

PROJECT

## MuSiCA

### Multi-level SiC Module for Aircraft applications

**Funding:** European (Horizon 2020)

**Duration:** Sep 2020 - Aug 2022

**Status:** Ongoing

**Total project cost:** €776,888

**EU contribution:** €619,525



**Call for proposal:** H2020-CS2-CFP10-2019-01

[CORDIS RCN : 229420](#)

#### Objectives:

MuSiCA will design and supply a power electronic module and gate driver using silicon carbide devices for a relatively high frequency 100kW aircraft motor drive application. The power converter topology has been chosen and is provided as an input to the project.

The main objective is to package silicon carbide devices in a manufacture-able and reliable power module package to enable silicon carbide technology to meet its full potential in terms of competitiveness against current solutions. The power module package will be integrated with the gate driver developed in the project.

The hardware will be produced during the project and tested on an existing Clean Sky 2 funded motor drive test bed. The output of the project will be a demonstration of the manufactured hardware and evidence of its manufacturability, reliability and low weight and volume, and potential to reduce CO<sub>2</sub>, NO<sub>x</sub> and Noise emissions. The target application is European Aerospace but the solutions developed will be applicable to other applications such as automotive, rail and renewable energy, where high reliability and manufacturability is desirable.

The key objectives of MuSiCA are to:

- Increase manufacturability;
- Increase long term in-service reliability;
- Increase modularity and scalability;
- Integration with Clean Sky test bed;
- Maximise the performance of silicon carbide power semiconductor devices;
- Enable the demonstration of the complete power converter.

The power electronics module developed in MuSiCA will support the Clean Sky ambitions.

It is expected that MuSiCA will directly address the ITD Systems and in particular will feed into the WP5 and WP 100.1: "Power Electronics and Electrical Drives" The CfP supports the activities within the Systems Integrated Technology Demonstrators by delivering an innovative multi-level power electronics module which can be used as a functional building block for the construction of converters for a variety of uses in on-board energy conversion systems.

#### 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:

**The University Of Sheffield**

**Address:**

Firth Court Western Bank  
Sheffield  
S10 2TN  
United Kingdom

**Organisation Website:**

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

**EU Contribution:** €252,347

**Partner Organisations:****Dynex Semiconductor Limited****Address:**

DODDINGTON ROAD  
LINCOLN  
LN6 3LF  
United Kingdom

**Organisation Website:**

<http://www.dynexsemi.com>

**EU Contribution:** €367,178

**Technologies:**

Electric road vehicles  
Integration of electric motor with SiC drivetrain

**Development phase:** Research/Invention

Aircraft propulsion  
Electric propulsion system for light  
aircraft

**Development phase:** Research/Invention

**STRIA Roadmaps:** Transport electrification, Vehicle design and manufacturing

**Transport mode:** Air transport

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

**Transport policies:** Environmental/Emissions aspects, Decarbonisation

**Geo-spatial type:** Other