Electrified Propulsion

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Air traffic will double in the next 15 years

One of our airplanes takes-off or lands every 2 seconds...

Air transport is a growth market

Air traffic will double in the next 15 years

Our industry has to set high environmental standards
CO2 technologies

Actively pushing all levers to reduce carbon footprint...

Structure weight reduction

Propulsion Technologies

Aerodynamic Efficiency

ATM Technologies
CO2 technologies

... including energy options and disruptive propulsion concepts.

- Turbofan development
- Boundary Layer Ingestion
- Unducted Rotor
- Electrified Propulsion
- Distributed propulsion
- Sustainable Aviation Fuel
Electrification
Significant activities launched
Electrified Propulsion Perspectives

Opens new perspectives for propulsion energy

Airbus E-Fan 1.0
(2008 – 2012)
Endurance: 1hr + reserves
Battery: 120 Wh/kg

Airbus Zephyr HAPS
(2018)
Endurance: 25 days
Battery: 440 Wh/kg

…and radical vehicle configurations

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Hybrid electric propulsion – Prototyping and technology bricks

Airbus “E-Aircraft Systems House”:
We develop electric and hybrid propulsion technologies

New test facility capable of testing power systems up to 20 MW

Installation of CityAirbus complete configuration (8 motors)

To enter into service in 2019
Hybrid Electric Flight Demonstrators

- **DA36 E-Star**
- **E-Fan 1.2**
- **E-Fan 1.1**
- **E-Fan 1.0**
- **Siemens Extra 330LE**
- **Vahana**
- **CityAirbus**
- **E-Fan X**

First flight:
- **Cri-Cri**: 2010
- **e-Genius**: 2011
- **DA36 E-Star**: 2011
- **DA36 E-Star 2**: 2013
- **E-Fan 1.0**: 2014
- **E-Fan 1.1**: 2016
- **E-Fan 1.2**: 2016
- **Siemens Extra 330LE**: 2016
- **Vahana**: 2017
- **CityAirbus**: 2018
- **E-Fan X**: 2020
- **20XX**: 20XX

Power:
- **20W**
- **2MW**
- **200kW**
- **20kW**

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First flight in Jan 2018

Over 50 test flights – over 1000 subscale model test flights
City Airbus first take-off – 3 May 2019
Flight envelope expansion will start now
E-FAN X – 2MW hybrid electric propulsion flight demonstrator

Strong acceleration of learning and experience acquisition
Pushing limits further: 2 MW power class, UHV distribution, altitude operation
Hybrid electric propulsion for large commercial aircraft

From **Low power hybridization** to **Fully distributed propulsion**

… all hybridization options are studied, from several 100kW to 20MW
Electrification will play a major role to achieve our long term environmental targets.
SAE E-40 Electrified Propulsion Committee

**Standardization group** to address considerations for performance, airworthiness, safety, aircraft integration, components and interfaces within and between propulsion system and other aircraft equipment for future **Electrified Propulsion Aircraft**

- Initial scope, rational and roadmap set by the industry in Sept 18 (Toulouse)
- **E-40 Created by SAE organization in Nov 18**
- First meeting 26-28 Feb 19
- Next meetings: 10-12 Sept 2019 in Barcelona, 10-12 March 2020 in Tokyo