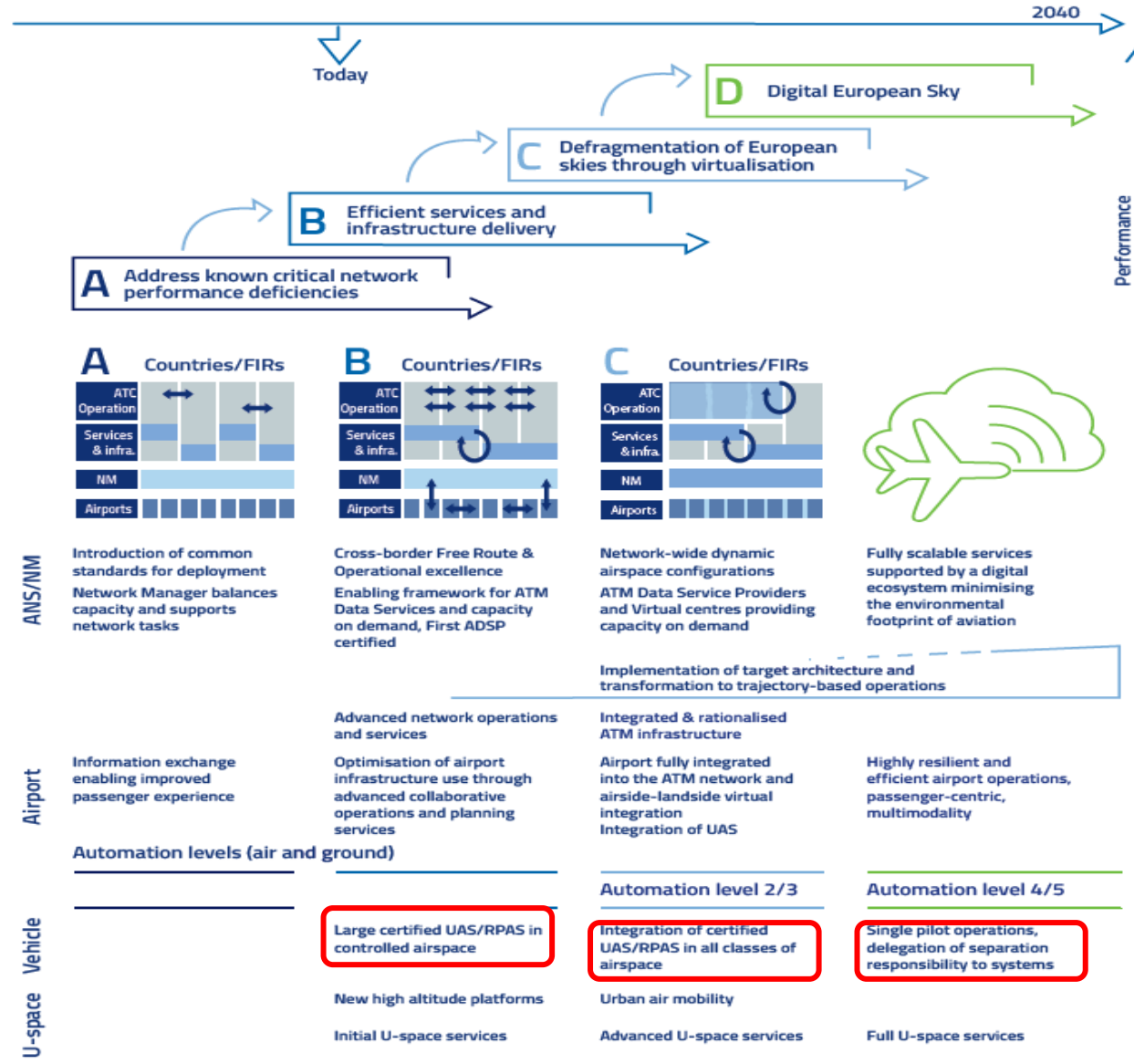


RPAS Integration in SESAR

SESAR JU's vision towards the ATM Master Plan and SRIA

Nil Agacdiken, SESAR JU Programme Manager
RPAS and AI in Aviation, Rome, 3-4 Nov 2022

RPAS Integration in SESAR 2020 ATM MP



RPAS developments in SESAR 2020

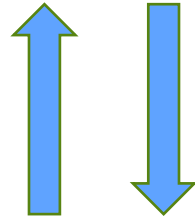
Wave 2

➤ IR Project PJ.13

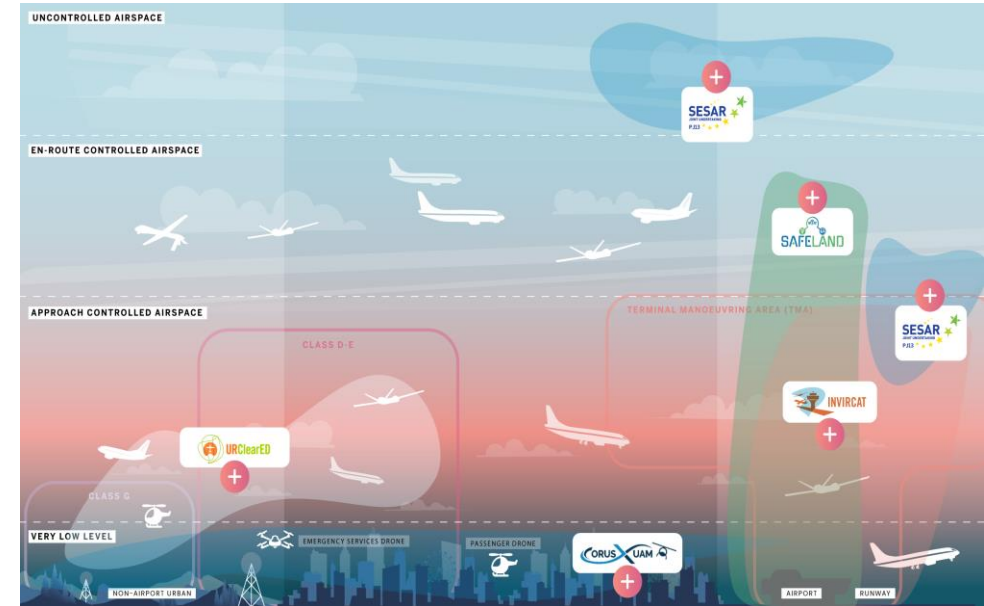
- RPAS Accommodation Solution 115 =>V3
- RPAS Safety Net Solution 111 =>V3
- RPAS Integration Solution 117 =>V2

➤ ER4 Projects

- URClearED
- INVIRCAT
- SAFELAND

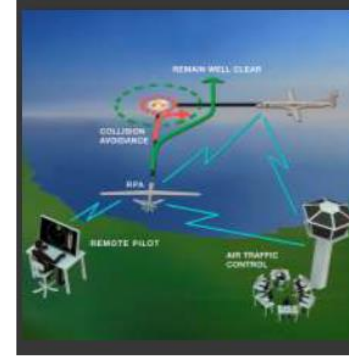


Standards (EUROCAE/RTCA)
ICAO RPAS Panel



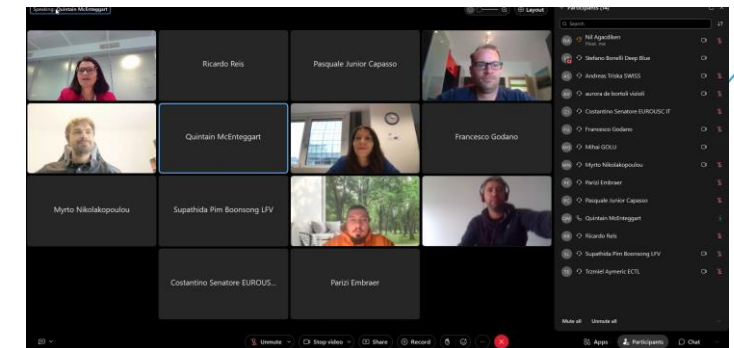
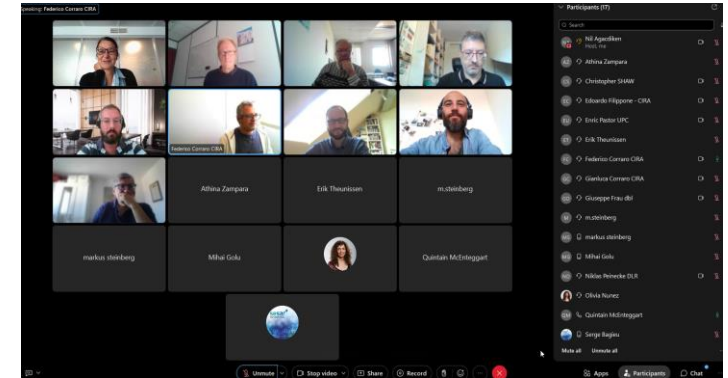
Progress so far in SESAR Wave 2

- SESAR solution 115 for RPAS accommodation at the end of Wave 2:
 - Positive safety case for accommodation for RPAS without a safety net
 - RPAS can be managed as a manned aircraft, at the expense of some ↑ATCO workload (e.g. due to latency and other RPAS specificities)
 - V3 Maturity Gate in Dec 2022
- SESAR solution 111 is in good progress in the validation for the two CA options, ACAS Xu and EUDAAS
 - Solution to ensure interoperability between both technical solutions
 - RWC for Situational Awareness under development
 - V3 Maturity gate in Q1 2023
- SESAR solution 117 work ongoing for the longer term concepts
 - Validations not all completed
 - V2 Maturity gate Q1 2023



Progress so far in SESAR Wave 2

- URClearED
 - completed successfully V1/TRL2 MG 22 Sep
 - a clear concept was proposed with the potential benefits of RPAS accessibility and safety with no negative impact on human performance
- INVIRCAT
 - completed successfully V1/TRL2 MG 23 Sep
 - shall continue its development in follow-up industrial research activities
 - identified standardisation needs for the handover of control between Remote Pilots (RPS).
- SAFELAND completed successfully TRL2 MG 13 Oct
 - completed successfully V1/TRL2 MG 23 Sep
 - shall continue its development in follow-up industrial research activities



Next R&D needs identified by ER4 projects

- Full RPAS integration in TMA and surface operations
- ATM-U-space interaction
- Customized operational procedure regarding the use of the RWC in the airspace classes D-G
- Incapacitation detection
- Transition period from nominal SPO case (on-board pilot in control) and incapacitation confirmation.
- Role of the cabin crew
- Ground Station
- Social Aspects
-



SESAR 3 JU a new instrument to implement the vision



Accelerate through research & innovation the delivery of an inclusive, resilient & sustainable Digital European Sky



50+ founding members representing entire aviation value chain (incl. new entrants)



- Horizon Europe - EUR 600 million
- Eurocontrol – up to EUR 500 million (in-kind & financial contributions)
- Industry - EUR 500 million minimum (in-kind & financial contributions)

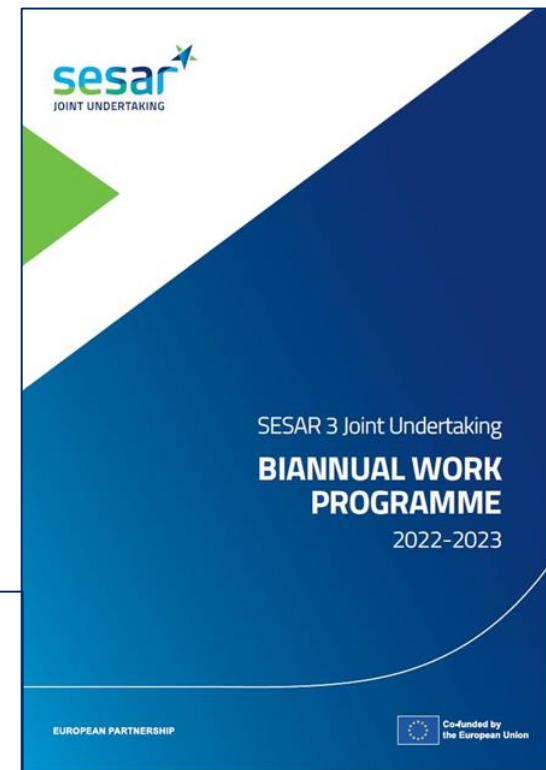
Additional funds via Connecting Europe Facility (in coordination with CINEA) to the value of at least EUR 200 million.



SESAR 3 Work Programmes

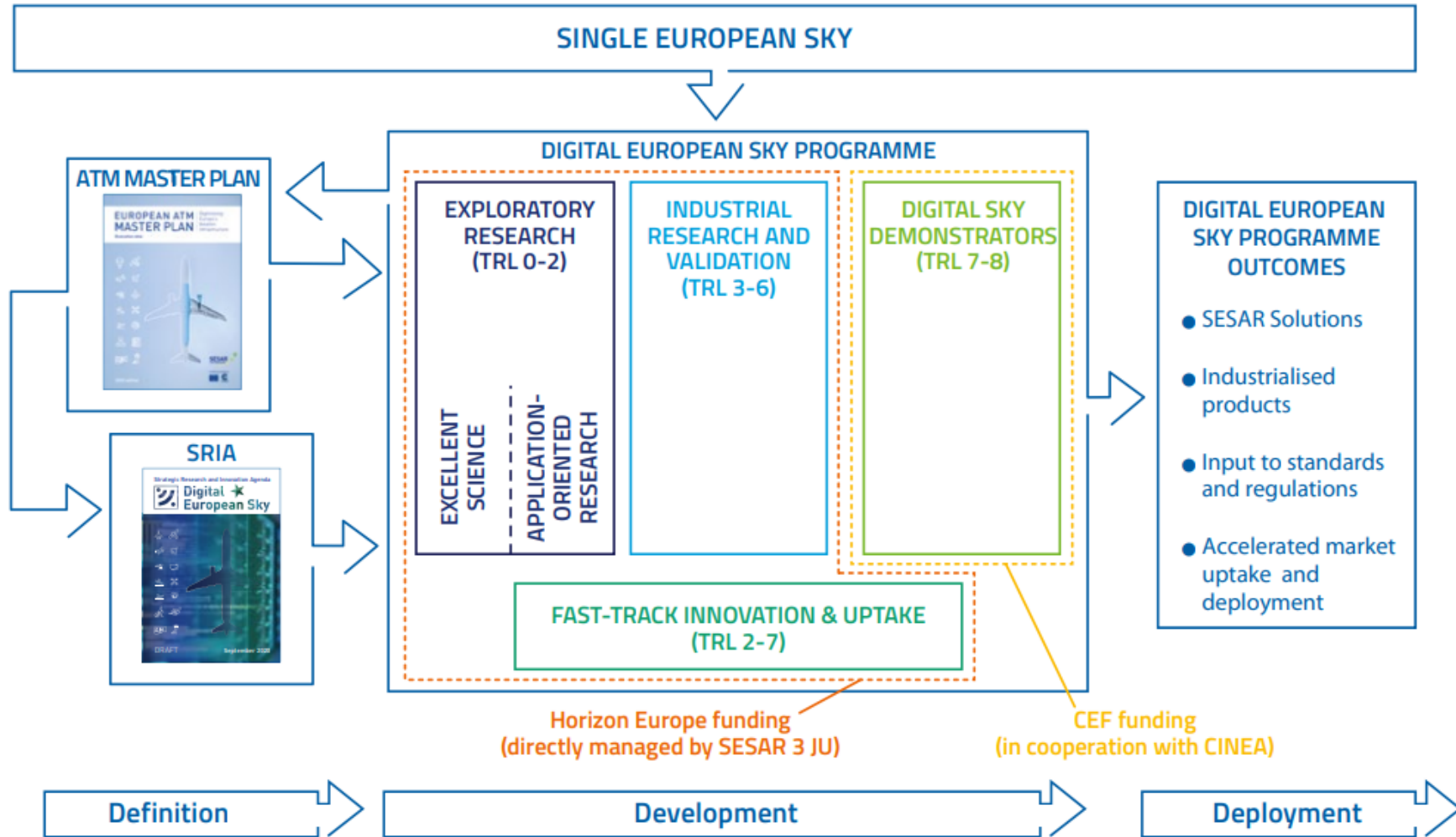


- ☐ Establishes the framework for the definition, planning and execution of the SESAR 3 JU operations from 2021 to 2031;
- ☐ Defines the overall lifecycle of the R&I programme;
- ☐ Defines the main principles for budget allocation.

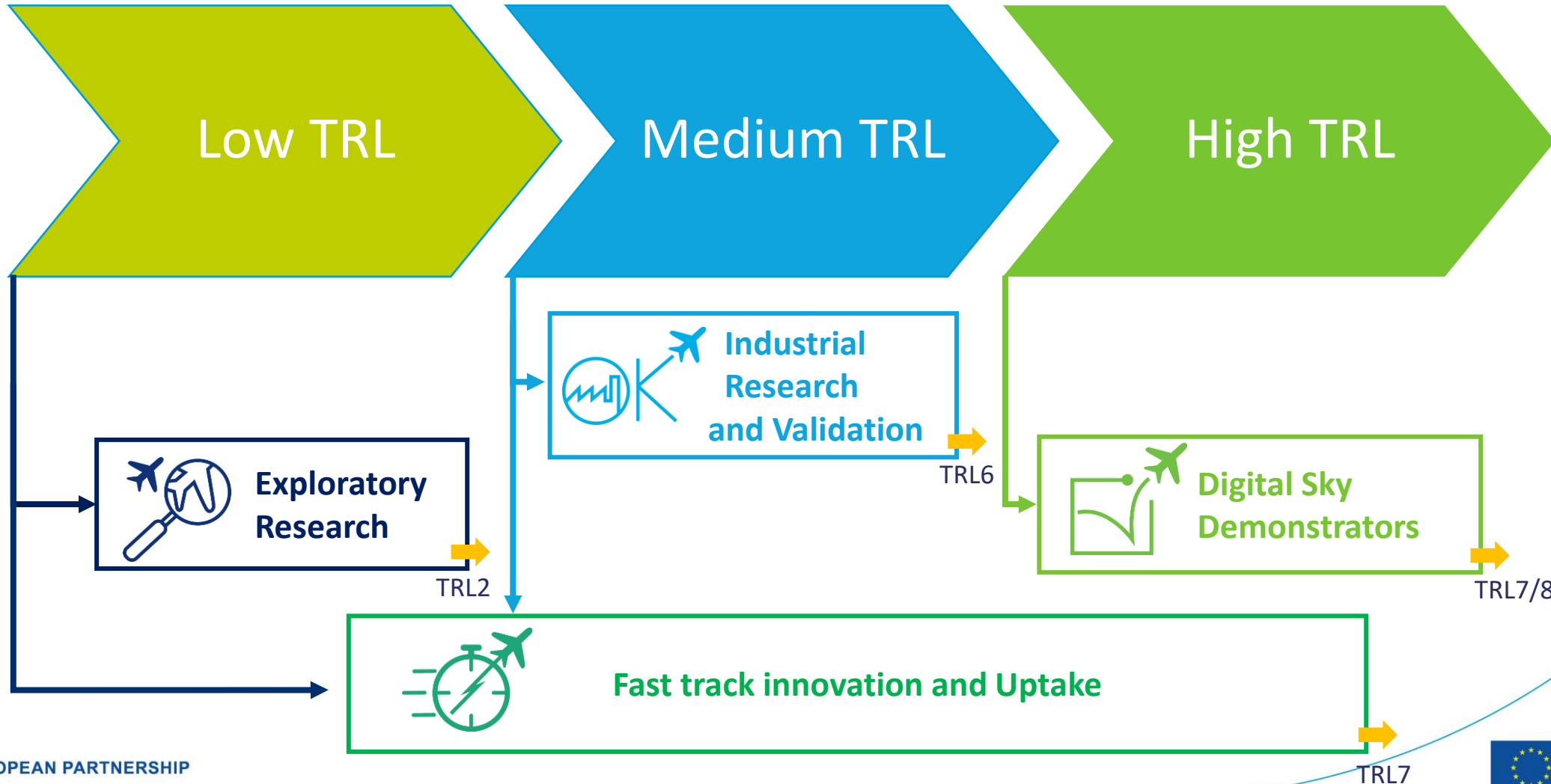


- ☐ Outlines the scope of R&I activities to be performed in 2022 & 2023;
- ☐ Defines the Calls Conditions and Technical Content:
 - Annex II section 2.1 : Call HORIZON-SESAR-2022-DES-ER-01
 - Annex II section 2.2 : Call HORIZON-SESAR-2022-DES-IR-01

SESAR 3 Innovation Pipeline



Research focused on the target maturity level



Digital European Sky research and innovation flagships



Connected and automated ATM



Air-ground integration and autonomy



Capacity-on-demand and dynamic airspace



U-space and urban air mobility



Virtualisation and cyber-secure data sharing



Multimodality and passenger experience



Aviation green deal

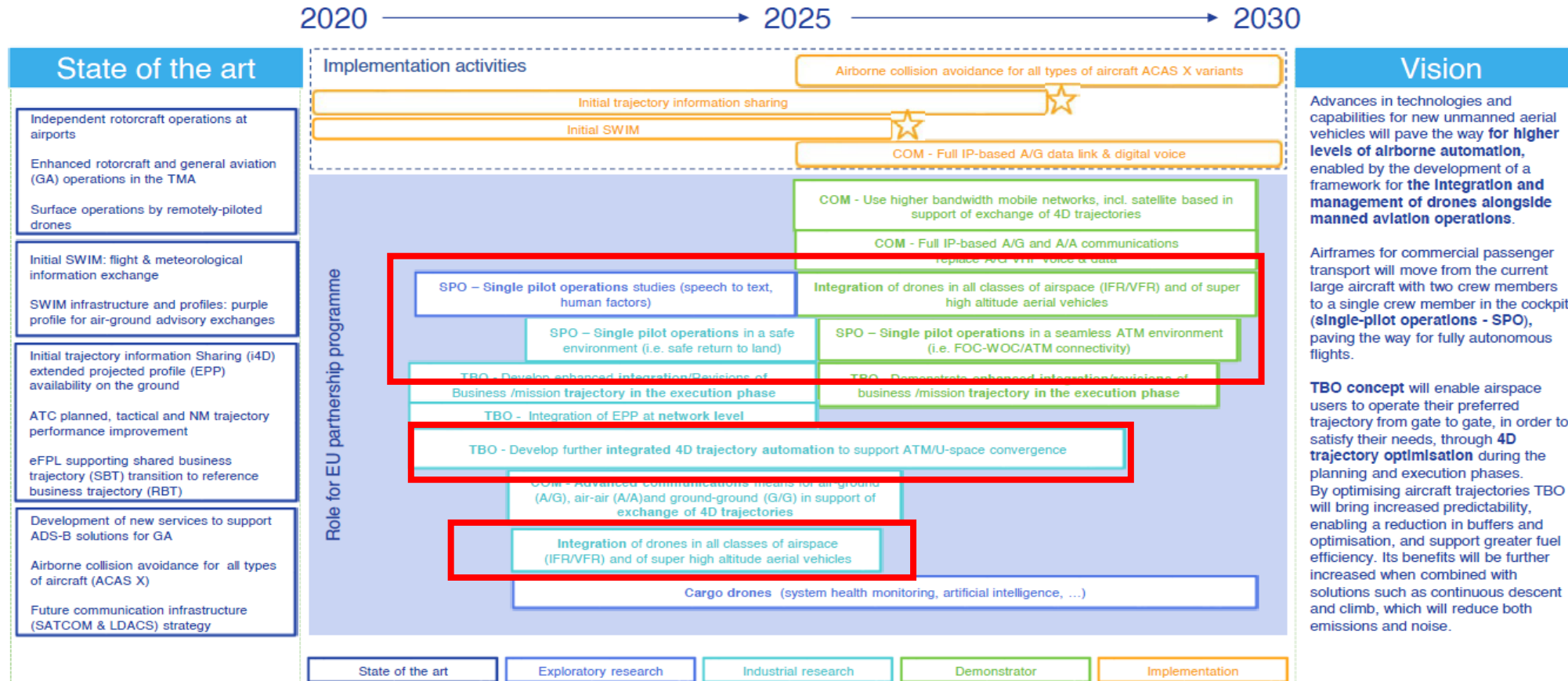


Artificial Intelligence for aviation



Civil/military interoperability and coordination

SRIA Air-Ground Integration road map





Air-ground integration
and autonomy



Industrial
Research
and Validation

TRL6

Phase C

IFR RPAS integration in controlled class A-C airspace:

technical capabilities and procedures for handling IFR RPAS in a cooperative environment in full integration with manned aviation

ATM / U-space interface and supporting technologies:

consolidated U2 services and complete the validation of the required interfaces with ATM

Aircraft as an AIM/MET sensor and consumer intelligent data pre-processing, smart filtering and integration, both on ground and on board the aircraft for the two-way exchange of AIM and meteorological data

TBO common data-driven trajectory prediction and conflict detection/resolution multi-sector capability/service (i.e. medium term) based on artificial intelligence and machine learning allowing advanced separation support to be provided to controllers



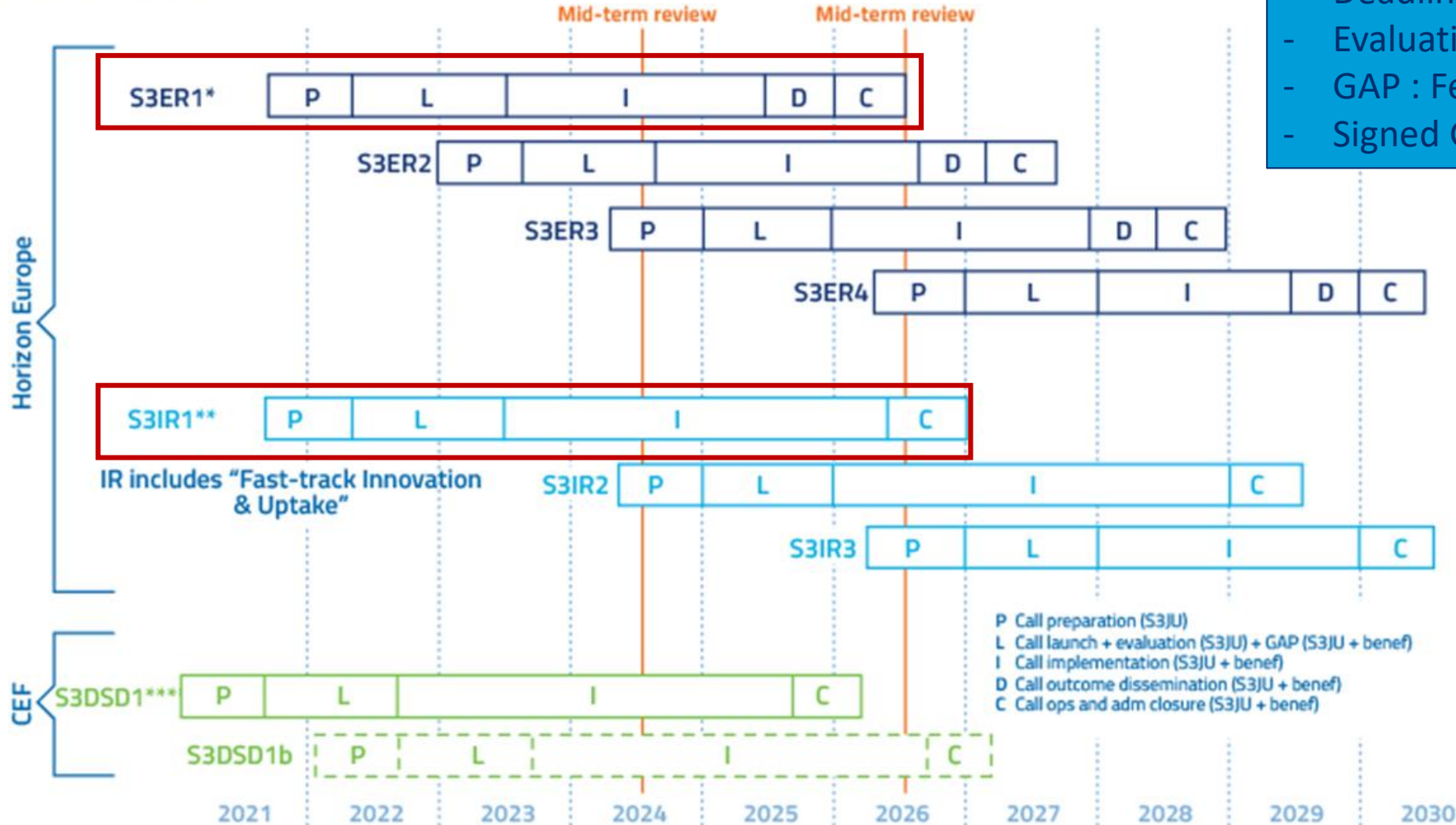
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- **Next generation airborne avionics platforms enabling autonomy**
 - Advanced airborne systems supporting Single-Pilot Operations (SPO)
 - Autonomous navigation in all phases of flight
 - Advanced airborne systems supporting RPAS and HAO
- **Air/Ground Integration enabling future operations**
 - Operations for safe return to land in Single-Pilot Operations
 - Operations for FOC-WOC/ATC connectivity in Single-Pilot Operations
 - Operations enabling the Integration of drones in all classes of airspace
 - Operations for Super-high-altitude operating aerial vehicles
 - Operations for safe dialogue between controller and pilot
- **Integrated 4D trajectory automation in support of trajectory-based operations (TBO)**
 - applications for 4D trajectory synchronisation
 - Trajectory revision during the execution phase as per ICAO TBO FF-ICE 2 concept
 - Gate-to-gate data driven trajectory prediction



Calls sequence



S3 ER1/IR1 calls schedule

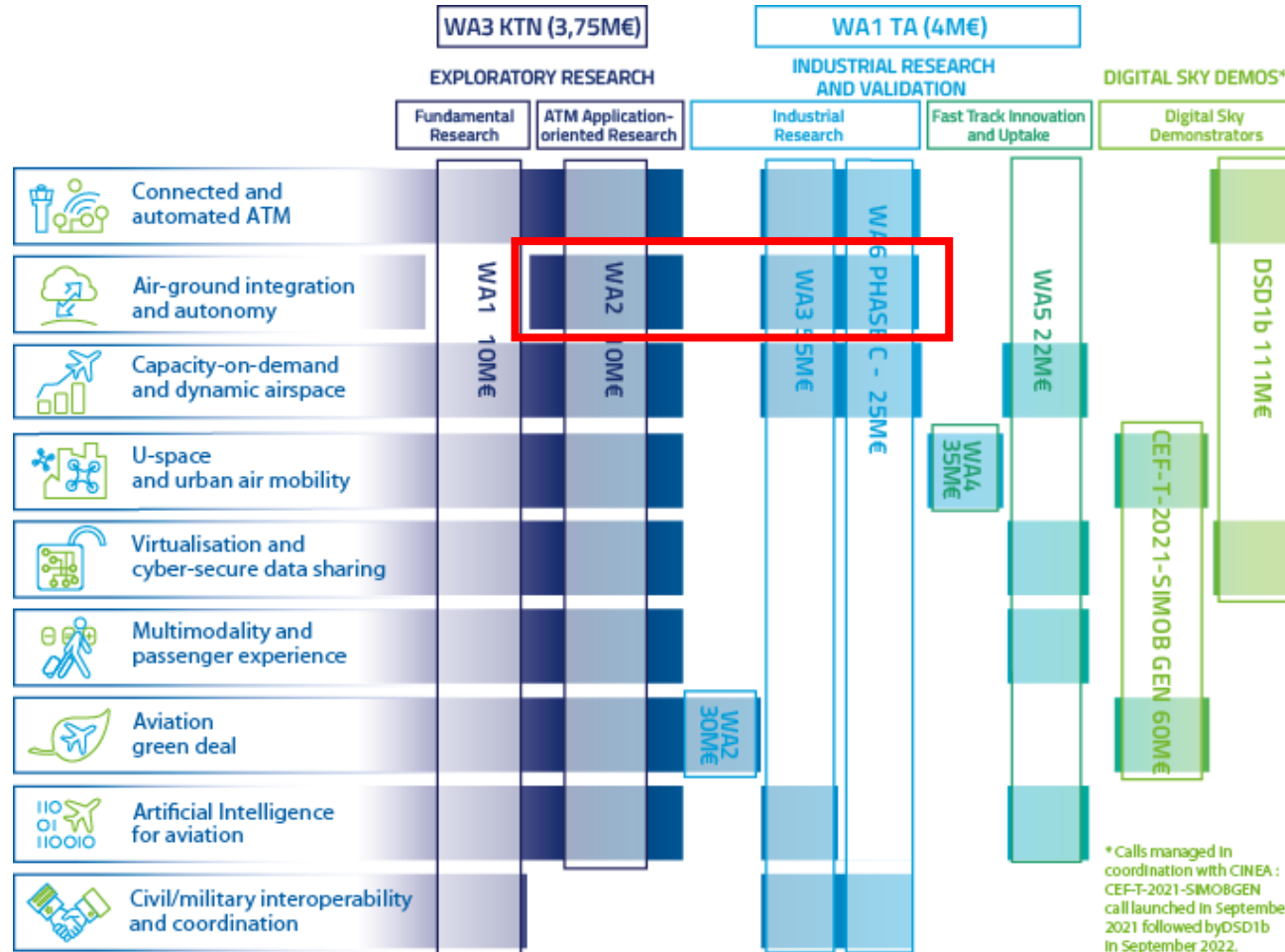
- Publication : 07 April 22
- Info day : 22 April 22
- Deadline : October 22
- Evaluation : Nov 22-Jan 23
- GAP : February 23
- Signed Grants : before Summer 23

*HORIZON-SESAR-2022-DES-ER-01

**HORIZON-SESAR-2022-DES-IR-01

***CEF-T-2021-SIMOBGEN

Content structure (2022-2023 calls)



- Working Areas (WA) defined per R&I Pillar + additional working areas to secure key strategic content e.g. Green Deal, U-space

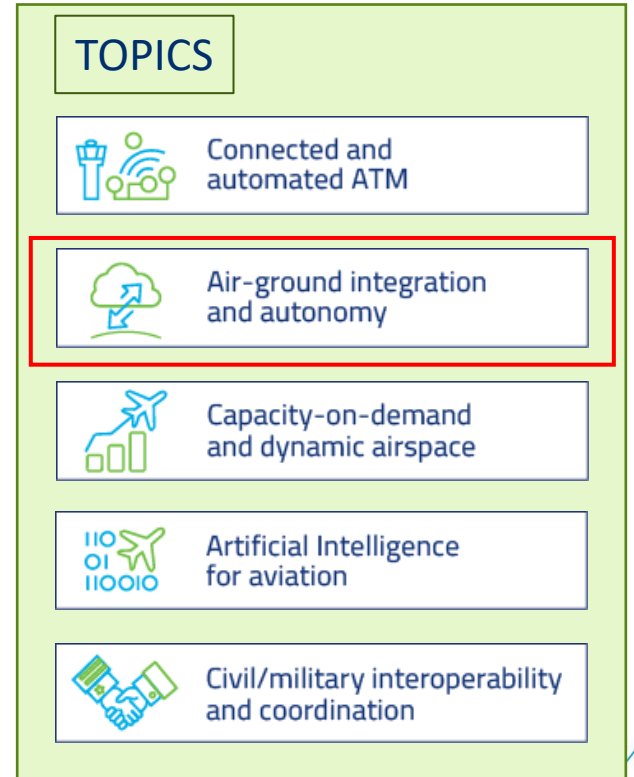
Not all pillars are covered for all flagships in the 2022-2023 calls

* Calls managed in coordination with CINEA : CEP-T-2021-SIMOB GEN call launched in September 2021 followed by DSD1b in September 2022.

- Topics per Flagship

WA 3 IR topics required to complete ATM Master Plan phase D

- ❑ Addresses Phase D of the ATM Master Plan 2020
 - ❑ Non-prescriptive set of SESAR solutions
 - ❑ Target TRL6
-
- *Fully scalable services supported by a digital ecosystem*
 - *Next generation of ATC platforms to deliver Trajectory Based Operations and virtualisation*
 - *Highly resilient and efficient airport operations, passenger-centric, multimodality*
 - *Single pilot operations, delegation of separation responsibility to systems assistants*
 - *High and Full Automation (level 4/5)*



WA 6 IR topics required to complete ATM Master Plan phase C

- ☐ Part of the scope of the first IR call ONLY
 - ☐ Focused on Phase C Key R&D solutions in ATM MP 2020 that will not complete TRL6 in SESAR 2020
 - ☐ Prescriptive solutions
-
- *Future satellite data link technologies SatCom Class A in a multilink environment (PJ.14-W2-107)*
 - *GBAS approach service type (GAST-F) (PJ.14-W2-79b)*
 - *IFR RPAS integration in controlled class A-C airspace (PJ.13-W2-117)*
 - *Increased flexibility of ATCO validations (PJ.10-W2-73 IFAV, PJ.33-W3-01a, PJ.33-W3-01b)*
 - *Collaborative Airport integration in the network (PJ.04-W2-28.2)*
 - *Integrated validation activities*

TOPICS



Connected and automated ATM



Air-ground integration and autonomy



Capacity-on-demand and dynamic airspace



Civil/military interoperability and coordination

THANK YOU FOR
YOUR ATTENTION