

# Bringing eVTOL one step closer: Enabling certification, Confirming design maturity, Facilitating validation

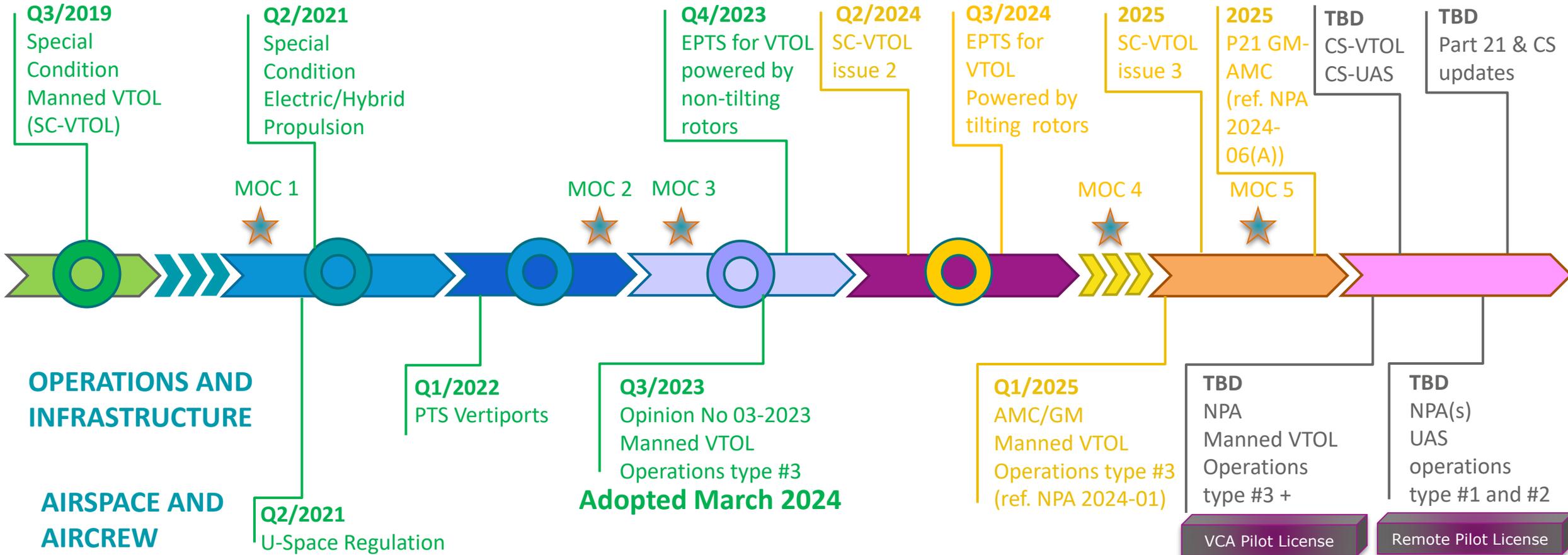
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# Enabling Certification: Our Journey

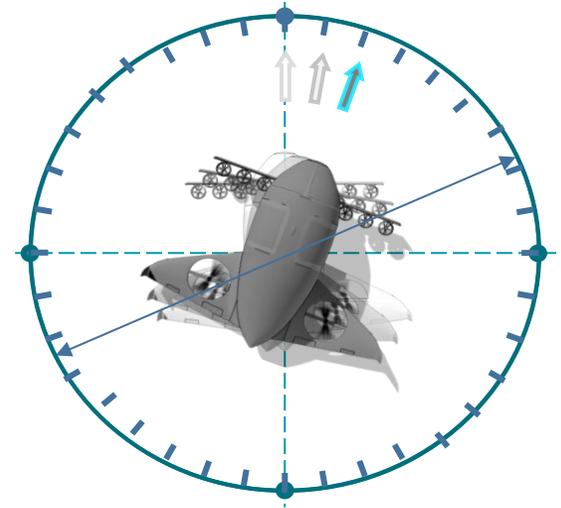


## TYPE DESIGN AND ENVIRONMENTAL PROTECTION



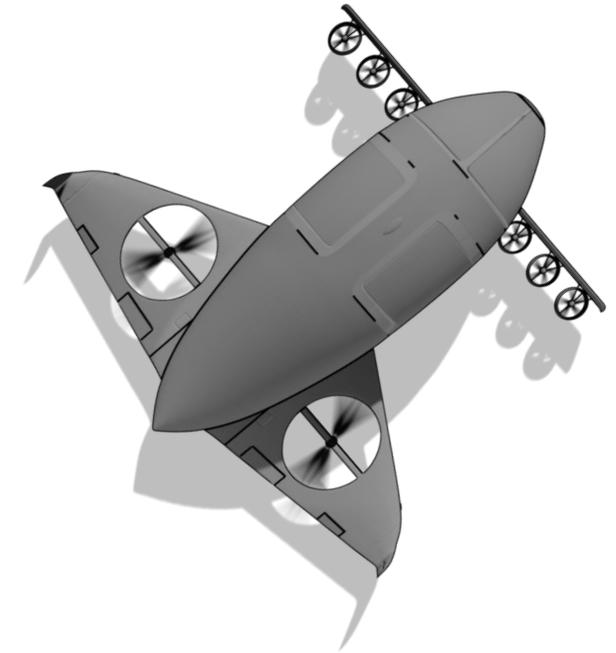
# Enabling Certification: SC-VTOL issue 2

- Applicability: Increase of the Maximum Certified Take-Off Mass from 3175 kg to 5700 kg, max. number of passenger remains 9
- Recorders: alignment with Part-IAM and consistency with lightweight recorder characteristics
- EASA/FAA Harmonisation: VTOL.2105(b)(1) and VTOL.2250(c)
- Introduction of Electrical Wiring Interconnection System (EWIS)
- Limited Overwater Operations
- Removal of Maximum Operating Speed (VMO and MMO)
- Consistency of safety objectives



# Enabling Certification: Outlook for Q4 2024 and 2025

- Easy Access Version including SC-VTOL issue 2 plus MOC-1, MOC-2 and MOC-3
- MOC-4 Final Publication and CRD
- MOC-5 containing :
  - Modified MOC VTOL.2555 Recorders
  - New MOC VTOL.2615(a) Air Data systems
  - New MOC VTOL.2517 EWIS
  - New MOC VTOL.2545 Pressurised systems
- Revision 3 of SC-VTOL – Further EASA/FAA Harmonisation

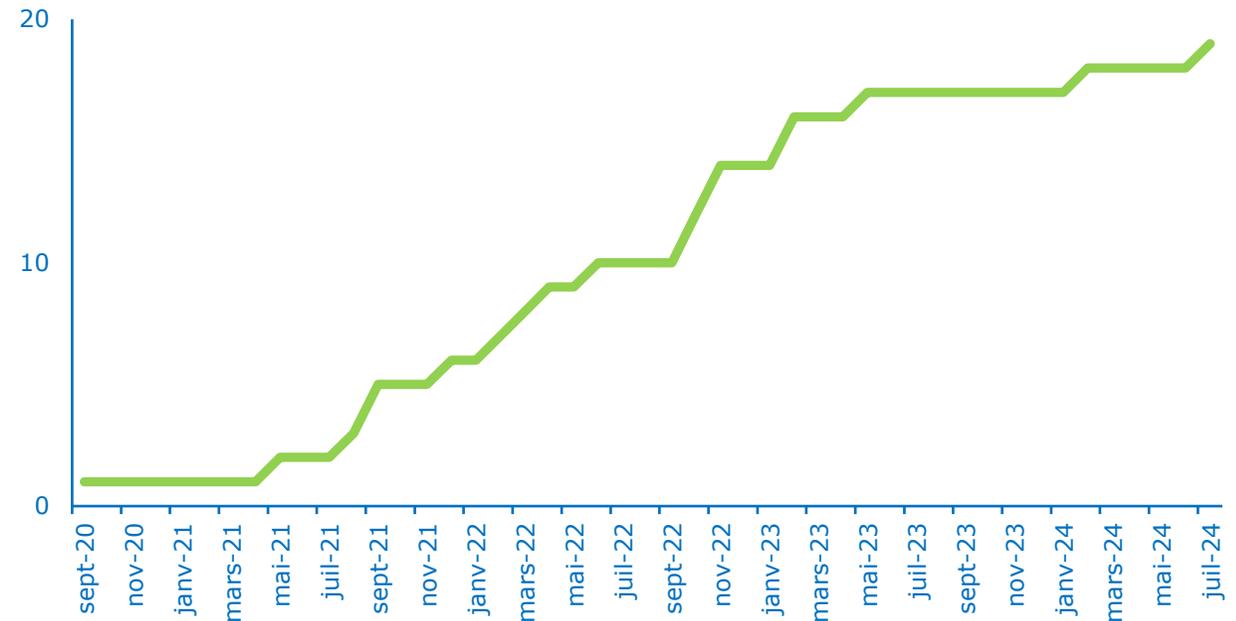


# Enabling Certification: Standardisation



→ Continued collaboration with Eurocae to develop standards that can be used and recognised as MOCs with the Special Condition VTOL (WG-112)

### Eurocae WG-112 Standards



# Confirming Design Maturity: Function & Reliability Testing

- Minimum Duration defined in 21.A.35(f)(2).
- Additional testing necessary for category enhanced under certain conditions.
- Representative flight duration.
- Minimum battery cycles to be agreed with EASA

Duration	Flight Hours		Cases	Use of integration benches
	Category Enhanced	Category Basic		
Minimum	150	150	All	No
Additional	150	0	New safety critical technologies and/or New engines	Yes

Certification Memorandum CM-21.A-B-003  
NPA 2024-06



# Confirming Design Maturity: Function & Reliability Testing

- Maturity to be shown with one main aircraft.
- Additional aircraft can be used.
- All aircraft shall be in the final configuration (deviations shall be agreed with EASA).
- Development and compliance flights can be used to a certain extent.

Aircraft Use	Category Enhanced	Category Basic
Minimum Amount of FH with same aircraft	50%	50%
Maximum Amount of FH for development, compliance, engine reliability and durability	30%	50%



# Facilitating Validation:



# Harmonisation

- eVTOL Taskforce established end of 2021 for Harmonisation of certification requirements. Participation extended to TCCA and ANAC.
- Five topics were identified as priority (others may follow).
- Discussions are ongoing to align where possible



# Facilitating Validation:



# Harmonisation

## SG 1

- Flight control philosophy
- HQ approval methodology

## SG 2

- Aircraft performance
- Continued Safe Flight and Landing

## SG 3

- Propulsion Battery Thermal Runaway

## SG 4

- High energy fragments

## SG 5

- Single Point failures

- Handling and Flying Qualities: XX.2135 and XX.2145. Plus XX.2140, XX.2150, XX.2155, XX.2160 and XX.2170

- Altitude 2105(b)
- Performance: 2105, 2110, 2115, 2120, 2125 and 2130
- CSFL/CEL 2000
- Autorotation/gli ding equivalent 2105(g)

- CMT (ANAC-EASA-FAA-TCCA) Decision Document

- Rotorburst: 1st [2320(a)(2)] & cascading failure [2320(a)(2) and 2240]
- Birdstrike, incl. proportionality, difference rotor/propeller, multiple birdstrike

- No single failure catastrophic for structures [XX.2250(c)]
- Structural durability [XX.2240(c)]



# Facilitating Validation:



# Harmonisation

## Opportunities

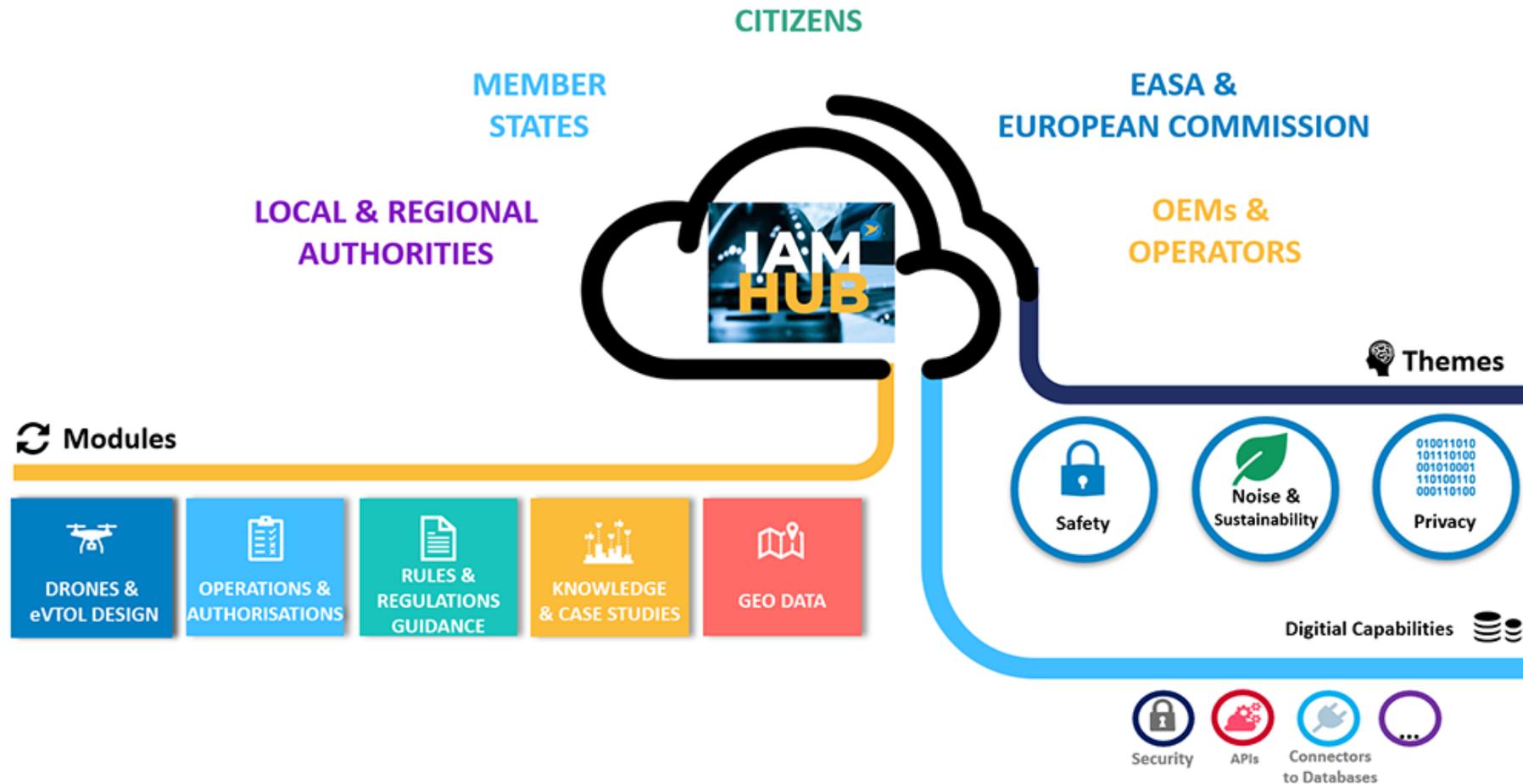
- Non-prescriptive / performance-based airworthiness requirements – FLEXIBILITY to adjust through policies
- Creation of eVTOL task force and leveraging multilateral cooperation mechanisms

## Challenges

- Insufficient exposition to the same data/projects.
- Interconnected considerations Design-Operations-Infrastructure
- Different rulemaking process and pace



# And... Enhancing collaboration: EASA IAM Hub



Thank you  
for your attention!

Your safety is our mission.



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