

PROJECT

## DISPROP

# Aerodynamic and aeroacoustic modeling of closely operating propellers for DIStributed PROPulsion

**Funding:** European (Horizon 2020)

**Duration:** Feb 2021 - Oct 2023

**Status:** Ongoing

**Total project cost:** €2,738,790

**EU contribution:** €2,738,790



**Call for proposal:** H2020-CS2-CFP11-2020-01

[CORDIS RCN : 232672](#)

### Objectives:

DISPROP aims at improving the current aerodynamic and aeroacoustic analysis and design capabilities for large aircraft operating with distributed propulsion (DP) and propeller arrays. This will be done by generating a high-quality, industry-relevant experimental database using 2D and 2.5D wing sections equipped with propeller arrays. Using this database, the capability of existing CFD and CAA codes will be updated in order to better predict the relevant aerodynamic and aeroacoustic interaction phenomena occurring between the wing and the propellers slipstream. Parametric studies will be conducted to identify most promising configurations.

This 30-month 2,7M valued project will consist of four phases. After a preparatory phase, where relevant geometries will be selected based on their high potential for DP, two to three wing geometries will be highly parametrized in Phase 1 and investigated by both CFD and medium-scale wind tunnel tests (WTT). Then, in Phase 2, the most promising configuration will be wind-tunnel tested on a large scale at DNW NWB to generate aerodynamic and aeroacoustic experimental database that will be used to validate CFD and CAA simulations. In a subsequent exploitation phase, the combined numerical and experimental database will be extrapolated to full-scale 3D geometries based on the advanced Power Balance Method.

The analysis and design tools matured and validated within DISPROP will enable the development of new aircraft configurations with DP and closely integrated propellers. Operating with a drastic increase in overall efficiency compared to conventional aircraft, such configurations contribute to the CS2 objective of reduced CO2 emissions.

The DISPROP consortium is composed of internationally recognized experts in CFD and CAA modeling, academic and industrial-scale WTT (the best facility in Europe for aerodynamic and aeroacoustic aircraft validation), as well as aircraft designers experienced in DP.

### Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

**Other programmes:** JTI-CS2-2020-CfP11-LPA-01-96 Analytical and experimental characterization of aerodynamic and aeroacoustic effects of closely operating propellers for distributed propulsion wing solutions.

### Lead Organisation:

**Technische Universität Berlin**

**Address:**

STRASSE DES 17 JUNI 135  
10623 Berlin  
Germany

**Organisation Website:**  
<http://www.tu-berlin.de>

**EU Contribution:** €510,125

## Partner Organisations:

### Stichting Duits-Nederlandse Windtunnels

**Address:**  
VOORSTERWEG 31  
8316 PR Marknesse  
Netherlands

**Organisation Website:**  
<http://www.dnw.aero>

**EU Contribution:** €500,235

### Leichtwerk Ag

**Address:**  
HERMANN-BLENK-STRASSE 38  
38108 BRAUNSCHWEIG  
Germany

**EU Contribution:** €87,588

### Technische Universitaet Braunschweig

**Address:**  
Pockelsstrasse  
38106 Braunschweig  
Germany

**Organisation Website:**  
<http://www.tu-braunschweig.de>

**EU Contribution:** €972,688

### Universität Stuttgart

**Address:**  
Keplerstraße 7  
106037 STUTTGART  
Germany

**Organisation Website:**  
<http://www.uni-stuttgart.de>

**EU Contribution:** €668,155

## Technologies:

Aircraft design and manufacturing  
Improved aerodynamic design tools

**Development phase:** Validation

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Air transport

**Transport sectors:** Passenger transport, Freight transport  
Societal/Economic issues, Environmental/Emissions aspects,

**Transport policies:** Safety/Security

**Geo-spatial type:** Other