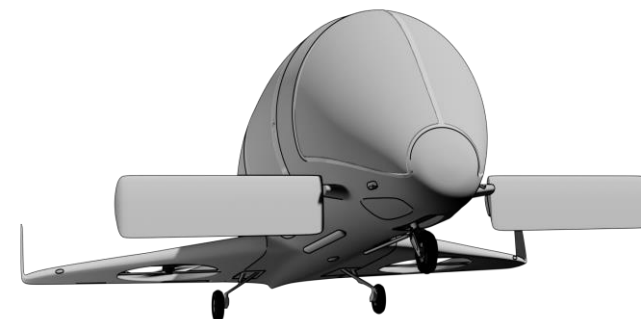


Bringing eVTOL one step closer: Enabling certification, Confirming design maturity, Facilitating validation

Oswaldo LOPEZ BLAS
Section Manager eVTOL, EASA



Enabling Certification: Our Journey



TYPE DESIGN AND ENVIRONMENTAL PROTECTION

Q3/2019
Special
Condition
Manned VTOL
(SC-VTOL)

Q2/2021
Special
Condition
Electric/Hybrid
Propulsion

Q4/2023
EPTS for VTOL
powered by
non-tilting
rotors

Q2/2024
SC-VTOL
issue 2

Q3/2024
EPTS for
VTOL
Powered by
tilting rotors

2025
SC-VTOL
issue 3

2025
P21 GM-
AMC
(ref. NPA
2024-
06(A))

TBD
CS-VTOL
CS-UAS

TBD
Part 21 & CS
updates

MOC 1

MOC 2

MOC 3

MOC 4

MOC 5

**OPERATIONS AND
INFRASTRUCTURE**

Q1/2022
PTS Vertiports

Q3/2023
Opinion No 03-2023
Manned VTOL
Operations type #3
Adopted March 2024

Q1/2025
AMC/GM
Manned VTOL
Operations type #3
(ref. NPA 2024-01)

TBD
NPA
Manned VTOL
Operations
type #3 +

TBD
NPA(s)
UAS
operations
type #1 and #2

**AIRSPACE AND
AIRCREW**

Q2/2021
U-Space Regulation

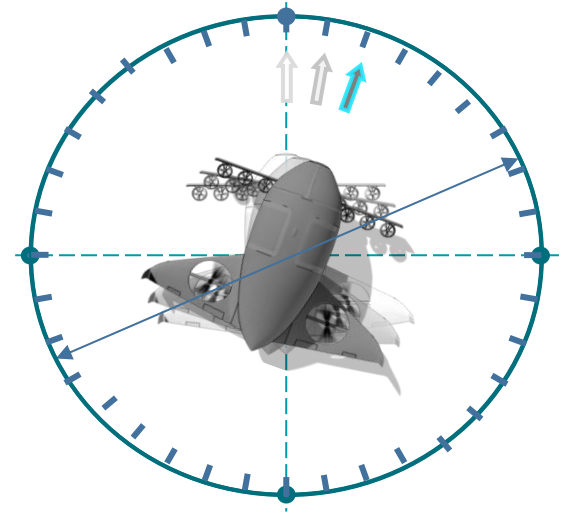
VCA Pilot License

Remote Pilot License



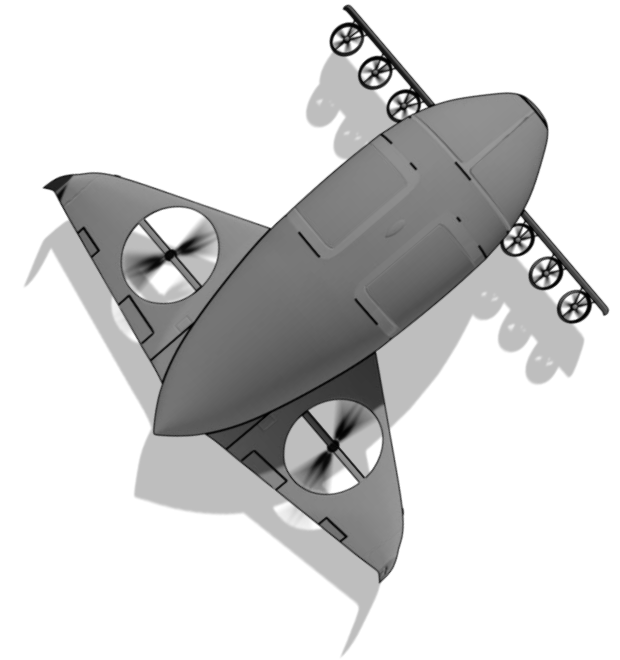
Enabling Certification: SC-VTOL issue 2

- 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

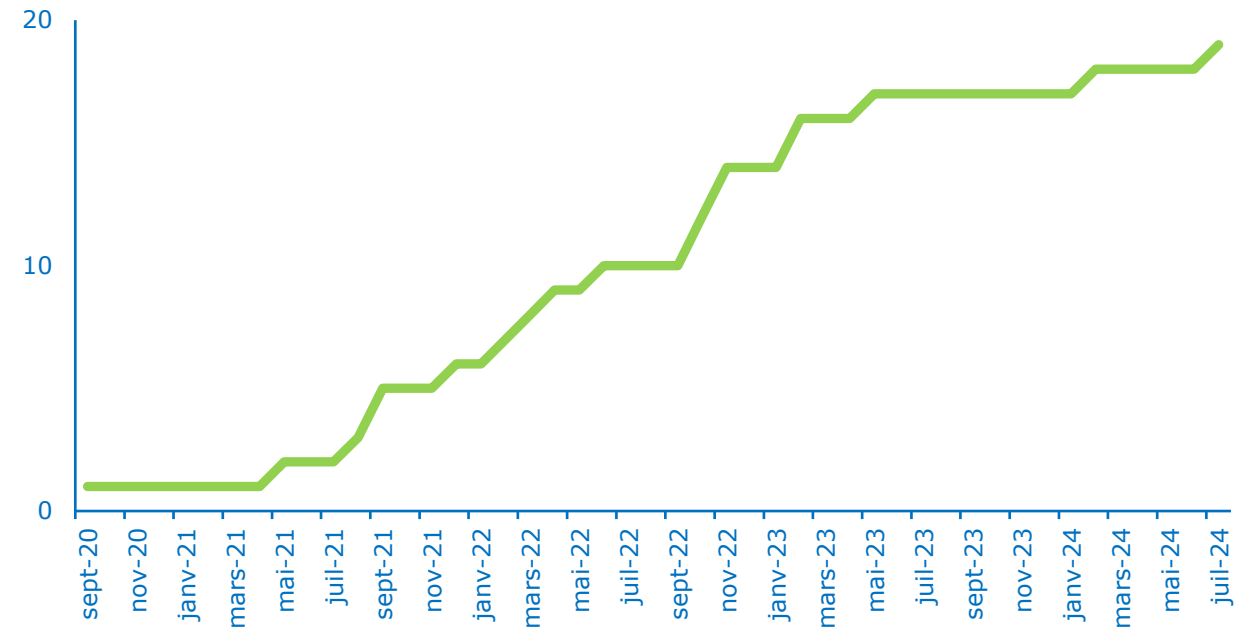


Enabling Certification: Standardisation



→ 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

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

SG 2

- Aircraft performance
- Continued Safe Flight and Landing

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

SG 3

- Propulsion Battery Thermal Runaway

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

SG 4

- High energy fragments

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

SG 5

- Single Point failures

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



Facilitating Validation:



Harmonisation

Opportunities

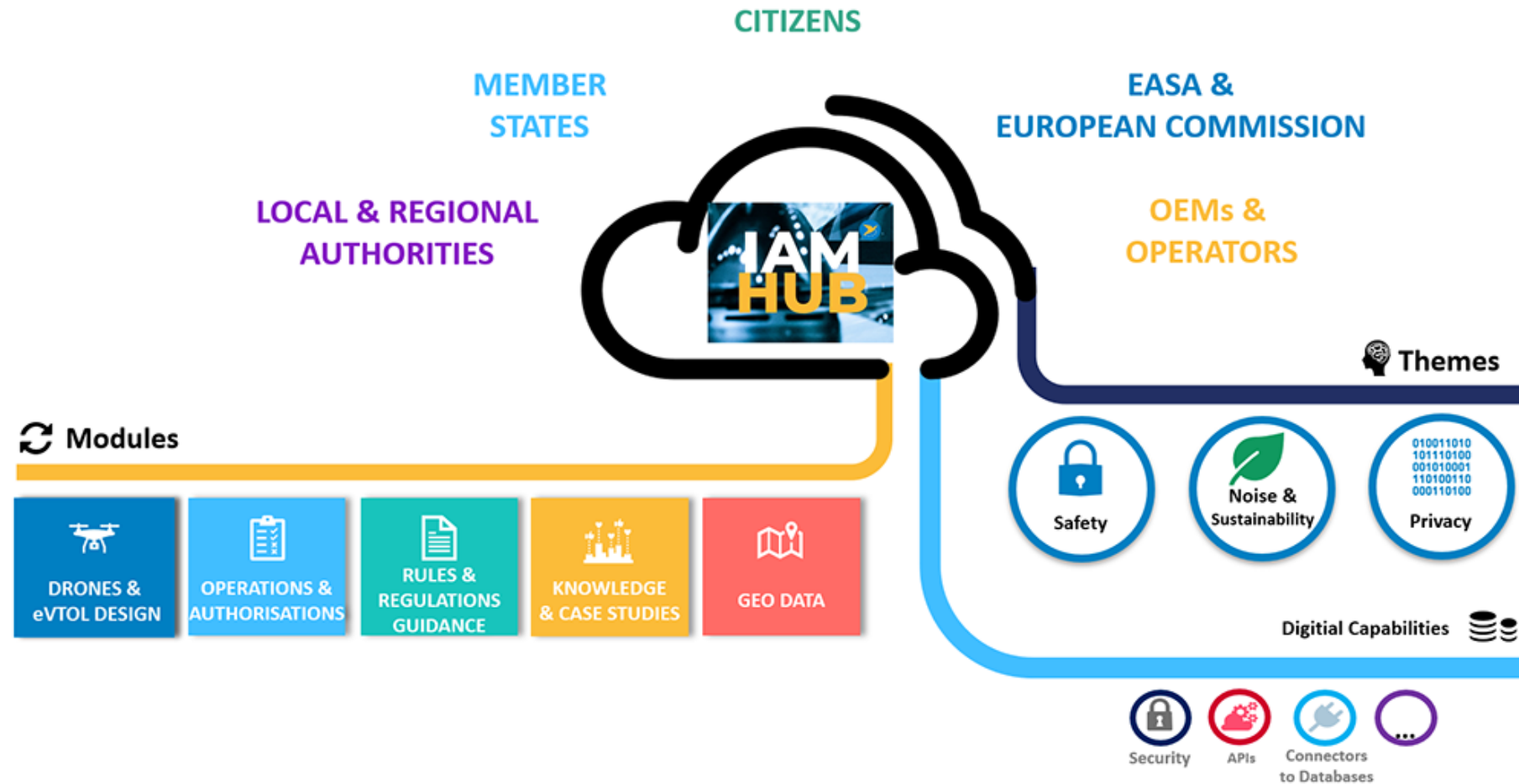
- Non-prescriptive / performance-based airworthiness requirements – FLEXIBILITY to adjust through policies
- Creation of eVTOL task force and leveraging multilateral cooperation mechanisms

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.

