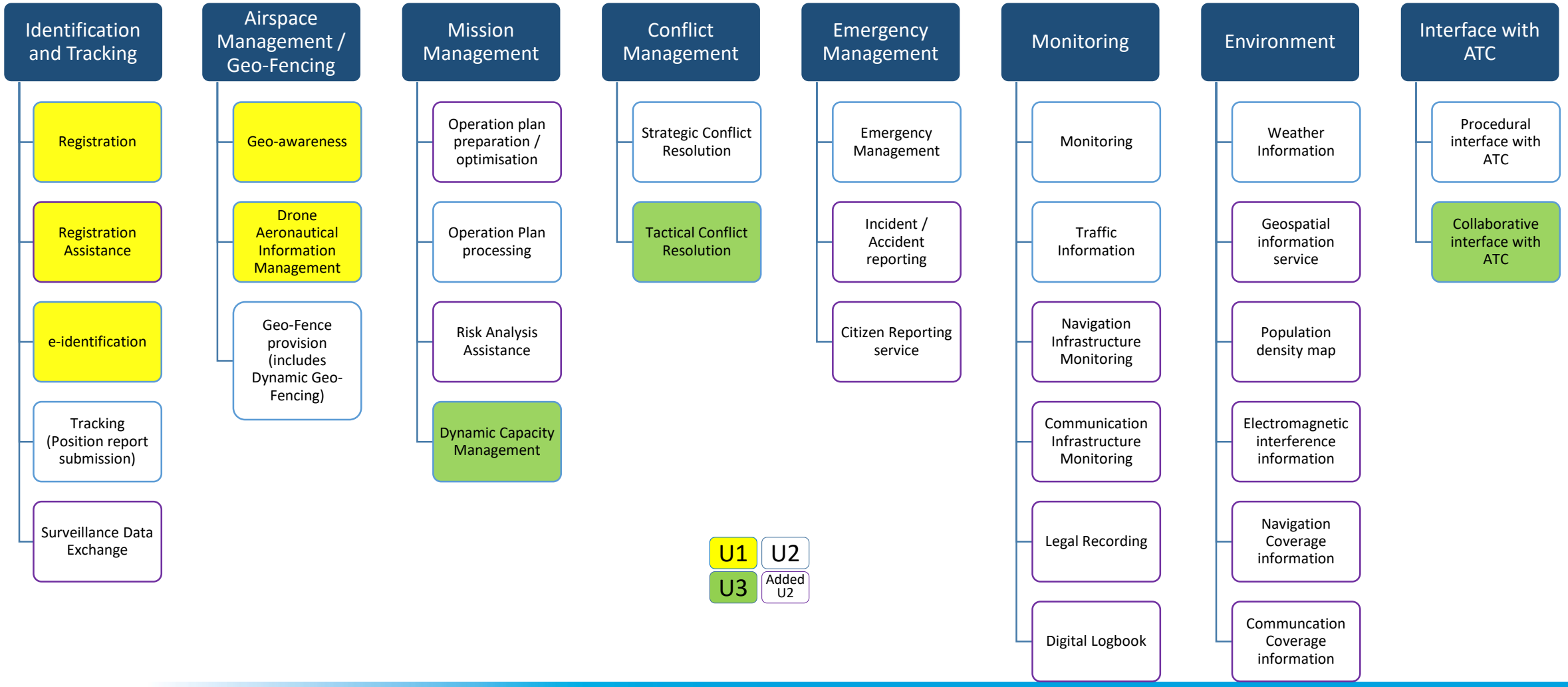
- U-space ConOps looks far into the future.
- U-space = test lab for ATM
- Urban Air Mobility aims to be uncrewed
  - If UAM uses UAS, can it use U-space?

CORUS-XAUM:
extending and revising the U-space ConOps

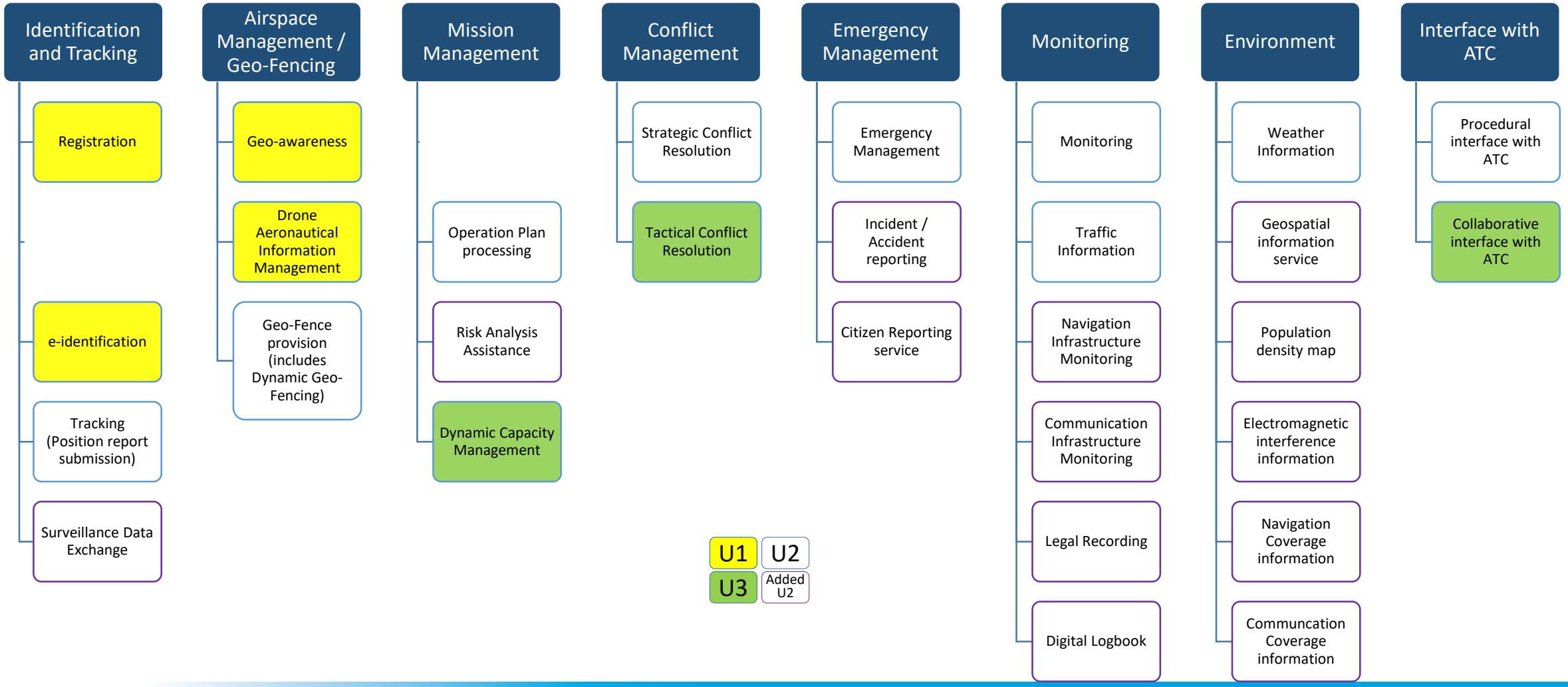
- Vertiports
  - Interactions with U-space: planning, contingencies and synchronisation with manned aviation
- Flight rules
  - How to integrate UAS and manned aircraft
- Airspace structure
  - Initial operations of passenger carrying EVTOL
- Aligning the U-space ConOps with the U-space regulations
- Incorporating the work of other projects
  - ICARUS and the Common Altitude Reference
  - plus many more

- Revised ConOps available from our website. https://corus-xuam.eu/new-u-space-conops/
  - Please comment – the website will explain how
- A final ConOps will be prepared at the beginning of next year.

U-space ConOps ed 3 (2019) services



Removing services without precise definitions



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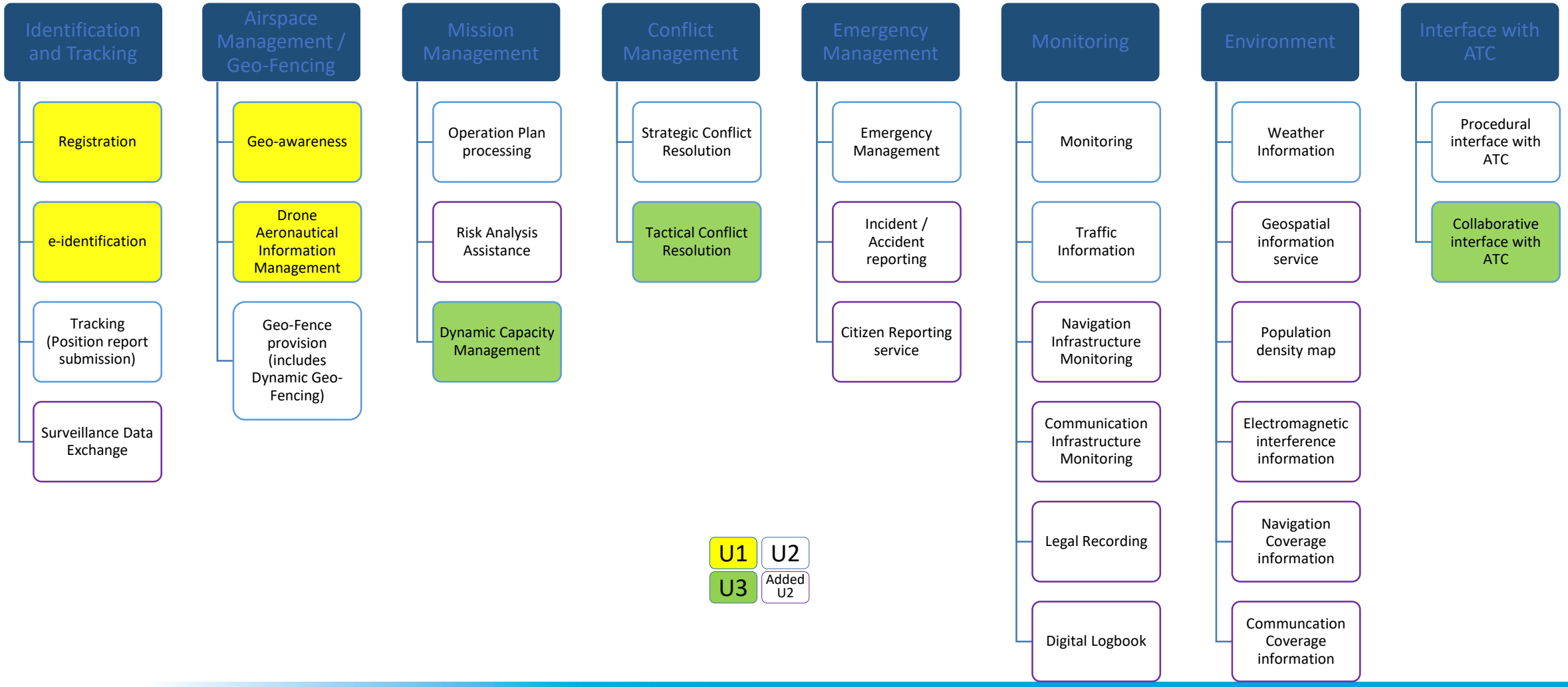
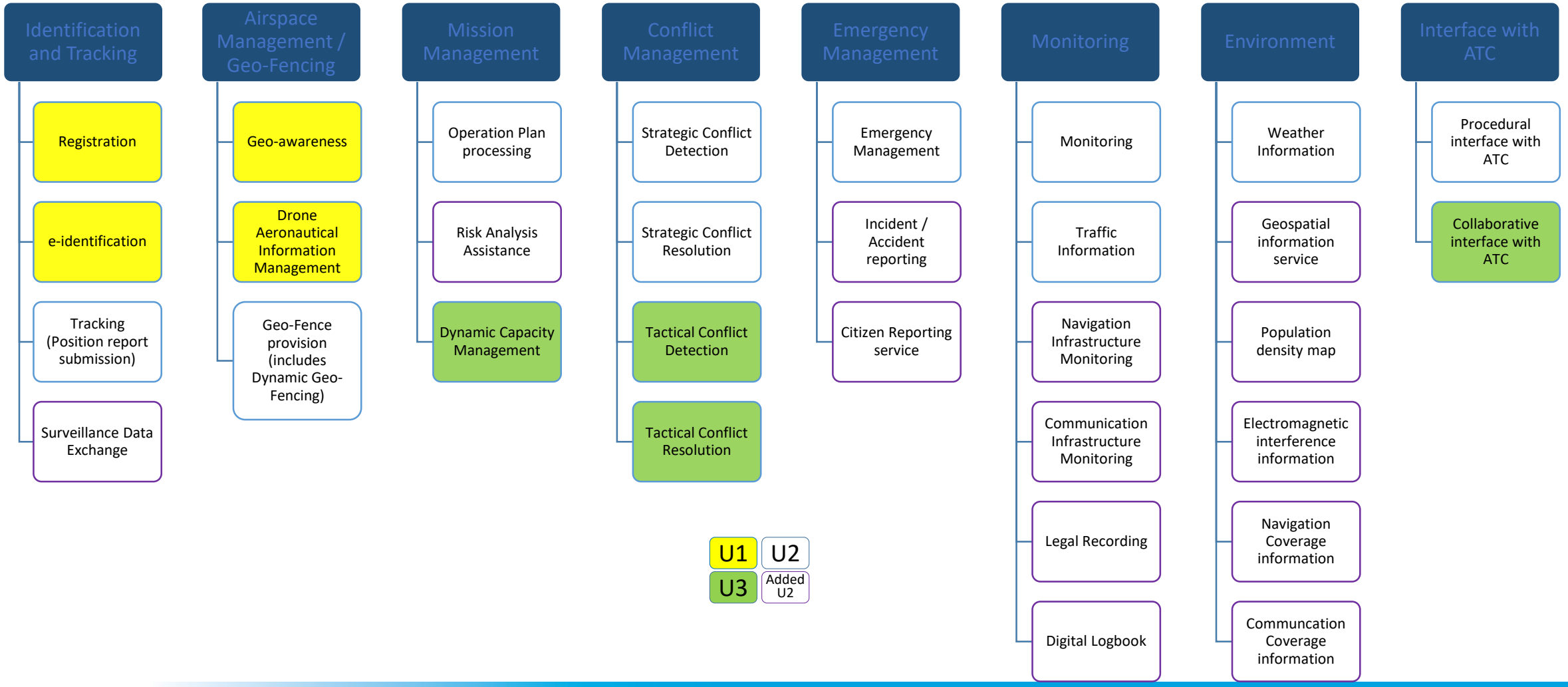
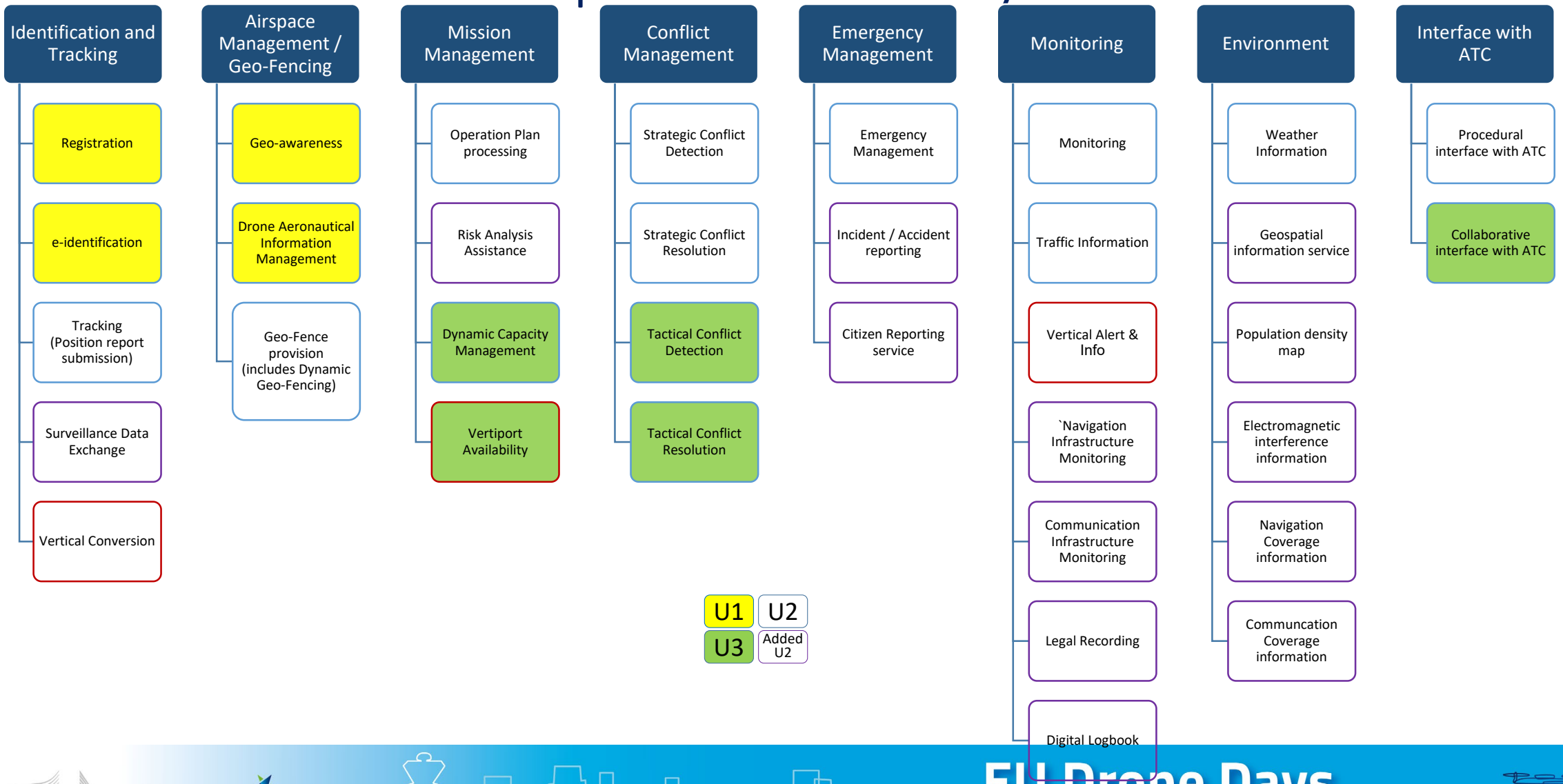


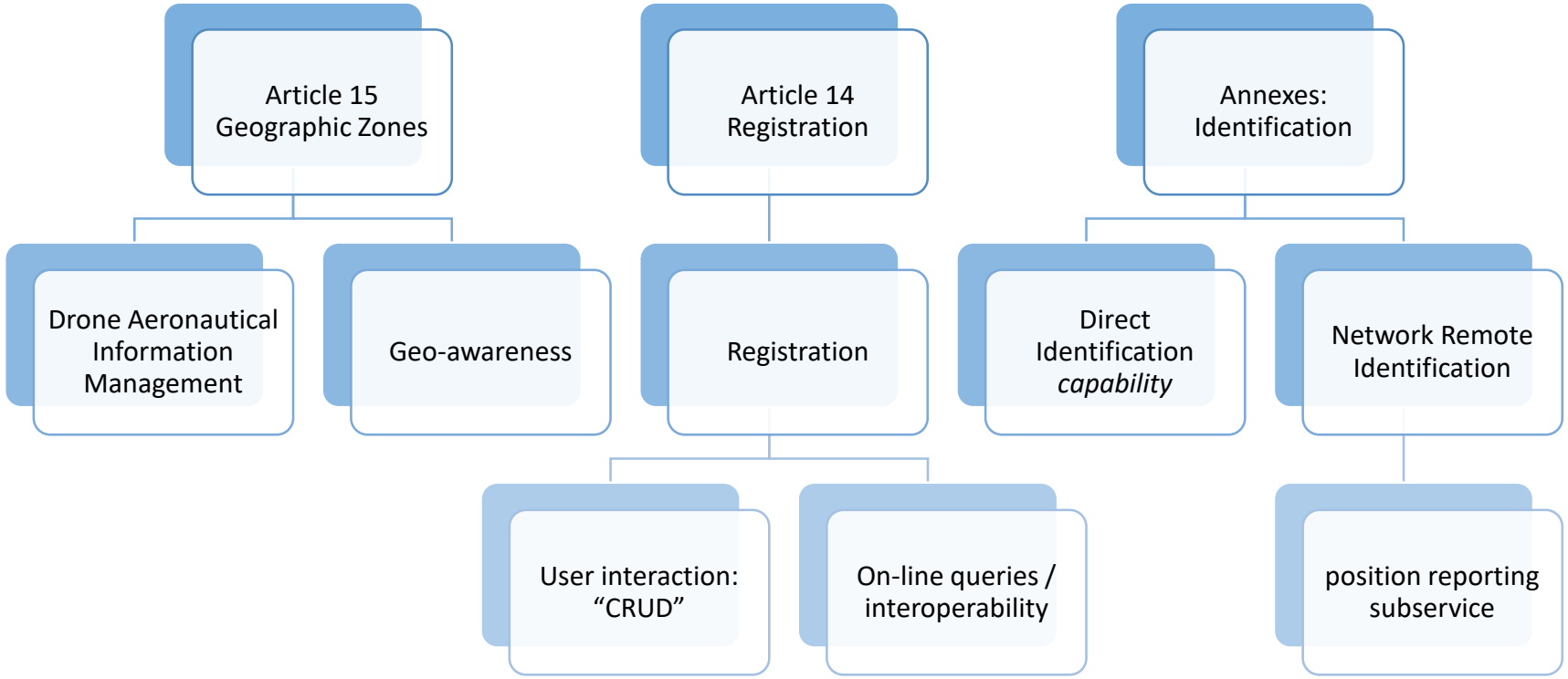
Separating conflict detection and resolution



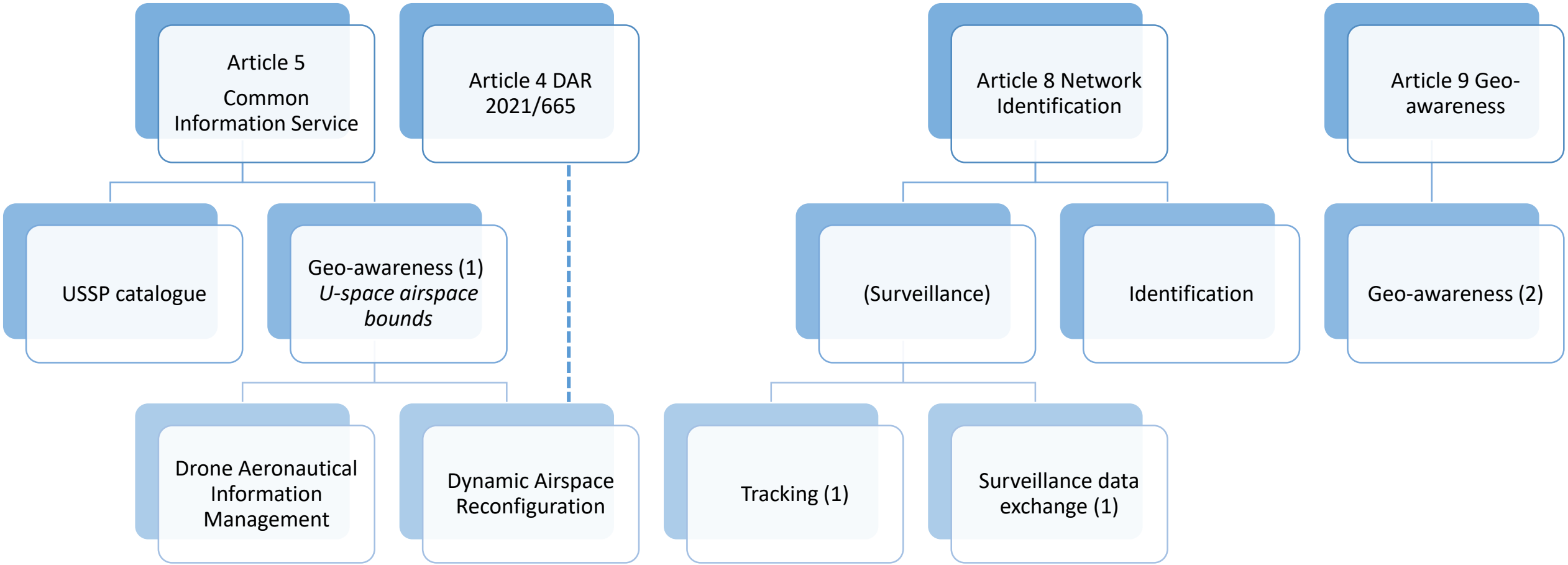
New services: Vertiport availability & CAR



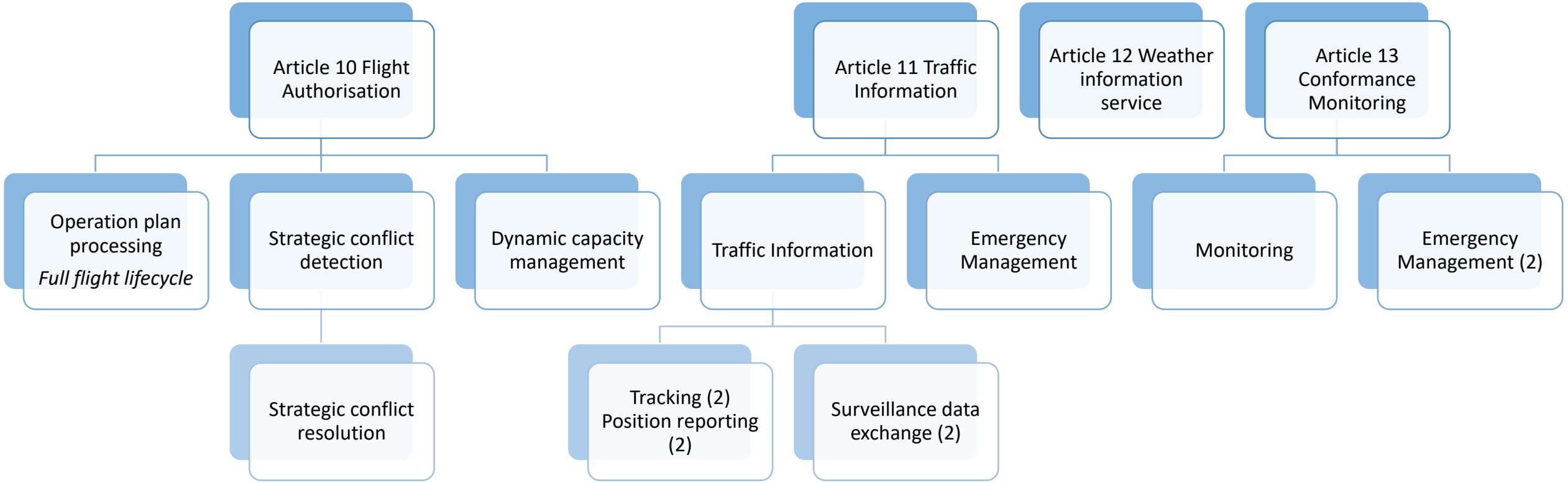
U1 Services: 2019/947



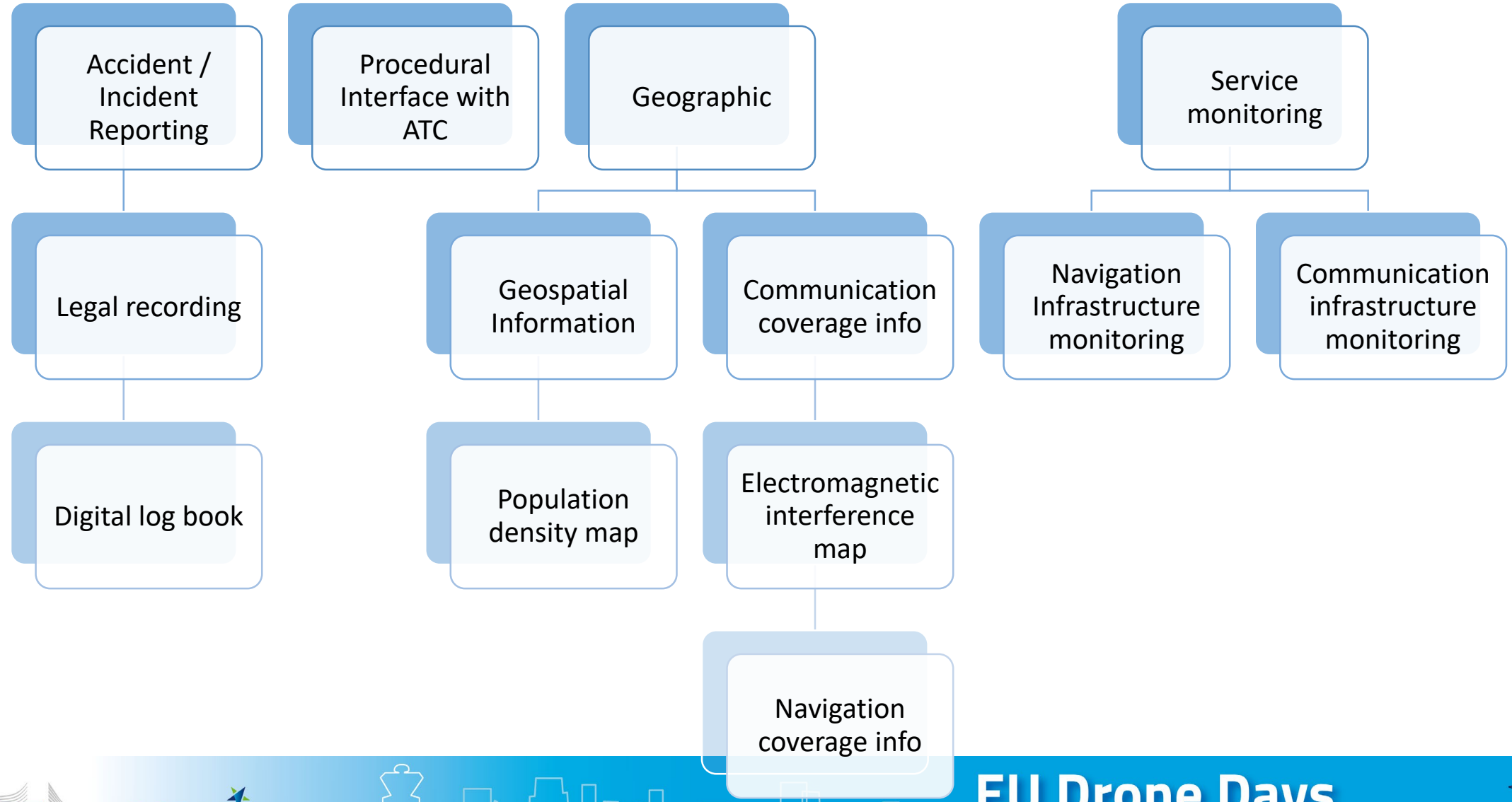
U2 Services: 2021/664: Articles 5-9



U2 Services: 2021/664 articles 10-12



U2 Services: Other



Passenger carrying operations

- EVTOL
  - Short endurance, currently
  - Initial operations have pilot on board
  - Un-crewed soon
- Passenger operations
  - Higher risk than cargo
  - Passenger operations have uncertain timing
  - Tactical processes are needed for efficiency
- Urban environment
  - High ground risk
  - High sensitivity to noise
  - High density of operations

- The Vertiport
  - Touchdown and Lift-Off area (TLOF) is a critical resource
    - TLOF are alternative landing spots for nearby aircraft
  - Vertiport resources are a key element in the planning of flights

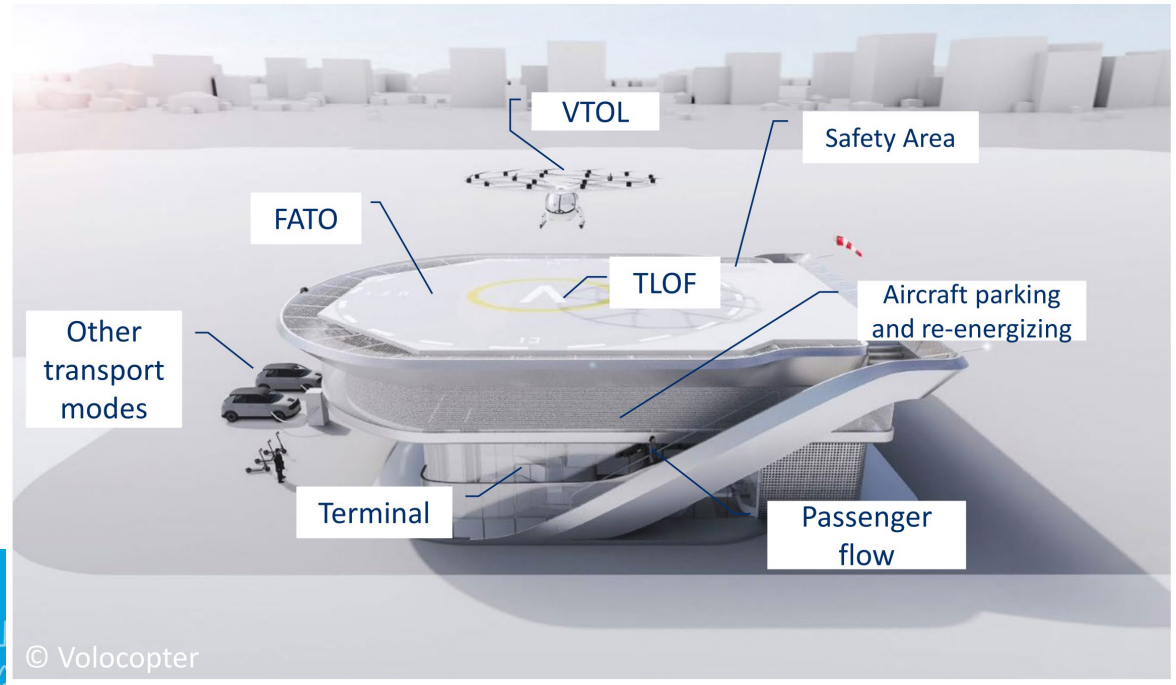


Diagram © Volocopter

EVTOL flight and alternative landing spots

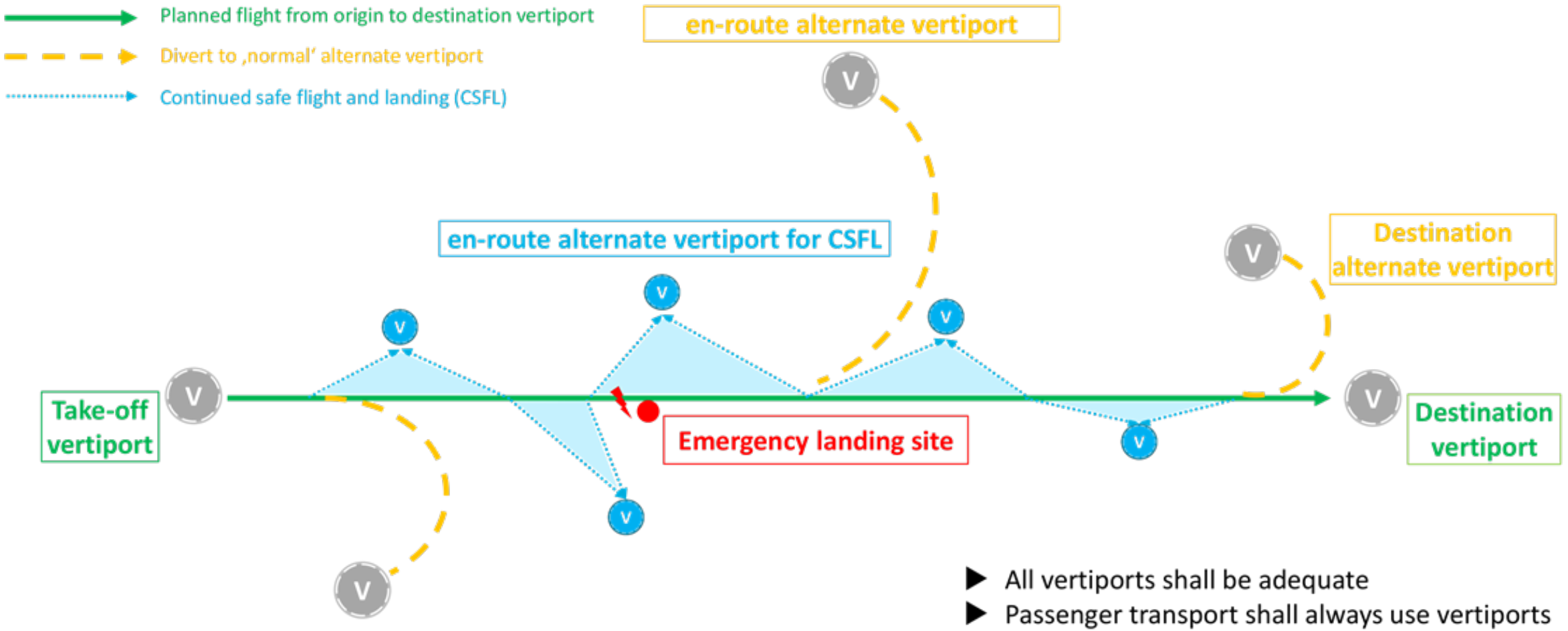


Diagram © Volocopter

A flight rule for U-space

- ICAO airspace classes A to G are defined in terms of flight rules and services.
- UAS in U-space are not currently considered as flying any of VFR, SVFR, IFR. Due to this
  - U-space airspace is a restricted area
  - UAS cannot fly among VFR, SVFR or IRF flights
- In order to have integration, we need to either
  - Fly UAS following an existing flight rule
  - Devise new flight rule for UAS and understand how manned aircraft can fly it or fly with it.
- We are working on a new flight rule. Two approaches look promising
  - SVFR – like: with U-space providing situational awareness to UAS and supporting visual situation awareness for manned aircraft
  - IFR – like: with different equipment carriage requirements to IFR and U-space providing a separation service.

Conclusion

- The U-space concept of operations can accommodate Urban Air Mobility
- The risk is higher and the service provision will need to be appropriately robust
- Adapting U-space for UAM is a step on the road to convergence with ATM

- The ConOps is available at https://corus-xuam.eu/new-u-space-conops/
  - Please comment – new version early 2023