

## Webinar discussion session – Questions & Answers

**Q1:** What do the passenger costs look like so far for the average trip? *from Chris Drew*

**Answer by MAHEPA:** Same cost as in a passenger car, although not at the beginning as it will depend on the scalability.

**Q2:** Do you think the MAHEPA H2 aircraft will be certified to commercial flights in 2025? *from Pilar Argumosa*

**Answer by MAHEPA:** We believe that with the best engineering team, the best collaboration with the agency and “infinite” budget the goal of certifying the first H2 aircraft by 2025 is achievable

**Q3:** How about the uncertainties of the input parameters in the model? Have you considered uncertainty/variations of inputs in your simulations and would you be trying to consider these through some e.g. Monte-Carlo-based approaches or neural networks? *from Michael Auinger*

**Answer by MAHEPA:** Nothing is there yet, so uncertainty, but parametric studies. Deterministic methods.

**Q4:** What will be regulator's perspective and how to address to the huge traffic increase? Airstrips? Pilots training? *from Alex Gomes*

**Answer by EASA:** It could take several years to build up the market demand as well as the respective infrastructure. Yet it appears feasible to build up the logistic side including airfield access, equipment and personnel. Generally speaking, the regulatory framework would be ready for such a roll-out.

**Q5:** Do you see the Microfeeder concept in competition to the VTOL? *from Boris Kölmel (EASA 21J.411)*

**Answer by MAHEPA:** We see eVTOL vehicles serving urban markets, particularly within urban metro-centers. The microfeeder concepts has 5x capacity over a typical eVTOL and is envisioned to serve the inter-urban market segments. We believe eVTOL and Microfeeders can coexist, and do not see direct competition.

**Q6:** With respect to innovation and projects that require new guidelines/ laws, should people just work being hopeful of the European Union creating new laws in the future or should teams first work on ensuring a framework/ law / regulation is enacted before stepping further into the project? *from Karthikumar Sambasivam*

**Answer by EASA:** One of the roles of EASA is to anticipate the evolution of the regulatory framework at an early state. EASA is therefore keen to contribute to research activities in particular with advice on certification and regulation aspects. EASA is doing this already now for selected research projects and intends to increase its efforts for future aviation related research programmes under Horizon Europe. With this, a process of parallel development of both innovation and regulatory framework should be ensured.

**Q7:** Are you planning to use any regenerative technologies on these hybrid-electric planes? *from Jatinder Goyal*

**Answer by MAHEPA:** Yes, during descent the batteries can be charged.

**Q8:** How do you foresee the certification process of fuel cell based systems? Since there are no certification rules nor special conditions from EASA or standards like ASTM ones used in the certification of CS 23 batteries airplanes *from Adrian CORRERO*

**Answer by EASA:** EASA is developing the European regulatory framework along with the progress in research activities. EASA also contributes to the coordination of the development of the necessary industry standards, e.g. through SAE and Eurocae. This is done in close cooperation with the research community and other regulators, such as the FAA, and ICAO. Furthermore, it should be noted that not only the certification standards have to be in place in a timely manner but also the rules and standards in other affected domains, such as continuous airworthiness, air operations and aerodrome operations.

**Q9:** Which is the process a new company facing with hybrid technology can get in contact with EASA in order to establish a partnership program as depicted by Mr Leroy? *from Lucas Marchesini*

**Answer by EASA:** Please feel free to contact initially Willy Sigl from the EASA research team, [willy.sigl@easa.europa.eu](mailto:willy.sigl@easa.europa.eu). Depending on the nature of the intended cooperation, either the EASA Innovation Cell or the EASA Research team will be your primary contact at EASA.

**Q10:** But what about the safety issues of H2 on-board and the lack of regulation? Is it time in 5 years to develop all the safety requirements to fly with H2? *from Pilar Argumosa*

**Answer by EASA:** As said above, EASA will develop the European regulatory framework along with the progress in research activities. High-level requirements can be established for low maturity levels within a short period of time. For an in-depth safety assessment and detailed requirements, however, the technology must have reached a higher maturity level.

**Q11:** Can you give us a notional idea of the reliability of each one of the key components in the chosen architecture and whether it will achieve or not the expected levels required to certify a Part 23 airplane? *from Fabricio Spigolon*

**Answer by MAHEPA:** It is not possible to offer a generalized reliability figure for all the key components. To comply with Part 23 requirements a thorough safety assessment process will have to be performed. Anyway, hybrid electric powertrains, having different power sources, could offer multiple solutions to cope with safety requirements.

**Q12:** Is there an expectation from regulators of impact /update on the guidances / regulations related to complex systems and software development to cope with increased level of integration, such as do-178, arp4754 and/or arp4761? If yes, what would be the time frame? *from Luis Samico*

**Answer by EASA:** The standards deal with the processes with regard to safety assessment (ARP-4761) and development assurance (ARP-4754) for highly integrated and complex systems. DO-178 deals with software development. Currently we see developments on the updates of these standards. EASA is at this moment not foreseeing impacts on European regulations.

**Q13:** Would the new regulations come under general aviation regime? *from Ninad Chavan*

**Answer by EASA:** This depends on the type of technology and for which category of aircraft the technology will be used.

**Q14:** Thank you for those very interesting presentations. I'm involved in research activities about adequacy of CS23 Amdt.5 and existing MOC for advanced a/c concepts. For MAHEPA, do you have identified any significant gaps on the route to certify a HE aircraft with respect to current regulation/airworthiness standards or current safety assessment process? *from Joel JEZEGOU*

**Answer by MAHEPA:** Yes, there is a public deliverable on the MAHEPA website that addresses this topic.

**Q15:** Hello, pertaining lithium-ion technology can you comment about liquid cooled battery in terms of overall weight and safety please? *from Edmar Alino*

**Answer by MAHEPA:** Liquid cooled batteries, including all systems, have actually cell level energy density in the range of 200 – 300 Wh/kg. Nevertheless, cells technology is progressing fast therefore it is hard to say what the future will be. In terms of safety, liquid cooled batteries are as safe as any other aeronautical system needs to be, and the weight penalty is manageable

**Q16:** Also the maintenance aspect involve the current B2 AML more.. *from Ninad Chavan*

**Answer by EASA:** The continuous airworthiness domain including the competences needs and qualifications of maintenance certifying staff as well as the requirements for maintenance training organisations are important building blocks for the integration of new technologies and innovations. As said before, the evolution of the regulatory framework needs to address all aviation domains.

**Q17:** For the sake of sharing of innovation knowledge, the projects on Liquid cooled battery and Cooling Systems Design are available to public? *from Edmar Alino*

**Answer by EASA:** For publicly-funded research projects, final research results are usually accessible to the general public.

**Q18:** Hello all, is it also under study to render the future hydrogen/electric/hybrid aircraft completely autonomous or with only one pilot? How is EASA preparing the future in this regard? *from Alexandre ADELLE*

**Answer by EASA:** EASA is preparing itself to handle future certification projects for single pilot operations and eventually fully autonomous systems. The propulsion architecture is an element of the overall safety assessment but not the determining factor.

**Q19:** Thanks for the interesting presentations. Will the slides be made available to the participants? *from Jaap Doornbos*

**Answer by EASA:** Yes, they'll will be published on the EASA's webpage.

**Q20:** Do you consider the massive investments and work required for securing and upgrading small airstrips & airfields to minimum airport standards (PAX handling, security, but also hangar, parking, public transport connection, power generation etc.) to enable such aircrafts operations? *from emmanuel.schmitz@luxaviation.com*

**Answer by MAHEPA:** Yes, these topics are considered in the analyses performed by the MAHEPA universities partners.

**Q21:** General question on the innovation level supported by EASA. It was said "the earlier stage the better". How do you translate this into a TRL (technology readiness level)? *from Michael Auinger*

**Answer by EASA:** EASA is currently already involved in research projects from TRL 3. This seems to be an appropriate entry level for EASA contributions also for the future.

**Q22:** Please could you write down some e-mail directions to get into contact with EASA in relation to the future regulation for hydrogen and fuel cell systems? Thank you again for the incredible workshop. *from Adrian CORRERO*

**Answer by EASA:** [willy.sigl@easa.europa.eu](mailto:willy.sigl@easa.europa.eu).

**Q23:** Thanks for the presentation. It will be very kind if you can share the slides. Thanks *from anger*

**Answer by EASA:** Yes, they'll will be published on the EASA webpage.