

PROJECT

IDERPLANE

Innovative DDesign for Reliable PLANEt bearings

Funding: European (Horizon 2020)

Duration: Nov 2018 - Oct 2021

Status: Ongoing

Total project cost: €761,594

EU contribution: €749,969



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

[CORDIS RCN : 218027](#)

Objectives:

The high-power transmissions that have to be designed for modern highly efficient turbofans need the extensive application of epicyclic gears with planet gear containing an integrated bearing.

These components are subjected to severe rolling contact fatigue (RCF) conditions as many others (e.g. wheels/rails of high-speed trains): propagation of micro-cracks starting from the bearing race surface and leading to spalling is a typical damage mode of these components.

The main idea behind IDERPLANE is to analyse the problem not in terms of the usual stress-based design of gears, but rather on damage tolerance concepts. This kind of analysis is meant at understanding/measuring the risk of a catastrophic failure in the case of development of subsurface propagation of cracks driven by shear stresses. Incidentally, it has to be emphasized that spalls can lead to sub-surface cracks only once they have reached a critical size.

If this could be seen an established route, unfortunately RCF is a grey area where there are no data available for such an analysis (that should be based on reliable crack growth curves), because it is very difficult to make cracks propagate under shear as it happens in RCF (and as it was shown in the known failures of planet gear containing an integrated bearing).

This is the strength and unicity of the IDERPLANE consortium where the partners have special technology and abilities: to obtain crack growth curves under RCF conditions on specimens (PoliMI); to reproduce the subsurface crack propagation in bi-disks experiments (UniBS); to follow and track the development of cracks under complex load conditions (INSA).

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-LPA-01-36 Innovative design for reliable and low weight power gearbox planet bearings

Lead Organisation:

Politecnico Di Milano

Address:

Piazza Leonardo Da Vinci 32
20133 Milano
Italy

Organisation Website:

<http://www.polimi.it>

EU Contribution: €254,375

Partner Organisations:

Argo Srl

Address:

VIA LUIGI CIBRARIO 7
10143 TORINO
Italy

EU Contribution: €27,125

Institut National Des Sciences Appliquees De Lyon

Address:

20 AVENUE ALBERT EINSTEIN
69621 VILLEURBANNE CEDEX
France

Organisation Website:

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

EU Contribution: €145,344

Libera Universita Di Bolzano

Address:

PIAZZA UNIVERSITA 1
39100 BOLZANO
Italy

Organisation Website:

<http://www.unibz.it>

EU Contribution: €50,000

Universita Degli Studi Di Brescia

Address:

PIAZZA MERCATO 15
25121 BRESCIA
Italy

Organisation Website:

<http://www.unibs.it>

EU Contribution: €273,125

Technologies:

Unclassified
Non-technology

Development phase: Research/Invention

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Safety/Security

Geo-spatial type: Other