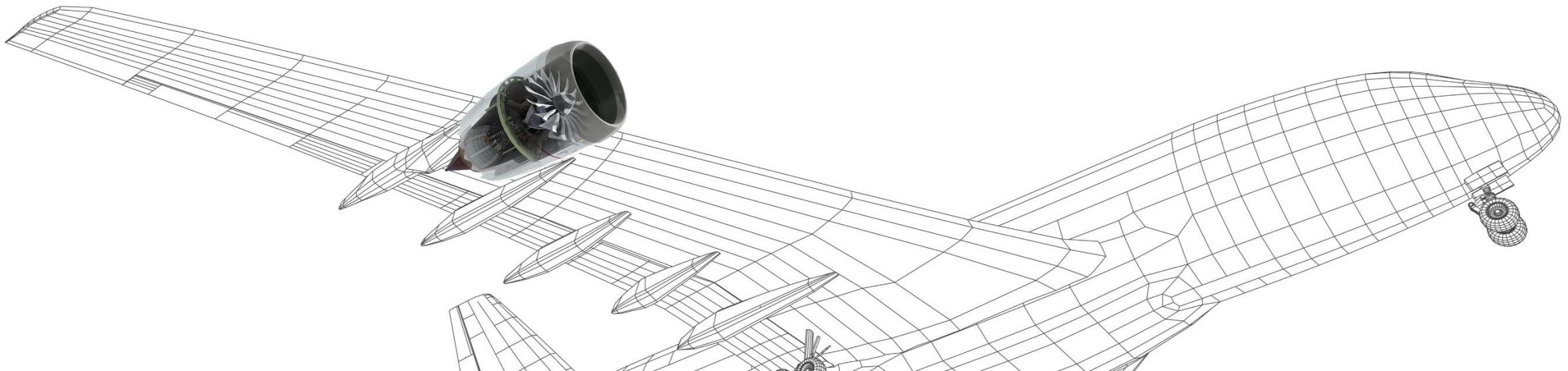


<u>Export Data</u>	
Tagger	<i>Giuseppe Pasquero</i>
Jurisdiction	Civil to be evaluated under Reg. (CE) 428/2009 as amended
Export Classification /Category	<i>No Export Controlled Technology (NECT)</i> Entry: 006218_20230503

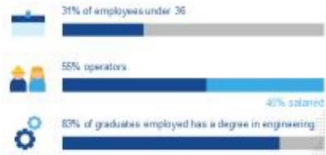


# Propulsion technology innovation



# Avio Aero in a “nut – shell”

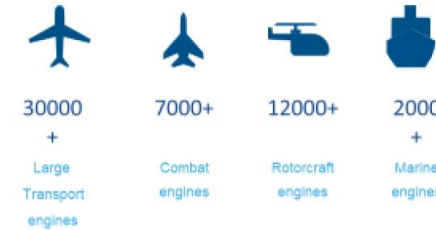
## A MAJOR EUROPEAN ENGINE PLAYER



5200+ PEOPLE  
ACROSS EUROPE

4300+ Italy  
900+ Poland and  
Czech Republic

## OVER 80% OF ALL COMMERCIAL AIRCRAFTS FLIES WITH OUR COMPONENTS



## PRODUCTS AND MANUFACTURING

- Additive manufacturing**  
Turin | Cameri | Brindisi | Pomigliano D'Arco (Italy)
- Airfoils**  
Bielsko-Biala (Poland) | Pomigliano D'Arco (Italy)
- Combustors**  
Pomigliano D'Arco (Italy)
- Controls**  
Bari (Italy)
- Frames and cases**  
Brindisi (Italy)
- Mechanical transmissions**  
Accessory Gearbox (AGB) | Power Gearbox (PGB) | Lube System  
Rivalta di Torino (Italy)
- Rotating components**  
Rivalta di Torino (Italy)
- Services**  
CRO | MRO  
Pomigliano D'Arco | Brindisi (Italy)
- Sand Casting**  
Borgaretto (Italy)
- Testing**  
Torino Sangone (Italy) | Prague (Czech Republic)

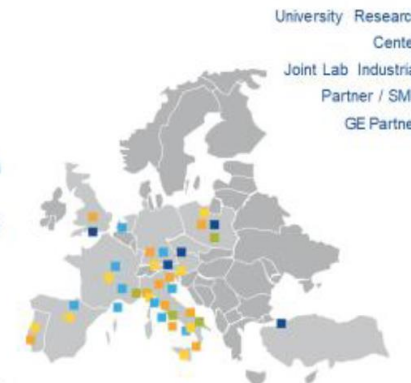
## RESEARCH AND DEVELOPMENT

Decades of collaborations with Italian and European Universities, Polytechnics and Research Centers

7 Joint Labs within the University campuses, where young talents and professionals collaborate in the development of the most innovative technologies

Small and medium-sized enterprises (SMEs) involvement in the *New Technology Introduction (NTI) Network*

New *EU Technology Development Cluster (E-TDC)*: the collaboration's network expands as it prepares for Clean Aviation's vital mission

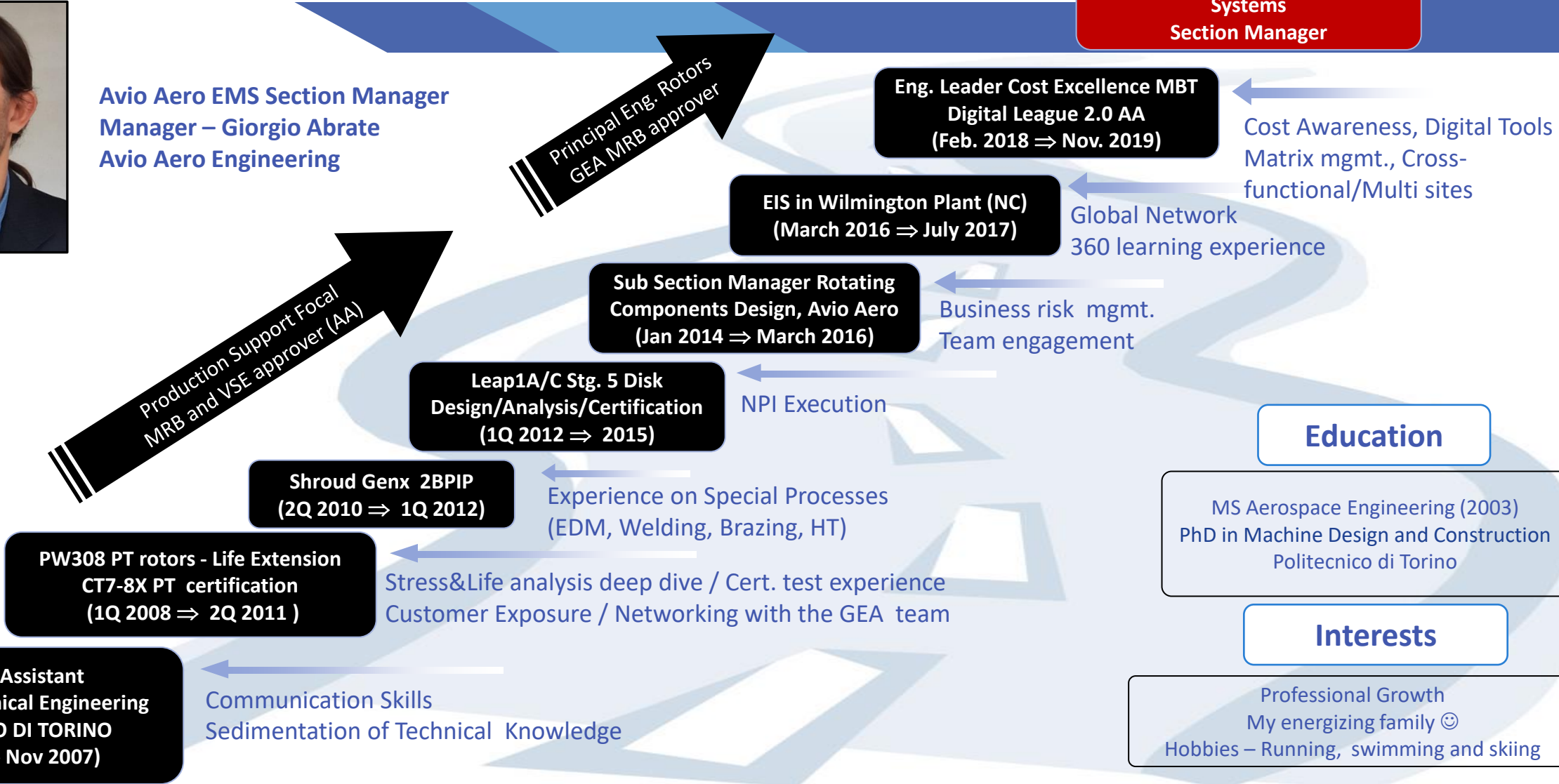


# Marco Allara



**Avio Aero EMS Section Manager**  
**Manager – Giorgio Abrate**  
**Avio Aero Engineering**

**Avio Aero Engineering Material Systems**  
**Section Manager**



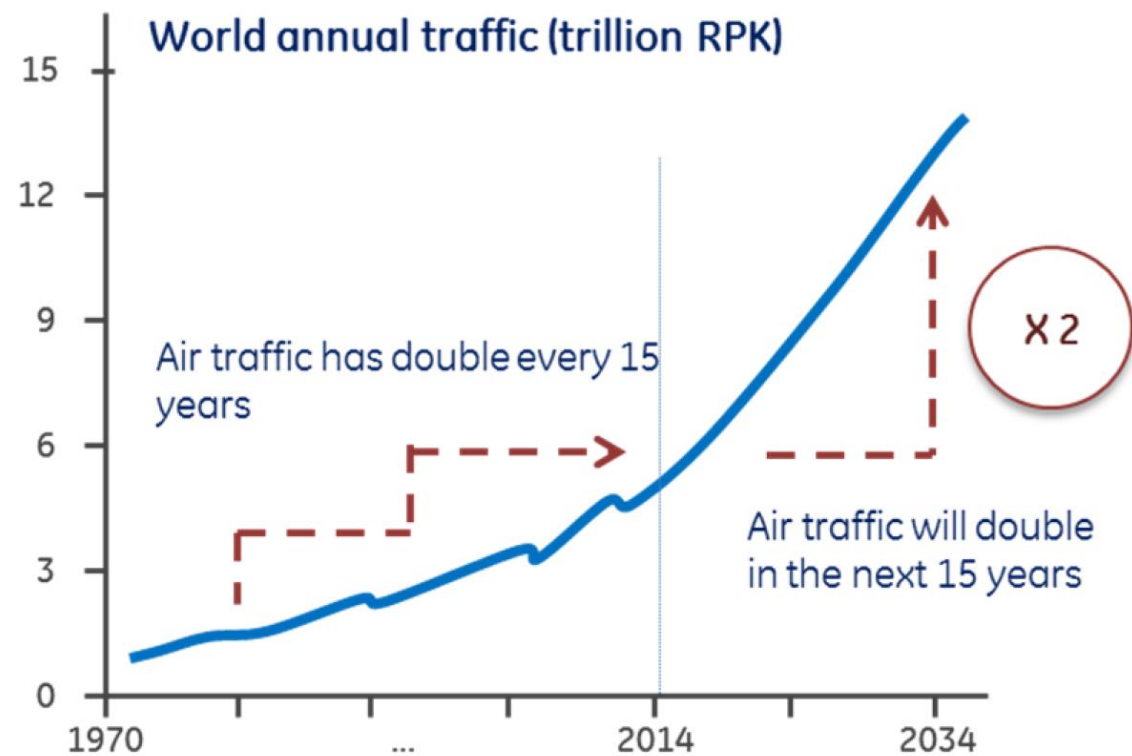
## Education

MS Aerospace Engineering (2003)  
 PhD in Machine Design and Construction  
 Politecnico di Torino

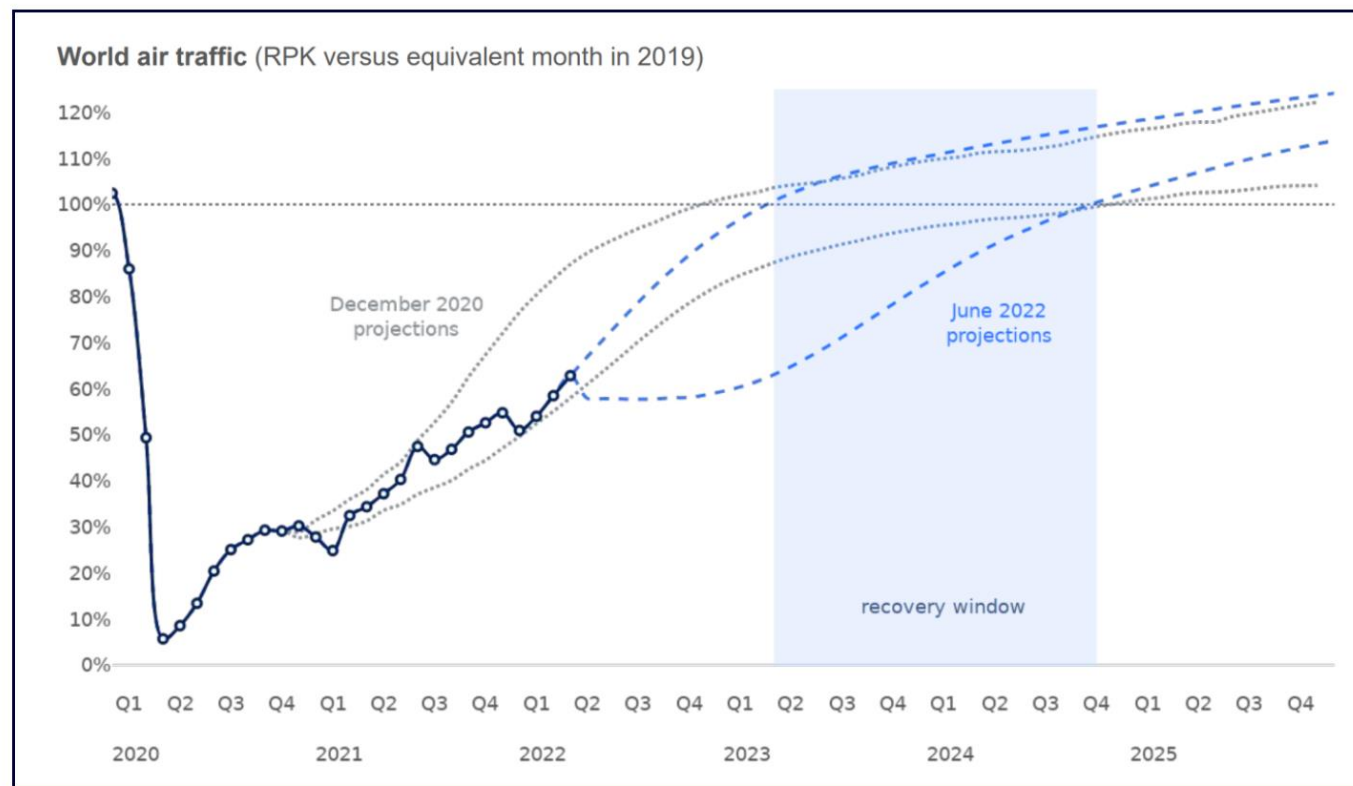
## Interests

Professional Growth  
 My energizing family 😊  
 Hobbies – Running, swimming and skiing

# Aircraft market landscape

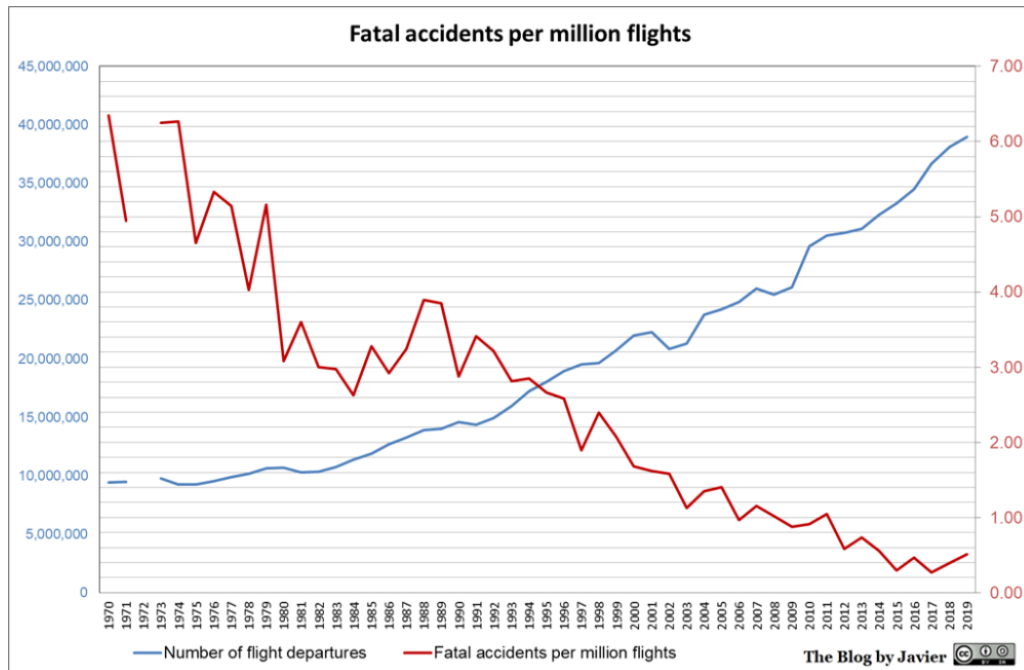


Source: ICAO, IATA Airbus GMF



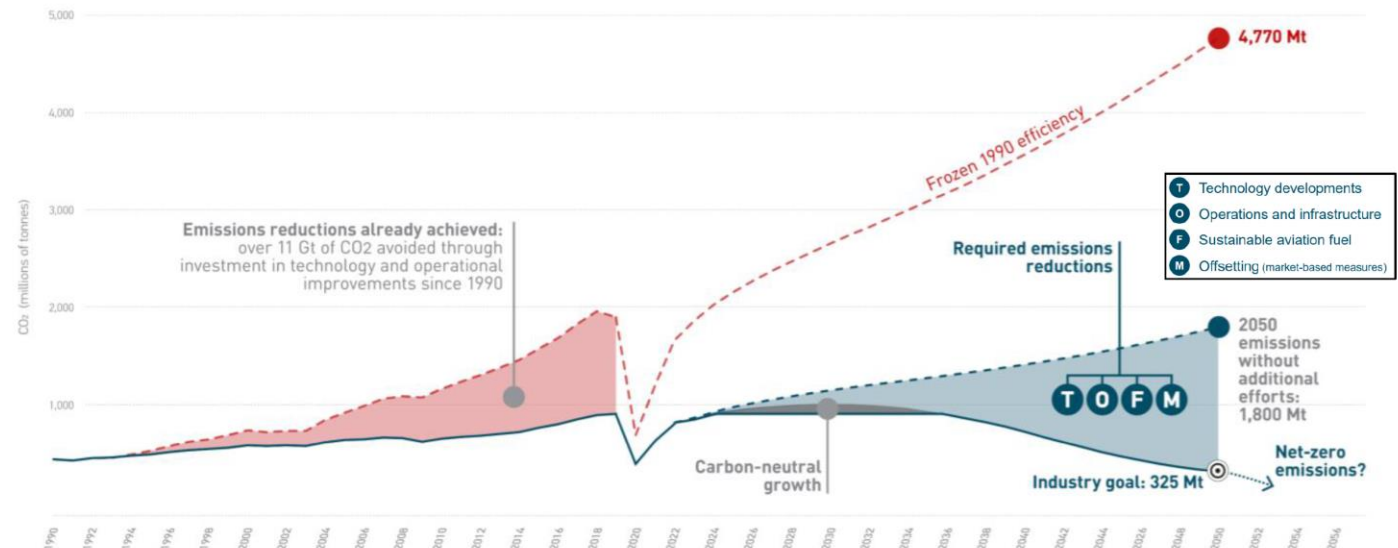
# Why do we need Technology Disruption?

## Safety



Source: ICAO, IATA Airbus GMF

## Environmental Impact – CO2



Source: IATA

# Innovation vs Disruption



*Exciting times ahead for aviation  
New architectures and new technologies*

*Perhaps the most exciting era since the Wright brothers  
and the jet engine introduction*

# Our Technology model ... meeting stakeholder needs

## Stakeholder needs

- Asset availability
- Efficiency / eco-friendly
- Predictability
- Reduced inspection burden



## Technology innovation

- Hybrid Electric
- Additive Manufacturing
- Digital Analytics
- Advanced Materials
- Cooling & Aerodynamics
- Architectures



**Reliable, economical,  
sustainable products**



**Hybrid Electric**



**Additive Mfg**

## Digital Analytics



# Ge Aerospace breakthrough technology demonstrators

## Hybrid electric

MW-class hybrid electric propulsion system development with NASA ... builds on GE's experience with motors, generators, power converters and power management systems



## Hydrogen

CFM International\* developing hydrogen combustion and fuel systems for Airbus ZEROe aircraft project ... builds on 8M operating hours with hydrogen in GE land turbines



## CFM RISE

GE and Safran Aircraft Engines program maturing advanced engine architectures like open fan, compact core and electric technologies for >20% better fuel efficiency vs. today's engines

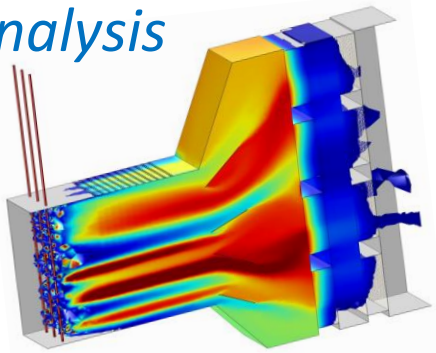


Source: ICAO, IATA Airbus GMF

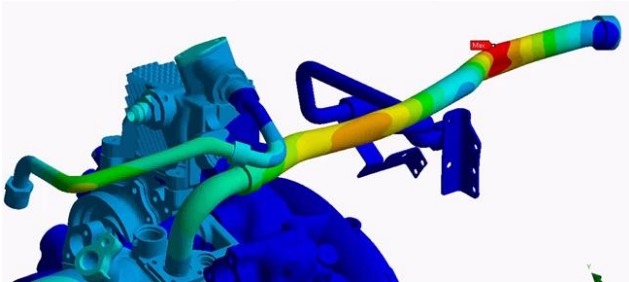
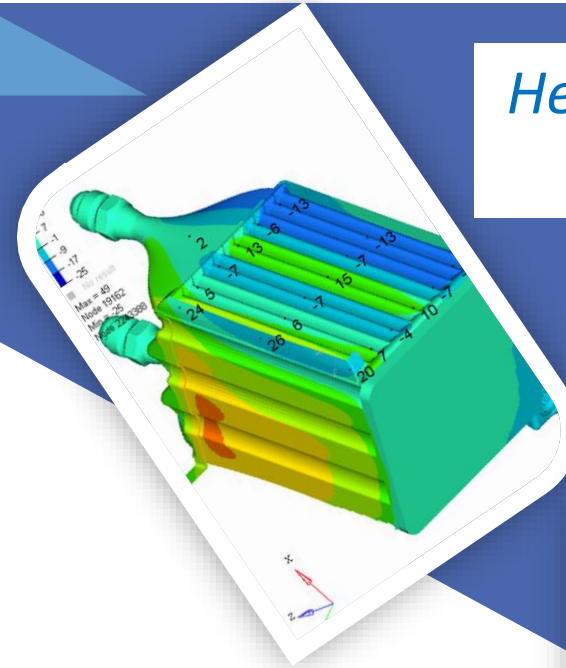


# ...just one example...Additive Heat Exchangers

CFD analysis

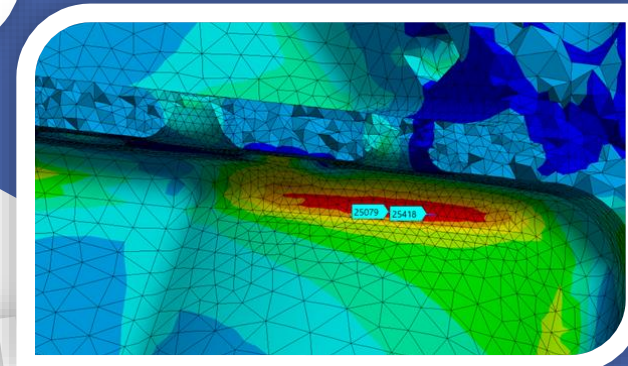


Heat Transfer Analysis



Modal Analysis

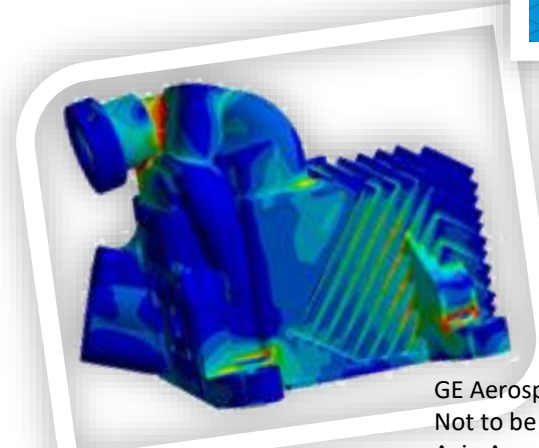
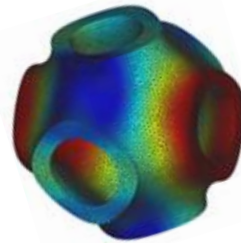
Life Analysis  
Probabilistic Approach



Stress Analysis

## Material & Manufacturing Process Modelling

- Additive Process Simulation
- HT simulation/ Residual stresses
- ....



Avio Aero 

A GE Aviation Business