

PROJECT

AManECO

ASSESSMENT OF ADDITIVE MANUFACTURING LIMITS FOR ECO-DESIGN OPTIMIZATION IN HEAT EXCHANGERS

Funding: European (Horizon 2020)

Duration: Oct 2019 - Sep 2022

Status: Ongoing

Total project cost: €1,501,233

EU contribution: €1,501,233



Call for proposal: H2020-CS2-CFP09-2018-02

[CORDIS RCN : 224960](#)

Objectives:

Selective Laser Melting (SLM) is key for improved design and production process of aviation parts. Applied to heat exchangers (HX), it could dramatically improve global eco-efficiency through access to radically new designs and open horizons in terms of shape, weight, efficiency. Nevertheless, some questions need to be solved regarding capability of Additive Manufacturing (AM) to manufacture thin walls, small holes/gaps, low overhang angle, resulting surface roughness and mechanical strength.

AManECO aims to enhance knowledge of metal AM and, specifically, the capability of SLM process to manufacture thin layers and wall thickness with adequate surface finish using AlSi7Mg0.6 and INCO 718 materials. In particular, to investigate aerothermal and mechanical performance of thin walls, to predict them in the design of AM-HX and consequently, be able to optimize the HX's design process in an Eco-friendly way after knowing the limits of the metal AM technology.

For this purpose, testing samples will be designed and manufactured to characterize in terms of surface properties, pressure resistance and gas tightness evaluation, equivalent stiffness and aerothermal properties. Besides, numerical studies based on FEM and CFD simulations will be done. Then, a representative design of HX based on the initial SOA of AM limitations will be optimized with the gained knowledge.

These designs, before and after optimization, will be processed and characterized. Then, a Life Cycle Inventory (LCI) database will be created to evaluate the ECO potential of the innovative HX.

AManECO will enable to:

- Increase efficiency of HX up to 10%.
- Reduce the overall of HX manufacturing costs by 30%.
- Reduce material waste and scraps by 15 % per component.
- Reduce time-to market up to 1 month.

A multidisciplinary consortium, with experts in HX design and AM (TUHH, LORTEK, FIT), samples characterization (CIDETEC, MU-ENG), numerical simulation (EPSILON, TUHH), and life cycle assessment and eco-design (CTME), has been defined.

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:

Lortek S Coop

Address:

Arranomendia Kalea 4 A
20240 Ordizia
Spain

EU Contribution: €490,250

Partner Organisations:**Epsilon Ingenierie****Address:**

RUE TARFAYA BATIMENT B612
31400 TOULOUSE
France

Organisation Website:

<http://www.epsilon-alcen.com>

EU Contribution: €80,063

Fit Production Gmbh**Address:**

AM GROHBERG 1
92331 LUPBURG
Germany

EU Contribution: €301,588

Mondragon Goi Eskola Politeknikoa Jose Maria Arizmendiarieta S Coop**Address:**

LORAMENDI 4
20500 ARRASATE
Spain

Organisation Website:

<http://www.eps.mondragon.edu>

EU Contribution: €118,119

Technische Universitat Hamburg**Address:**

Am Schwarzenberg Campus 1
21073 Hamburg
Germany

Organisation Website:

<http://www.tu-harburg.de>

EU Contribution: €350,375

Fundacion Centro Tecnologico De Miranda De Ebro**Address:**

CALLE MONTANANA PARCELAS R60 Y R61
09200 MIRANDA DE EBRO BURGOS
Spain

Organisation Website:

<http://www.ctme.es>

EU Contribution: €80,883

Fundacion Cidetec**Address:**

PASEO MIRAMON 196 PARQUE TECNOLOGICO DE MIRAMON
20014 SAN SEBASTIAN
Spain

Organisation Website:

<http://www.cidetec.es>

EU Contribution: €79,956

Technologies:

Additive manufacturing
Selective Laser Melting
(SLM)

Development phase: Research/Invention

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Other specified

Geo-spatial type: Other