

PROJECT

## ESTRO

### Experimental and theoretical assessment of laminar flow robustness at high mach and reynolds numbers

**Funding:** European (Horizon 2020)

**Duration:** Apr 2019 - Mar 2022

**Status:** Ongoing

**Total project cost:** €1,476,050

**EU contribution:** €1,476,050



**Call for proposal:** H2020-CS2-CFP08-2018-01

[CORDIS RCN : 221221](#)

#### Objectives:

According to the requirements of the topic JTI-CS2-2018-CFP08-REG-03-01, the proposal ESTRO will produce experimental and numerical data in flow speed and in "cruise conditions" to validate the relevant aerodynamic performance of the Regional 90 sit turboprop A/C wing including laminar flow extension measurements and wing span load distribution. In particular, the tests in wind tunnel conditions will be performed at some Reynolds numbers, whose higher value is expected to be around 11 million, and at low and cruise Mach numbers. Accurate pressure distributions, infrared flow images, wing deformation, wall balance and load control and alleviation measurements are expected.

The data will be the result of an experimental test campaign performed in a Laminar transonic wind tunnel with the main objective to evaluate the laminar flow robustness, the aerodynamic performances and load control effectiveness of a turboprop A/C wing at high/medium speeds (Mach numbers up to 0.67) and wind tunnel Reynolds number around 10-11 million. Numerical simulations aim to first assess the wind tunnel experimental results and then to extrapolate the data to flight conditions. In addition, the effects of the propeller on the wing laminar flow extension will be evaluated through 3D boundary layer computations coupled to linear stability analyses based on ray theory.

#### 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-CS2-2018-CfP08-REG-03-01 Laminar Flow robustness and Load control effectiveness evaluation for a Regional Turboprop wing

#### Lead Organisation:

**Universita Degli Studi Di Salerno**

**Address:**

Via Ponte Don Melillo 1  
84084 Fisciano (Sa)  
Italy

**Organisation Website:**

<http://www.unisa.it>

**EU Contribution:** €1,165,250

#### Partner Organisations:

**Ibk-Innovation Gmbh & Co. Kg****Address:**

BUTENDEICHSWEG 2  
21129 HAMBURG  
Germany

**Organisation Website:**

<http://www.ibk-innovation.de>

**EU Contribution:** €94,375

**Dream Innovation Srl****Address:**

VIA F. PARRI 1  
81030 SANT'ARPINO  
Italy

**EU Contribution:** €216,425

**Technologies:**

Computer-aided design and engineering  
Improvement of transition-prediction tools for future laminar flow aircraft

**Development phase:** Validation

**STRIA Roadmaps:** Vehicle design and manufacturing, Infrastructure

**Transport mode:** Air transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Other specified

**Geo-spatial type:** Other