

PROJECT

## FLORA

### FLow control in RAdial compressor

**Funding:** European (Horizon 2020)

**Duration:** Sep 2018 - Aug 2022

**Status:** Ongoing

**Total project cost:** €449,750

**EU contribution:** €449,750



**Call for proposal:** H2020-CS2-CFP07-2017-02

[CORDIS RCN : 218091](#)

#### Objectives:

The enhancement of an engine operability involves increasing the compressor surge margin which is still an open challenge.

The project FLORA (FLow control in RAdial compressor) is twofold.

First, it proposes to achieve a comprehensive understanding of the transient behaviour of the radial compressor delivered by the Topic Leader through a precise characterization of the instabilities which develop at various rotation speeds and at different IGV (Inlet Guide Vanes) stagger angles. Detailed experimental investigations are planned providing an improved and time-resolved description of the path to surge.

Then, it proposes to apply passive flow control strategies in order to push back the compressor surge line towards low mass flow which will consequently enhance the compressor stability, hence the engine operability. The proposal particularly aims at evaluating the benefits from the boundary layer aspiration in radial geometries in terms of performance (gain in pressure ratio and efficiency) and surge margin. Besides experiments, calculations will help for the understanding of the internal flow structures which develop from stable operating points up to surge. High-fidelity Large Eddy Simulations (LES) will be used to get an in-depth comprehension of the impact of the flow control on the internal flow.

The project FLORA will contribute to the development of stable and efficient radial compressors with extended operating range.

#### 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-CS2-2017-CfP07-ENG-01-30 Numerical and experimental study of high speed radial flow compressors

#### Lead Organisation:

**Ecole Centrale De Lyon**

**Address:**

AVENUE GUY DE COLLONGUE 36  
69134 ECULLY  
France

**Organisation Website:**

<http://www.ec-lyon.fr>

**EU Contribution:** €393,500

## **Partner Organisations:**

### **Centre Europeen De Recherche Et De Formation Avancee En Calcul Scientifique**

**Address:**

Avenue Gaspard Coriolis 42  
31057 Toulouse  
France

**Organisation Website:**

<http://www.cerfacs.fr>

**EU Contribution:** €56,250

## **Technologies:**

Aircraft design and manufacturing  
Active flow control and interrelations with Reynolds stress

**Development phase:** Research/Invention

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Air transport

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

**Transport policies:** Other specified

**Geo-spatial type:** Other