PROJECT

DENOX

Innovative Technologies of Electrochemical Suppression and Electromagnetic Decomposition for NOx Reduction in Aeroengines

Funding: European (Horizon 2020)

Duration: Jan 2019 - Dec 2022

Status: Ongoing

Total project cost: €997,500

EU contribution: €997,500

Call for proposal: H2020-CS2-CFP08-2018-01

CORDIS RCN : 221524

Objectives:

DENOX project aims to develop and experimentally prove two breakthrough technology concepts and their optimal combination for drastic reduction of NOx emissions in aeronautic gas-turbine engines (GTEs).

Technology concept 1 is electrochemical suppression of NOx generation in primary combustion zone. It consists in generation of modulated discharge(s) in combustion chamber to initiate chemical reactions competitive to conventional NOx generation mechanisms.

Technology concept 2 is electromagnetic decomposition of NOx molecules in engine exhaust. It consists in application of multi-frequency electromagnetic fields to the exhaust flow to ensure resonance excitation of chemical bonds in NOx molecules up to their dissociation.

DENOX technology concepts are underpinned by the results of KhAI's theoretical investigations and numerical studies of high-temperature high-pressure low emission combustion processes, which demonstrated potential to decrease NOx concentration in exhausting gases on 20-95% without decreasing of engine efficiency.

The project will combine analytical studies and numerical simulations with experimental investigations and multi-level testing campaign to translate proposed technology concepts from TRL1 to TRL3 and to assess full potential of their combination for the next-generation GTEs.

DENOX outcomes will contribute to the advancement of aircraft engines in both (i) mid-term perspective (EIS 2035) through progress in understanding and modelling of high-temperature low emission combustion processes, and (ii) long-term perspective (EIS 2050) through the potential to drastically reduce NOx emissions to meet Clean Sky 2 High Level Objectives and ACARE SRIA goals.

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-CS2-2018-CFP08-THT-01 Innovative NOx Reduction Technologies

Lead Organisation:

Science And Technology Center In Ukraine

Address:
METALISTIV 7A

KYIV
03057
Ukraine

EU Contribution: €8,750

Partner Organisations:

National Aerospace University "kharkiv Aviation Institute"

Address:
17 Chkalova St.
KHARKIV
61070
Ukraine

Organisation Website:
http://www.khai.edu

EU Contribution: €988,750

Technologies:

Emissions control systems
Polymer foam filter for NOx reduction

Development phase: Research/Invention

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Environmental/Emissions aspects

Geo-spatial type: Other