The CORUS Concept of Operations in context

AW-Drones Workshop

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The CORUS project context & process

- SESAR2020 Exploratory Research project
- 9 consortium members
- 21 member advisory board
- 100+ cooperating organisations in
  - 8 “sibling” projects simultaneously explore technology questions
  - 10 related demonstration projects
- 500+ member U-space Community Network

- CORUS ran three large workshops
  - 100+ attendees at each
  - With diverse interests
  - Coming from far and wide

- CORUS sought to develop a Concept of Operations for U-space
  - Which enables a wide range of UAS uses
  - Which will accommodate the level of traffic today **and in that expected in the future**
  - Which takes on board the best ideas from around the world
  - Which is accepted by a wide range of stakeholders
  - Which is usable by a range of contemporary projects

- CORUS has made three iterations of the ConOps.
  - Taking feedback and comments on each version

The CORUS project has received funding from the SESAR Joint Undertaking under grant agreement 763551 of the European Union’s Horizon 2020 research and innovation programme.

Airspace Volumes

- Focus on VLL
- All VLL is divided into
- X, Y and Z volumes
- X = low risk
- Y = higher risk
  - Access only with approved operation plan
  - Specific technical requirements per volume
- Z = highest risk
  - Access only with approved operation plan
  - Za = ATC controlled airspace
  - Zu under U-space

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Airspace Volumes and Conflict Resolution

- X:
  - No conflict resolution service
  - Enables VLOS
  - Pilot remains responsible to remain well clear
- Y:
  - Approved flight plan required
  - Conflict resolution before take off
  - Usually:
    - Position reporting required
    - Information given to pilot during flight
      - Conformance & Geo-awareness
      - Warnings & Traffic information
  - Y airspace may not have these if primary goal is to manage access
    - National park
- Z:
  - Conflict resolution before flight **and** in flight
  - Requires tracking
    - Separation minima in function of system performance
  - Za
    - ATC controlled airspace, e.g. airport
    - U-space provides
      - Situational awareness to ATC
      - Communication tools
      - Standard ways of working
  - Zu
    - U-space (software) provides conflict resolution during flight, from the ground

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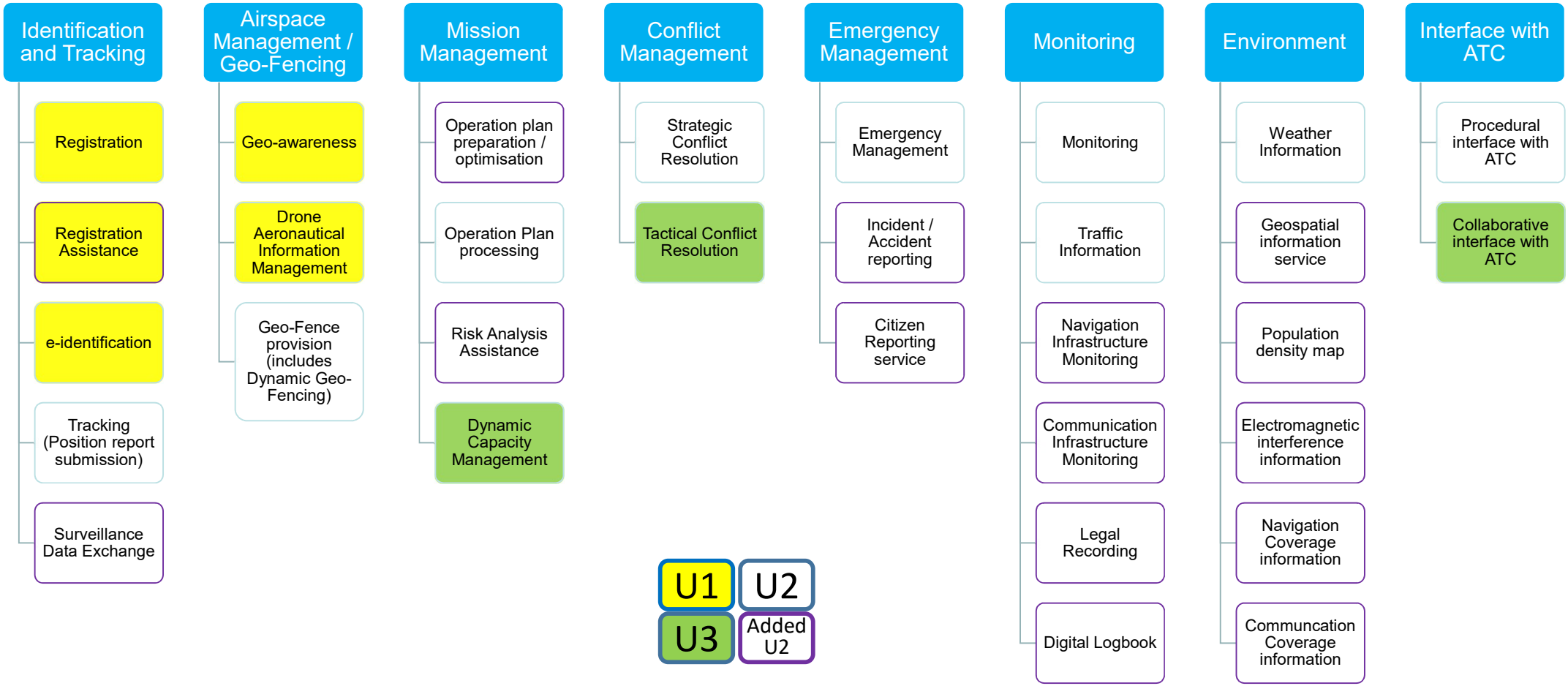
U-space Services



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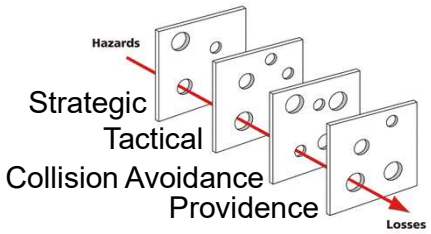
Aspects of the ConOps



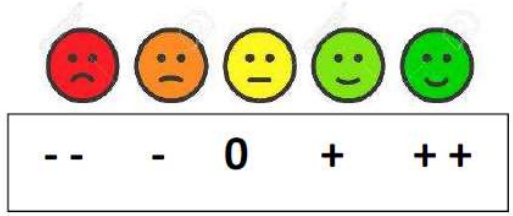
Increasing safety

- Geo-awareness
- Conflict resolution
- Conformance monitoring

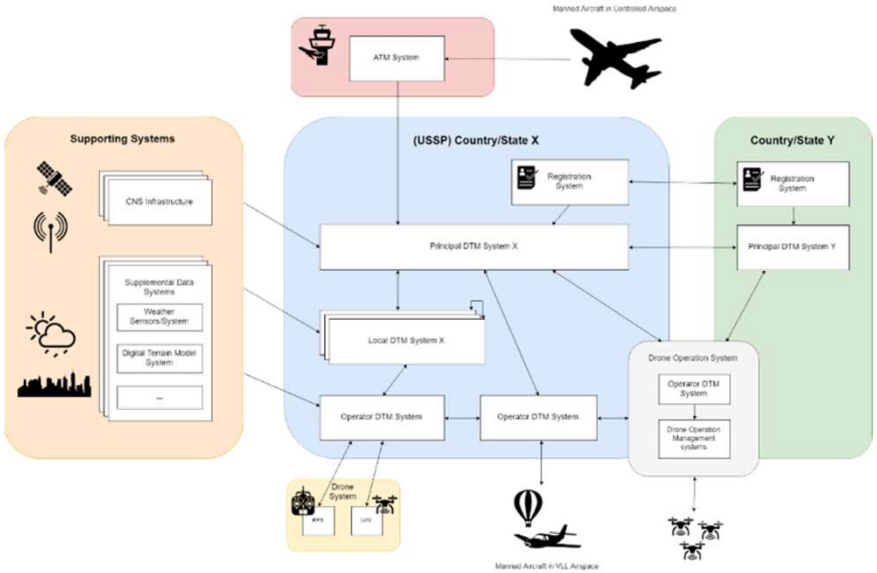
Assessing Safety

- Methodology for the U-Space Safety Assessment (MEDUSA)
- SORA
- Event reporting

Best practices



Social Acceptance Indicators



Architecture

CONOPS available at https://www.eurocontrol.int/project/concept-operations-european-utm-systems
Swiss cheese diagram: by Davidmack - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=31679759
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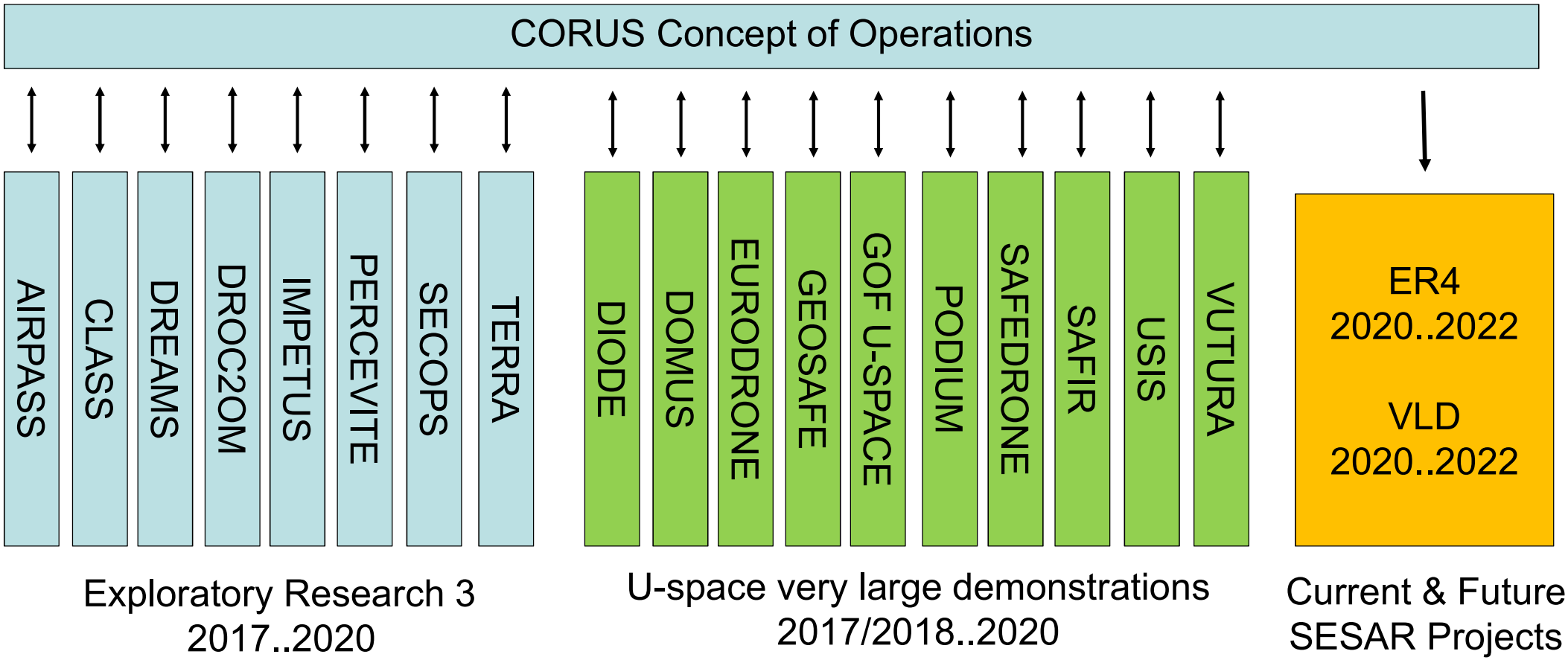
Sibling Projects = SJU managed ER & VLD



Register for the Webinar on 12th November - https://www.sesarju.eu/node/3673

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A quick word on U-space deployment

- Registration is included in European Commission Implementing Regulation (EU) 2019/947
- U-space deployment is beginning across Europe
- A survey of the situation at the end of 2019 has been published
- https://www.eurocontrol.int/publication/u-space-services-implementation-monitoring-report
- This survey is annual.

- The U-space regulation is expected in 2021.
- This will unleash a wave of deployment

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Current and future U-space research

- SESAR ER4
  - BUBBLES – Separation management service
  - DACUS – Demand And Capacity management for U-Space
  - FACT – Future All Aviation CNS Technology
  - ICARUS – Common altitude reference
  - INVIRCAT - Control of RPAS in the TMA
  - URClearED – Remain well clear
- Horizon 2020, INEA, GSA et al
  - SUGUS - Solution for E-GNSS U-Space Service
  - LABYRINTH – 4D planning swarms
  - …

- Coming soon:
  - Further ER4 projects
  - SESAR-WAVE3-03-2020
    - Collaborative U-space-ATM interface
  - SESAR Urban Air Mobility VLDs
    - Optimised Used of Airspace
    - Integrated Trajectory Management
    - U-space capabilities and services to enable Urban Air Mobility
    - Environmental sustainability

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