



Flying with improved aerodynamics

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BASF Research Press Conference, December 1, 2023



Flying more sustainably
Sharkskin Technology

powered by  **Lufthansa
Technik**



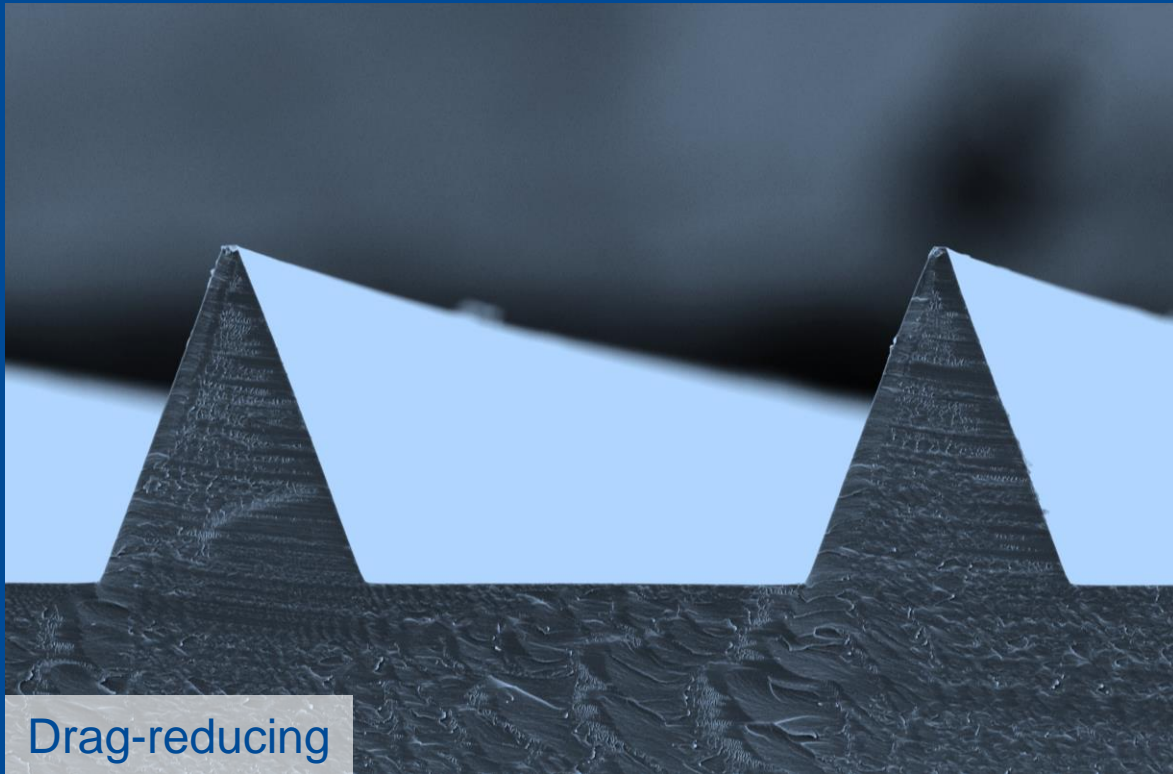
Imagine a world where flying is less harmful for the environment



Our motivation:

Using our expertise in surface functions to make aviation more sustainable

Bionic boost: textured surfaces inspired by nature

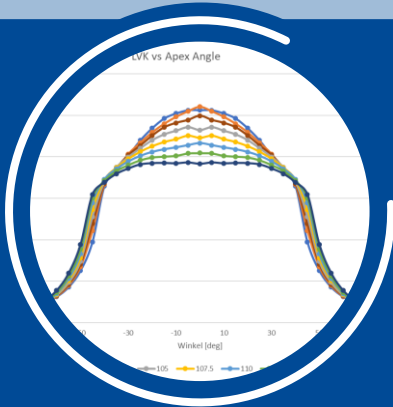


- Many examples of functional textured surfaces in nature
- One of the most popular ones: sharkskin
- Goal: industrialization of such textures
- Our motivation: develop a solution for more sustainable aviation

Technology development using open innovation

Structure & simulation

- Structure design & simulation
- Effect simulation



Materials & product design

- Strong material expertise
- Competencies in multi-layer systems



Customer integration & concept

- Tailored product concepts
- Ready-to-use solutions



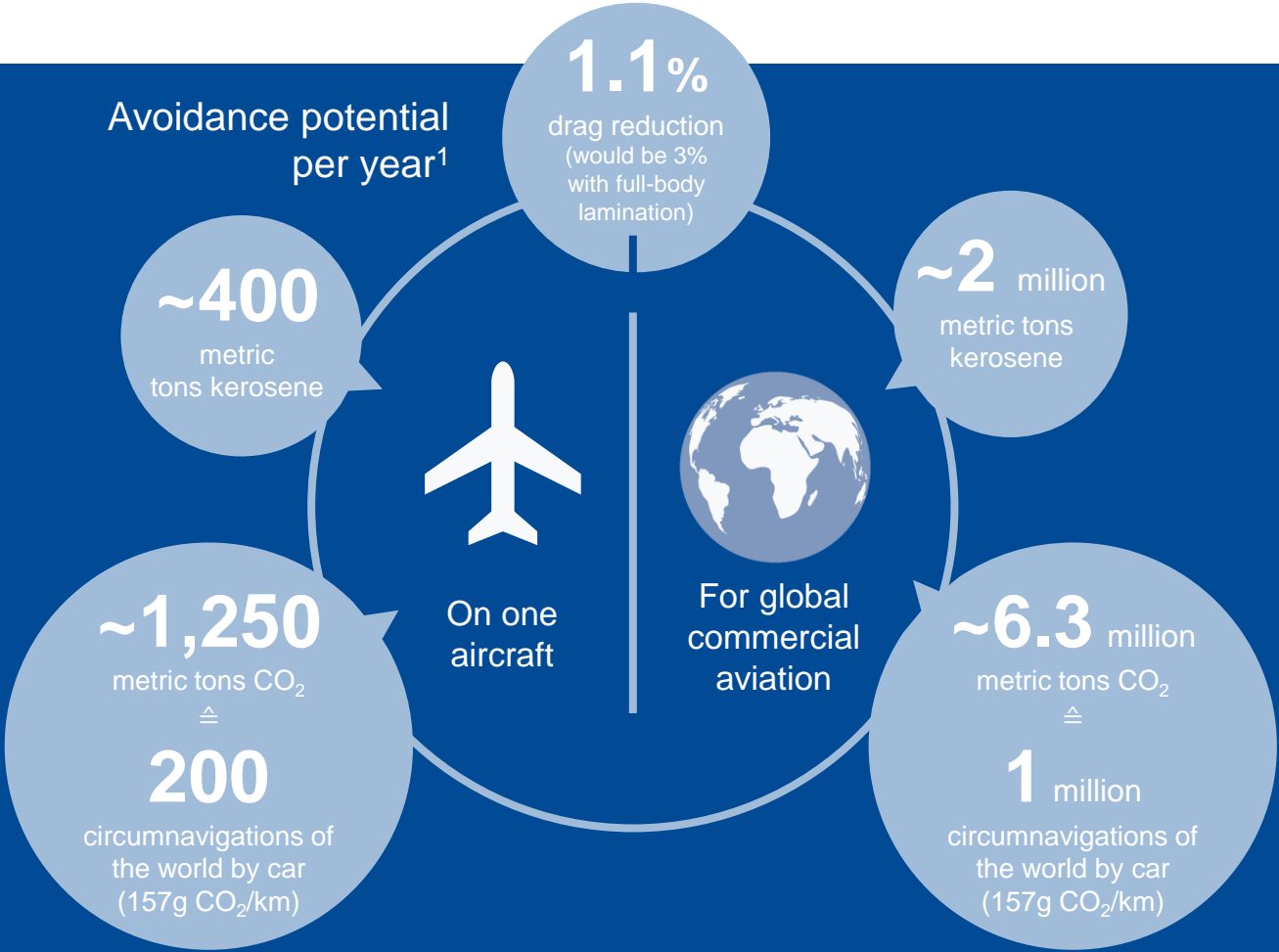
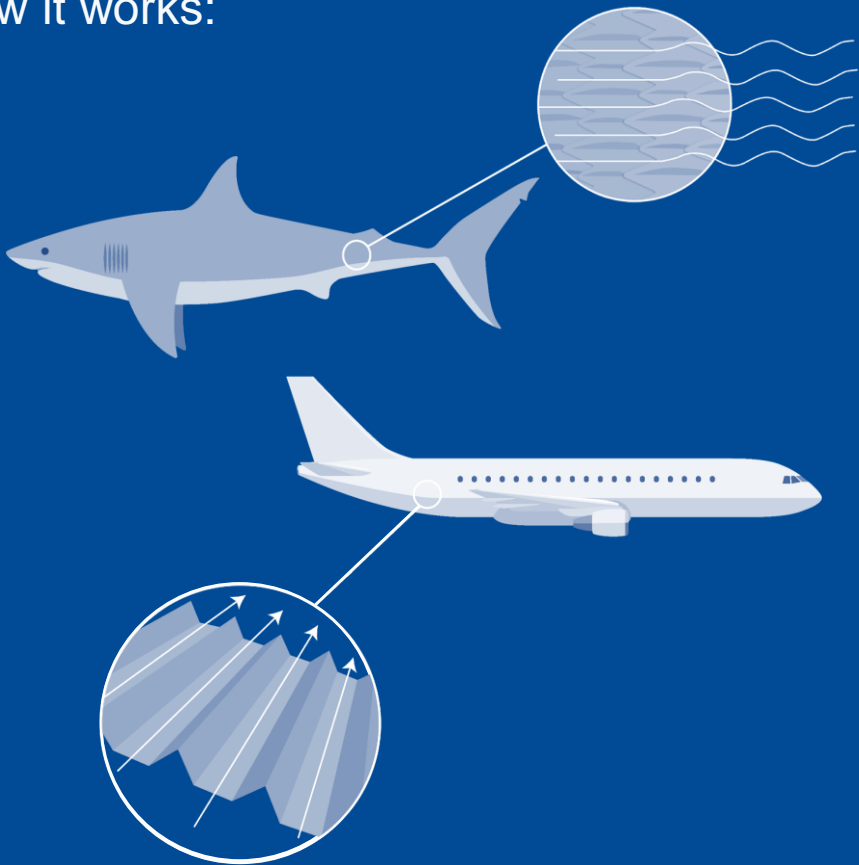
Scale-up & engineering

- Set up & run production
- Engineer & build production machines



Less aerodynamic drag, less kerosene, less CO₂

How it works:



¹ Figures refer to using NovaFlex SharkSkin on SWISS's Boeing 777-300 fleet

Development partnership with Lufthansa Technik

“The extremely constructive collaboration with BASF is [...] the best example of cross-sector cooperation in the interest of the sustainability of the aviation industry.”

**Dr. Johannes Bussmann in 2021,
then Chief Executive Officer
of Lufthansa Technik AG**



Strong collaboration with Lufthansa Technik as key for commercialization

Product adaption to customer requirements:

- Material wise:
UV, rapidly changing temperatures, mechanical loads, etc.
- Application wise:
self-adhesive film that remains protected during application
- Application process
- Aviation approvals: Supplemental Type Certificate (STC)

Additional applications under evaluation

The innovation:

NovaFlex riblet films imitate nature's property. **Microstructured films cause substantial drag reduction**



Flying with improved aerodynamics

1 Functional textured surfaces can be produced for industrial application

2 Drag reduction on aircraft of 1.1% is proven in practical use

3 Significant CO₂ emission potential on aircraft. Around 1,250 tons CO₂ per Boeing 777 per year

4 Efficiency may be increased (up to 3%) by laminating the full body of aircraft

5 Additional applications beyond aviation under evaluation: wind turbines, marine, etc.

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We create chemistry