PROJECT

STIMULANT

SURFACE INTEGRITY CONSCIOUS HIGH-PERFORMANCE HYBRID MACHINING FOR SAFETY-CRITICAL SUPERALLOY AEROENGINE PARTS

Funding: European (Horizon 2020)

Duration: Oct 2017 - Mar 2021

Status: Complete

Total project cost: €858,764

EU contribution: €759,321

Call for proposal: H2020-CS2-CFP04-2016-02

CORDIS RCN : 210360

Objectives:

STIMULANT aims to develop and demonstrate “surface integrity conscious” hybridisation of machining processes for safety-critical aeroengine parts that is able to deliver a step-change in Material Removal Rates (MRR) and reduction in production costs.

STIMULANT will take key knowledge at different levels of maturity that exists within the Consortium and progress it, via Standard Features (StdFs) methodology, to the demonstration on “engine-like” safety-critical parts.

STIMULANT’s Objectives are scaled on three Phases:

Phase 1 – Standard features (StdF) identification

- Decompose families of critical-safety aeroengine parts into classes of StdFs with technical, functional and economic characteristics to allow the selection of single/multiple hybrid machining methods that minimise manufacturing costs.

Phase 2 – Validation of individual hybrid machining processes

- Develop and test a Spatially & Temporally Heat-Controlled Hybrid High Speed Machining for high MRR and cost efficiency and provide predictable properties of workpiece surface integrity and fatigue performance.
- Develop and test a Dynamically Erosion-Controlled Hybrid Waterjet Machining for high productivity and geometrical accuracy of freeforms by controlled-depth, i.e. waterjet milling, and complex contours by waterjet through-cutting and demonstrate it as StdFs with high surface integrity and fatigue performance.
- Develop and test a Dynamically Material Removal Controlled Hybrid Laser Waterjet Guided for generating cost-efficient and high geometrical accuracy of complex geometry surfaces by controlled-depth milling and through-cutting and demonstrate it as StdFs with high surface integrity and fatigue performance.

Phase 3 – Demonstration of hybridisation of machining processes and routes

- Demonstrate the hybrid machining methods validated on the Phase 2 on “engine-like” safety-critical parts and integrate them on hybridised processing routes for cost-effective machining of safety-critical aeroengine parts.

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 Nottingham

Address:
University Park
Nottingham
NG7 2RD
United Kingdom

EU Contribution: €346,413

Partner Organisations:

Fundacion Tekniker

Address:
Avenida Otaola 20
20600 Eibar Guipuzcoa
Spain

Organisation Website:
http://www.tekniker.es

EU Contribution: €180,875

Waterjet Ag

Address:
Mittelstrasse 8
CH 4912 Aarwangen
Switzerland

Organisation Website:
http://www.waterjet.ch

EU Contribution: €90,650

Synova Sa

Address:
CHEMIN DE LA DENT D'OCHE
1266 ECUBLENS
Switzerland

EU Contribution: €101,133

Seco Tools Ab

Address:
BJORNBACKSVAGEN 2
73782 FAGERSTA
Sweden

Organisation Website:
http://www.secotools.com

EU Contribution: €40,250

Technologies:

Manufacturing processes
Adaptive control techniques for machining

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