



## HIGHPSLEEVE

# FINAL PROJECT REPORT

**Grant Agreement number:** 632482  
**Project acronym:** HIGHPSLEEVE  
**Project title:** Implementation carbon fibres for rotor of high speed rotating electric machine

**Funding Scheme:** JTI-CS-2013-02-SGO-02-081  
**Date of latest version of Annex I against which the assessment will be made:** 10/05/2014  
**Period covered:** from 01/06/2014 to 30/09/2016  
**Name, title and organization of the scientific representative of the project's coordinator<sup>1</sup>:** Angel Lagrana, Project Manager – ASCAMM/EURECAT  
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<sup>1</sup> Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement.

## DECLARATION BY THE SCIENTIFIC REPRESENTATIVE OF THE PROJECT COORDINATOR

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate) <sup>1</sup>:
  - has fully achieved its objectives and technical goals for the period;
  - has achieved most of its objectives and technical goals for the period with relatively minor deviations.
  - has failed to achieve critical objectives and/or is not at all on schedule.
- The public website, if applicable
  - is up to date
  - is not up to date
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organizations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator:  
..... Angel Lagraña.....

Date: .....30...../ .....09...../. ....2016.....

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism and in that case, no signed paper form needs to be sent

<sup>1</sup> If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

**HIGHPSLEEVE****1 PUBLISHABLE SUMMARY**

The objective of the project HIGHPSLEEVE is to develop an innovative rotating composite sleeve to be assembled in an electrical motor by Topic Manager

Reducing specific fuel consumption is a real challenge for future aircrafts. This can be achieved by means of increasing the performance of different systems, such as electrical motors and the associated weight reduction.

The performance improvement means to increase the rotational speed of electrical motors to diminish the dimensions for a given power, but has a drawback which is the limitation in using metal sleeve to keep the permanent magnets in place.

The need for a composite sleeve also could help in the second goal which is weight reduction, but this will depend on other constraints such as working speed and assembly needs.

The aim of the project is to study and manufacture a specific sleeve of an electrical machine with some of the following characteristics:

- To meet a specific air gap condition:
- To meet tolerances expected for the fixation's thickness
- Uses of metal parts on the sleeve must be reduced, but this will depend on the specific electrical machine on which the sleeve will be assembled (in example: permanent magnet or salient poles rotor)
- Tithing to the rotor has to be done by the fixation itself in case of permanent magnet or with an assembly system in case of salient poles rotor
- Pressure of fixation on magnet, for rotating speeds of 50.000 rpm, has to be in range of beyond 100 MPa, for -50 to 250 °C.
- Also similar values of pressure and temperature range but speed of 30.000 rpm will be looked for salient pole rotors.

Also, the attachment of the sleeve to the electrical engine will be studied; finally, some prototypes will be manufactured and tested.

To achieve these goals, the HIGHPSLEEVE project will address through the different workpackages in which the project is divided, the following main activities:

- Review of requirement received from Topic Manager = WP1
- Manufacturing process selection = WP1
- Material selection = WP1
- Definition of a text matrix to obtain material properties for design = WP1
- Testing of material = WP1
- Detailed design of the sleeve = WP1
- Detailed design of assembly system = WP1
- Manufacturing of prototypes sleeve in a first run manufacturing trials = WP2
- Testing of sleeve of first run = WP2
- Manufacturing of sleeves in a second run = WP2
- Testing on speed test bench = WP2
- Conclusions of the feasibility = WP2

In the provision of the requirement document the Topic Manager needed to better focus sleeve feasibility in four different cases, two dedicated to a salient poles rotor and two dedicated to a Exitatrice rotor, rather than the one proposed at the call which was one case of permanent magnet rotor.

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This new interest makes the project to address to different manufacturing process than initially foreseen for a permanent magnet sleeve.

Also the need to design four different cases in parallel vs one foreseen for the initial interest has made the design phase longer than expected, also due to this new development needed a more complex assembly solution which will include an assembly fixture to achieve the sleeve onto the rotor.