



HYCARUS Project Periodic Report



1. Publishable summary

Grant Agreement number: 325342

Project acronym: HYCARUS

Project title: HYdrogen cells for AiRborne Usage

Funding Scheme: Collaborative project SP1-JTI-FCH.2012.1.6

Date of latest version of Annex I against which the assessment will be made:
28/11/2014

Periodic report: 1st 2nd

Period covered: from 1st May 2013 to 31 October 2014

Name, title and organisation of the scientific representative of the project's coordinator:

Lothar Kerschgens

Program Manager - Fuel Cell

Fangdieckstraße 64 - D-22547 Hamburg - Germany

Tel: +49 40 5480 16161

E-mail: lothar.kerschgens@zodiacaerospace.com

Project website address: www.hycarus.eu

1. Publishable summary

Project objectives



Launched in May 2013, HYCARUS (HYdrogen Cells for AiRborne Usage) is a European collaborative project partially supported by the Fuel Cell and Hydrogen Joint Undertaking (FCH JU), an initiative of the European Union driven by the joint cooperation of European public research centers and private industries actively engaged in the investigation of the fuel cells usage. The project aims to demonstrate how promising hydrogen-air Proton Exchange Membrane (PEM) fuel cell system technologies are in non-essential aircraft applications.

The HYCARUS consortium is composed of 10 partners from 6 European countries:

- Europe's leading system integrator – Zodiac Aerospace (FR, DE, NL, CZ);
- Fuel cell research organization – CEA (FR);
- World leader aircraft manufacturer – Dassault Aviation (FR);
- World leader in industrial gases – Air Liquide (FR),
- Europe's leading test facility organizations – INTA (ES) & JRC-IET (BE) and
- Europe leader in collaborative R&D consultancy – ARTTIC (FR).

The main objectives of the project are to design a Generic Fuel Cell System (GFCS) aiming to power non-essential aircraft applications such as galleys, lavatory or crew rest compartment in commercial aircrafts, or to be used as a precursor for the secondary power source on-board a business jet, and test the GFCS in a representative environment at TRL6 level. Finally, HYCARUS should also assess and exploit the by-products in different airborne applications - galleys, lavatories, warmers, chillers or inerting functions such as fuel tank.

A description of the work performed since the beginning of the project and of the main results achieved so far

Since the beginning of the project, the HYCARUS consortium was intensively searching for a suitable partner to perform the Flight Tests. The negotiations led to a very successful end and Dassault-Aviation, one of the HYCARUS beneficiary, is now in charge of conducting the Flight Test campaign. A Falcon test aircraft will be used to perform this campaign, and hence all the activities pertaining to the flight demonstration (design, installation and operation of the demonstrator) are constrained by the characteristics of this aircraft.

Further to this, HYCARUS successfully accomplished a number of tasks including in particular completion of specifications and sizing of the GFCS and a complete top-down safety analysis (WP1). Preliminary designs of various systems and components necessary for the GFCS integration were completed, such as:

- the membrane electrode assembly and the fuel cell stack (WP2)
- the battery system (WP4)
- the GFCS components (WP2, WP3, WP4 and WP5)

The project will now build on the first results to demonstrate the GFCS in a representative environment, in accordance with the TRL6 level. The consortium started with the preparations for the Permit to Fly with the aim to achieve the GFCS aircraft integration in 2015 and the flight-tests in 2016.

The expected final results and their potential impact and use

The GFCS is a demonstrator which will serve as a precursor for the systems that will be mounted as secondary power sources on-board business jets; but the fuel cell systems of this type are also designed to supply cabin interiors, such as galleys, lavatory or crew rest compartment in a large commercial aircraft. These applications / technologies will contribute to reducing aircraft fuel consumption and green-house gas emissions and offer innovative services to aircraft manufacturers, airlines and business jet operators.

The address of the project public website

www.hycarus.eu

Contact details

Zodiac Aerospace

Lothar Kerschgens

Program Manager - Fuel Cell

Fangdieckstraße 64, D-22547 Hamburg, Germany

Tel: +49 40 5480 16161 - Cell: +49 173 3495 669

lothar.kerschgens@zodiacaerospace.com