

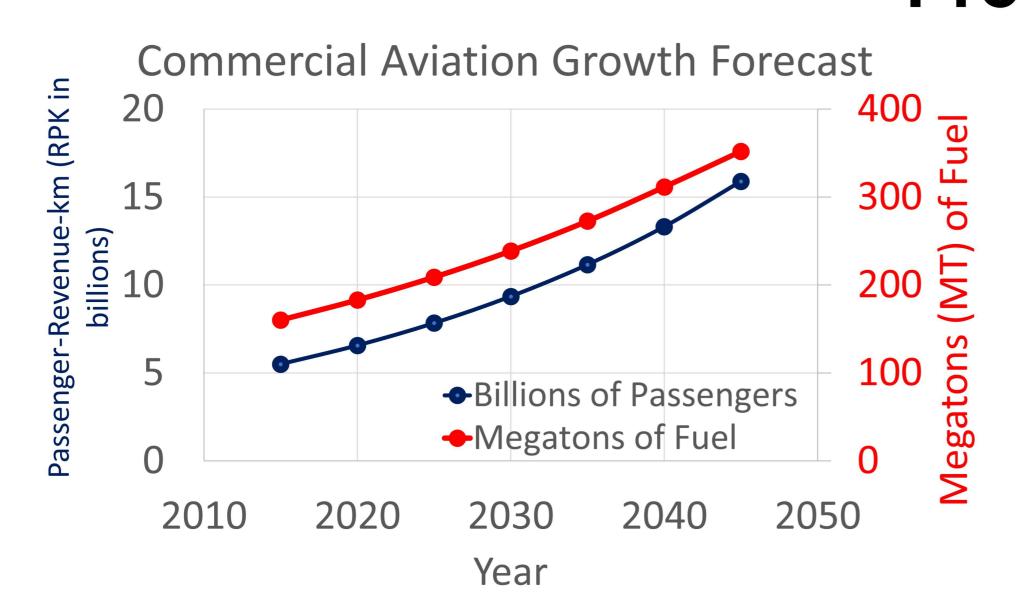


Flexible Airplanes?

Achieving higher fuel efficiency by continuously adapting wing geometry

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Problem

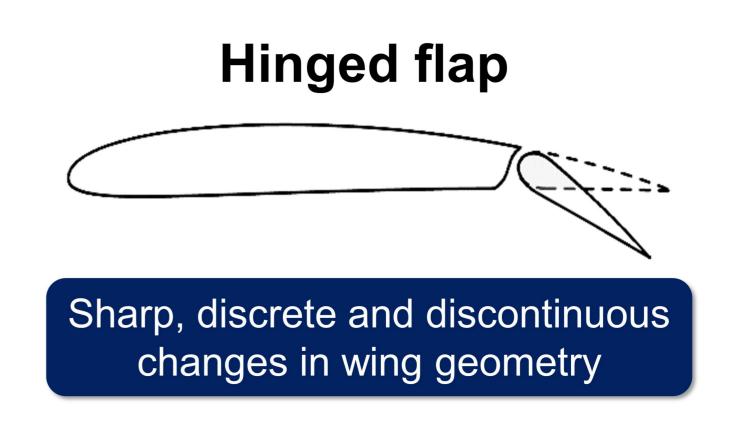


2.5%
of total CO₂ was emitted by aviation industry in 2019

Climate Emergency
Severe consequences for the environment



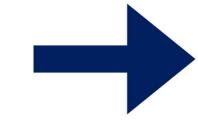
Technical Problem Highly turbulent wake



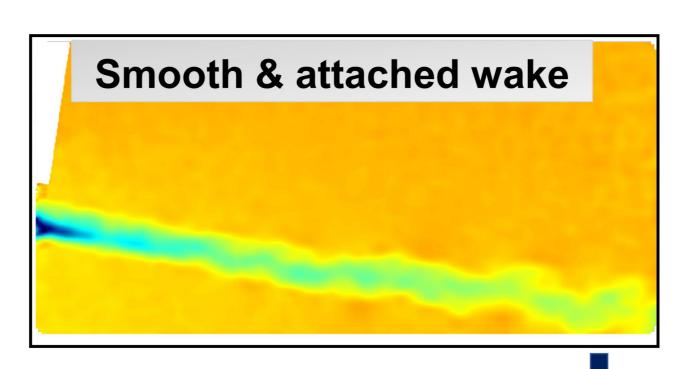


High Drag

Caused by surface discontinuities & gaps



Higher Fuel Consumption & Noise



Technical Solution

Camber Morphing



Smooth & continuous changes in wing geometry

16% to 50%

lower drag

Compared to a

hinged flap



Fish Bone Active Camber (FishBAC) device



How can it deflect continuously?

Combination of stiff and rigid components (e.g. carbon fibre plate) with flexible ones (e.g. silicone rubber sheet)

How was it made?

Manufacturing techniques: 3D printing, machining, composite hand layup

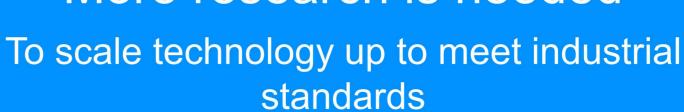
How do you simulate its behaviour?

Developed novel & bespoke structural and aerodynamic mathematical models during PhD

How was it tested?

Structural and wind tunnel experiments to study its structural & aerodynamic behaviour

More research is needed





3% to 6%

lower fuel burn

If implemented in

commercial airliners

bristol.ac.uk/composites