

Technological and Operational Roadmap for Greening of Aviation

Track Number 2200

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Abstract

The session focuses on the more recent results in the fourth and last year of the project EFACA (Environmentally Friendly Aviation for All Classes of Aircraft). After an introductory overview of the EFACA project (Paper 1), it goes into more detail at the five levels of the project: (i) **Level 1:** Laboratory and test bench demonstration to TRL3 of 3 critical technologies, namely: (Paper 2) A gearbox combining power from a gas turbine and electric motor to drive a 700 HP propeller; (Paper 3) An hydrogen fuel cell with novel phase change cooling to boost efficiency and operability; (Paper 4) A complete liquid hydrogen fuel system, comprising cryogenic storage and transport, vaporizer and combustor; (ii) **Level 2:** Status and prospects of two technologies: (Paper 5) Advances in battery power for emissions free flight of small aircraft; (Paper 6) Alternative sustainable aviation fuels for carbon neutral flight of large long-range airliners; (iii) **Level 3:** Preliminary design of two aircraft types: (Paper 7) A propeller regional airliner (PRA) with 1000km range with 80 passengers using hybrid turboelectric propulsion combining turboprop and hydrogen fuel cell in the ATR72-600 class; (Paper 8) A liquid hydrogen fuelled jet liner (LHJ) with 2000km range with 150 passengers in the A 220/320 class; (iv) **Level 4:** Assessment of the current and future status of (Paper 9) Airport Noise and (Paper 10) Local and Global Emissions of all types (CO₂, NO_x, Sulphur, Particles and Contrails), including the benefits of the 2 EFACA designs: PRA/LHJ compared with current ATR72-600/A320neo; (v) **Level 5:** Roadmap for greening of aviation (Paper 11), relative to ACARE FlightPath 2050, EU FIT 55 for 2035 and ICAO NetZero 2050 targets, bearing in mind the benefit of new technologies and time scale for replacement of older by cleaner aircraft.

References

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