

PROJECT

## AEROGUST

### Aeroelastic Gust Modelling

**Funding:** European (Horizon 2020)

**Duration:** May 2015 - Jul 2018

**Status:** Complete

**Total project cost:** €4,289,986

**EU contribution:** €4,237,652



**Call for proposal:** H2020-MG-2014\_TwoStages

[CORDIS RCN : 193369](#)

#### Objectives:

Encounters with atmospheric turbulence are vitally important in the design and certification of many manmade structures such as aircraft and wind turbines. Gusts cause rapid changes in the flow about the structures, leading to rigid and flexible unsteady responses. Knowledge of aircraft/gust interactions is therefore vital for loads estimation during aircraft design as it impacts on control systems and often defines the maximum loads that these structures will experience in service. At present industry typically uses the linear doublet lattice method with static loads corrections from expensive wind tunnel data. The wind tunnel data is created using the final aerodynamic surface in the predicted cruise shape. This means that gust loads come relatively late when the design options have been narrowed. Increased competition and environmental concerns are likely to lead to the adoption of more flexible materials and the consideration of novel configurations, in which case the linear assumptions of the current gust loads process will become unacceptable. To introduce non-linearity into the gust loads process without significantly increasing the cost and time, this project has three main objectives: to carry out investigations using CFD (Computational Fluid Dynamics) so that the non-linearities in gust interactions are understood; to create a gust loads process that does not require wind tunnel data and hence reduces the need for wind tunnel testing; to develop updated reduced order models for gust prediction that account for non-linearity at an acceptable cost. These investigations will reduce the need for expensive wind tunnel testing and hence lead to time and cost savings at the design stage therefore ensuring that the European aerospace and defence industry remain competitive in the future. The wind turbine industry has similar concerns, with gusts and wind shear restricting the locations available for wind farms. The project will also address these issues using common methodology.

#### 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)

#### Lead Organisation:

**University Of Bristol**

**Address:**

BEACON HOUSE QUEENS ROAD  
BRISTOL  
BS8 1QU  
United Kingdom

**Organisation Website:**

<http://www.bristol.ac.uk>

**EU Contribution:** €827,425

## Partner Organisations:

### Institut National De Recherche En Informatique Et Automatique

**Address:**

Domaine de Voluceau- Rocquencourt  
B.P. 105 LE CHESNAY  
France

**Organisation Website:**

<http://www.inria.fr/>

**EU Contribution:** €286,269

### Stichting Centrum Voor De Ontwikkeling Van Transport En Logistiek In Europa

**Address:**

Van Nelleweg 1  
3044 BC Rotterdam  
Netherlands

**Organisation Website:**

<http://www.cetle.org>

**EU Contribution:** €341,550

### University Of Cape Town

**Address:**

Private Bag X3  
Rondebosch  
7701  
South Africa

**EU Contribution:** €324,375

### Airbus Defence And Space Gmbh

**Address:**

Ludwig-Boelkow-Allee 1  
85521 Ottobrunn  
Germany

**Organisation Website:**

<http://www.airbus-group.com>

**EU Contribution:** €68,750

### Deutsches Zentrum Fr Luft Und Raumfahrt E.v

**Address:**

Linder Hoehe  
51147 KOELN  
Germany

**Organisation Website:**

<http://www.dlr.de>

**EU Contribution:** €468,204

### Piaggio Aero Industries S.p.a

**Address:**

Viale Castro Pretorio 116  
185 ROMA  
Italy

**Organisation Website:**

<http://www.piaggioaero.com>

**EU Contribution:** €219,375

**Dassault Aviation**

**Address:**

9, Rond-Point des Champs-Élysées - Marcel Dassault  
75008 PARIS  
France

**Organisation Website:**

<http://www.dassault-aviation.com>

**EU Contribution:** €383,864

**Optimad Engineering S.r.l.**

**Address:**

Via Giacinto Collegno 18  
10143 Torino  
Italy

**EU Contribution:** €304,250

**The University Of Liverpool**

**Address:**

Brownlow Hill 765 Foundation Building  
Liverpool  
L69 7ZX  
United Kingdom

**Organisation Website:**

<http://www.liv.ac.uk>

**EU Contribution:** €350,216

**Valeol Sas**

**Address:**

COURS VICTOR HUGO 213  
33130 BEGLES  
France

**Organisation Website:**

<http://www.valeol.fr>

**EU Contribution:** €318,750

**Numerical Mechanics Application International**

**Address:**

5 Avenue Franklin Roosevelt  
1050 BRUSSELS  
Belgium

**Organisation Website:**

<http://www.numeca.com>

**EU Contribution:** €344,625

## **Technologies:**

Computer-aided design and engineering  
CFD and FEA modelling of gust loads

**Development phase:** Research/Invention

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Air transport

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

**Transport policies:** Societal/Economic issues

**Geo-spatial type:** Other