

GE Aerospace: We invent the future of flight for a more sustainable industry



Innovating engine technologies for revolutionary efficiency

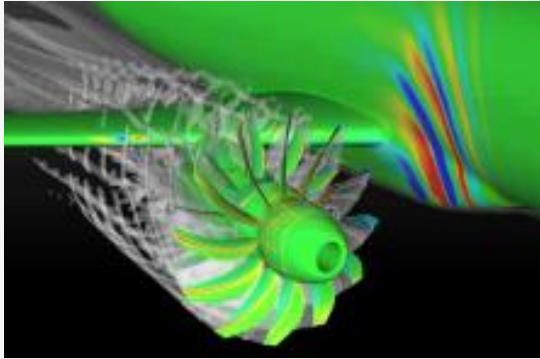
Lead the future of aircraft propulsion with technologies requiring less energy consumption

Compatibility with future clean energy sources

Shape, expand and support economically-viable clean energy solutions

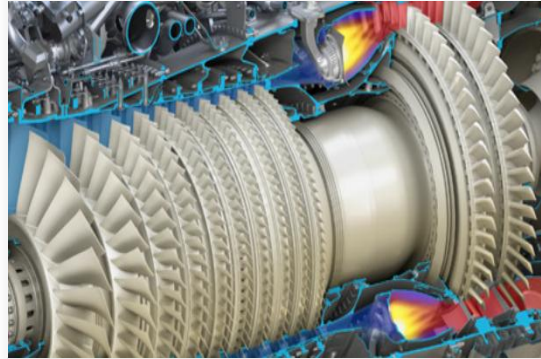
CFM's RISE program

Uncompromising new technologies



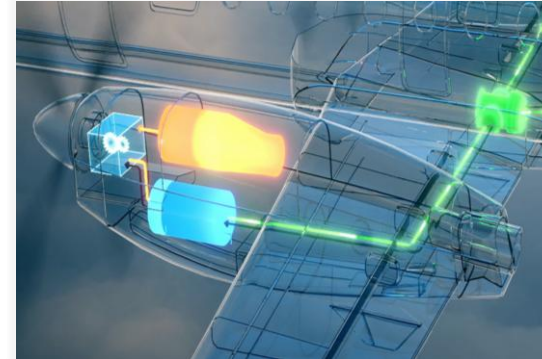
- Next-generation architecture
- Step-change in efficiency vs. ducted fans
- Targeting lower noise level vs current engine

Open Fan



- Next-generation compressor technologies & materials
- Increased thermal efficiency
- Higher operating pressure

Compact core



- Developing MW-class hybrid electric powertrain
- Advancing higher power density / lower weight components
- Decade+ of experience

Hybrid electric



- RISE technologies to be 100% SAF certified
- Developing key hydrogen propulsion building blocks

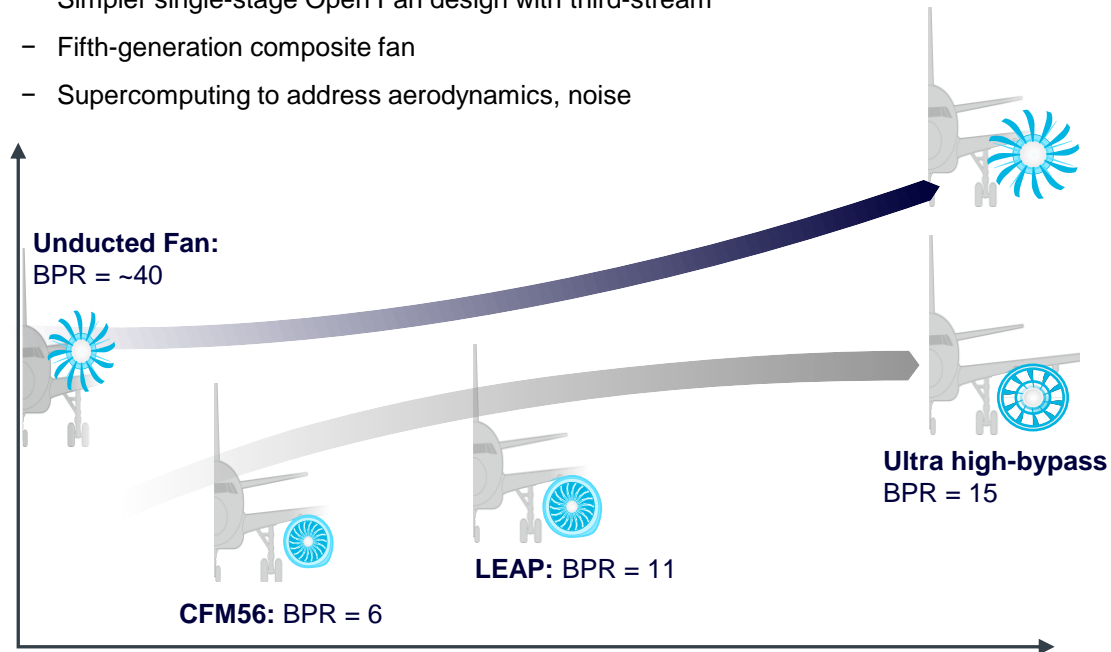
Alternative fuels

Open Fan provides most durable path to achieve >20% fuel burn improvement

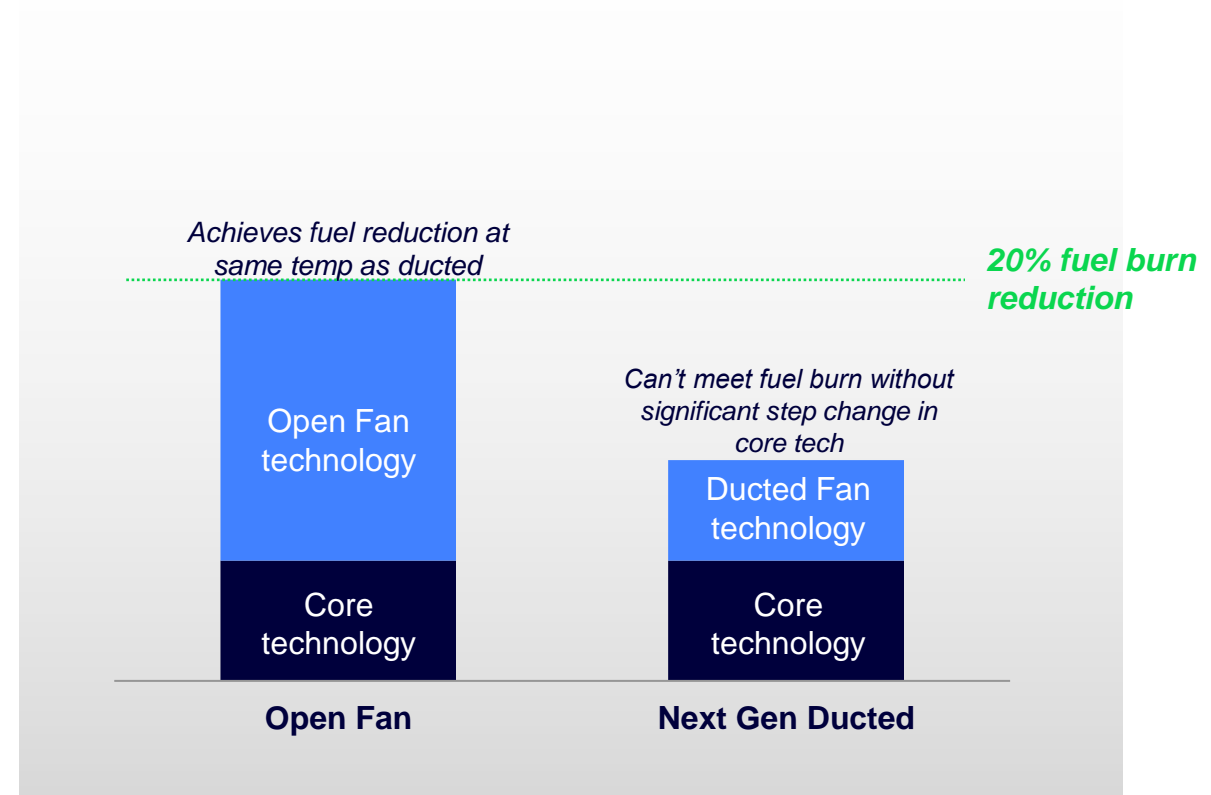
Unlocking propulsive efficiency ...

Advances over 40 years:

- Simpler single-stage Open Fan design with third-stream
- Fifth-generation composite fan
- Supercomputing to address aerodynamics, noise

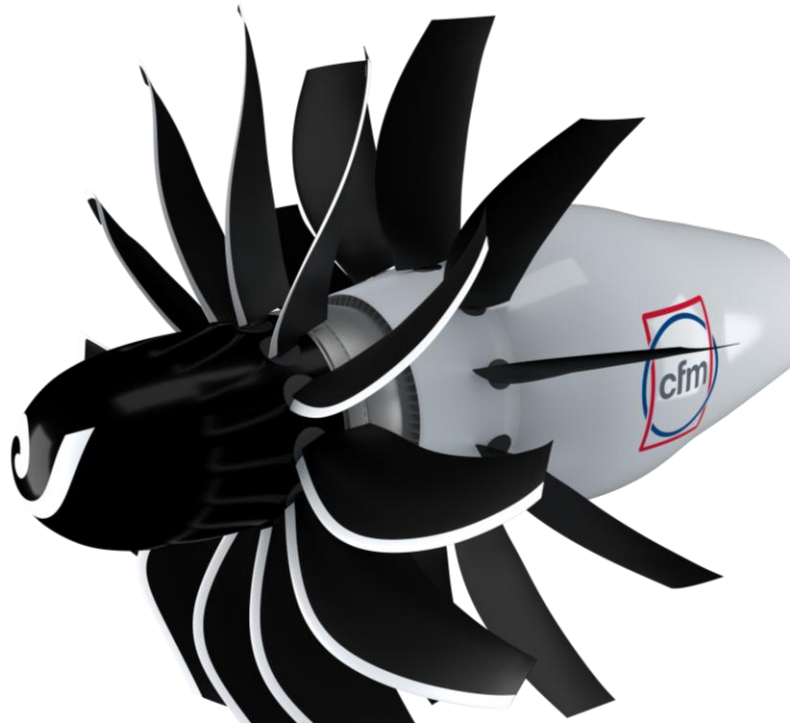


... with lowest risk path

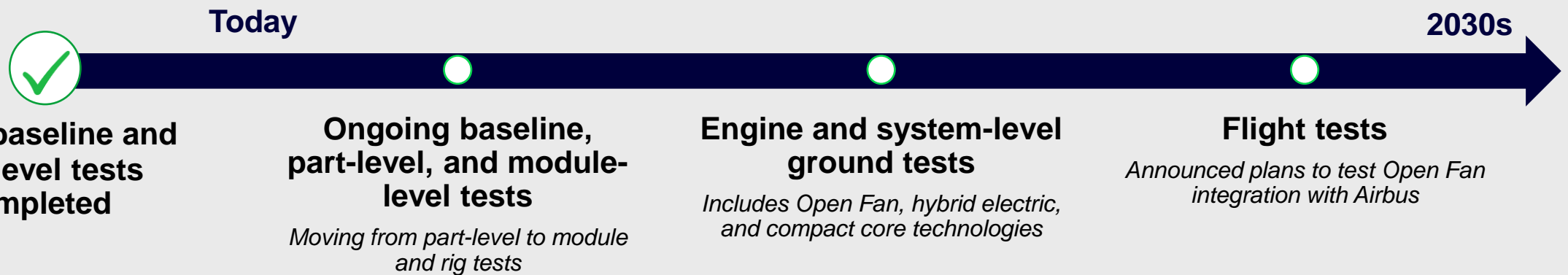


Why the time for Open Fan is now: Same physics, plus advanced new engineering capabilities

CFM RISE program: real tests, real hardware, real progress



Open Fan	<p>State-of-the-art design tools: New agreement w/ U.S. DoE to expand supercomputing capability, allows for improved aerodynamics</p> <p>Real testing: >200 hours wind tunnel and acoustic testing^{a)}</p> <p>Real hardware: First full-size Open Fan blades and outlet guide vanes (OGVs) for ingestion^{a)}, mechanical validation tests</p>
Compact core	<p>Second test campaign for high-pressure turbine airfoils started focused on endurance, showing early durability focus</p>
Hybrid electric	<p>NASA Turbofan Engine Power Extraction Demonstration component & engine baseline tests complete, transition to hybrid engine ground test</p>
Alternative fuels	<p>100% sustainable aviation fuel (SAF) compatibility, advancing hydrogen combustion</p>



(a – Completed by CFM

RISE is a program of CFM International, a 50-50 joint company between GE Aerospace & Safran Aircraft Engines.