

CRISIS AS AN OPPORTUNITY



Interview with Markus Fischer,
Deputy Board Member Aeronautics at DLR

Climate change, a pandemic, noise emissions – how are these major challenges affecting aviation today?

: The air transport system in Germany and Europe as a whole has long had the overarching goals of advancing high-tech capabilities and developing a climate-neutral air transport system with the highest safety standards. These have not changed as a result of COVID-19. However, the crisis and the increasingly apparent signs of climate change have shown us that we need to act much faster than before. We and our partners see the crisis as an opportunity to challenge design paradigms and research topics that have proven ground-breaking and successful for us over the recent decades of constant increases in air traffic volumes. New areas of focus, such as the increasing electrification and digitalisation of aviation, simulation-based design processes, new energy sources, new materials and the principles of lightweight construction will play a major role in all of this. They make appreciable changes to the design space and important design criteria for a future air transport system, and thus merit intensive research. All those involved in the aviation sector have to ask themselves how future flight will differ from the way it is today. This might manifest itself in the size, mission, cruising speed or altitude of the aircraft, for instance, or even the flight path.

What measures seem to be quick wins on the long journey towards climate-neutral flight – sustainable fuels, hydrogen, batteries and fuel cells, perhaps?

: Air transport makes a significant contribution to climate change, as its emissions mostly occur at altitudes at which their impact on the climate is particularly high. This is the typical operating range of large civilian passenger aircraft on short- to long-haul routes. New aircraft gas turbine concepts and thermodynamic cycle processes, the advancement of tried-and-tested engine concepts combined with the use of sustainable fuels to replace fossil kerosene, and the direct combustion of hydrogen all count as quick wins when it comes to making air traffic more environmentally friendly. Climate-optimised flight guidance is another rapid and promising instrument, at least when applied to part of the airborne fleet and within specific areas of airspace. At the same time, hybrid-electric drives that run turbo-electrically or are based on energy storage systems such as batteries and fuel cells must also be further investigated. Within this decade, the energy and power density of such technologies will prove useful in aircraft and operating concepts for feeder flights and regional aircraft that fly on routes within urban areas or to the next-largest airport.

How is DLR contributing towards a greener air transport sector?

: DLR's aeronautics research is oriented towards the European Green Deal. Our aim is to provide application-oriented solutions for zero-emissions flight from 2050. In doing so, we are looking at not only reducing the chemical emissions, but also the physical emissions, for instance by further reducing aircraft noise with quiet aircraft designs and flight manoeuvres. In addition, we will be advising airports, policy makers and municipalities on measures they can take. Thanks to the expertise and capabilities of over 25 DLR institutes and facilities conducting research in the field of aeronautics, not to mention a unique research infrastructure, DLR enjoys an overview and whole-system understanding of the entire air transport system. More than ever before, we want to bring this capability to bear on the aviation network made up of academia, industry, business and government. We want to provide a basis for taking action and making decisions so that we can jointly make air transport fit for the future in an eco-efficient way.

Questions asked by **Julia Heil**, an editor in the Public Affairs and Communications department at DLR.



Markus Fischer has been Deputy Board Member Aeronautics at DLR since earlier this year. He received a Doctorate in Mechanical Engineering from Leibniz University Hanover in 1994 and worked as a researcher at the DLR Institute of Aerodynamics and Flow Technology from 1991 to 1996. He then worked at various companies in the aviation industry, including Airbus and Rheinmetall Defence. In 2017, he returned to DLR and was appointed Programme Director for Aeronautics.