Partner /offer

Date (01-12-2021)

(*) – Mandatory

- **(*) Relevant topic(s) in work programme (code & name of the topic(s) line(s))**

HORIZON-CL4-2022-RESILIENCE-01-25: Optimised Industrial Systems and Lines through digitilisation (IA)

- **Quick description of the project concept**

As a partner, CTIF can contribute to the design of digital tools for the metallurgy industry, can contribute to the development of advanced material modelling solutions for foundry, forge or metal additive manufacturing and to the development of simulation and optimisation methods validated by experience thanks to its semi-industrial resources (for foundry). CTIF can propose use cases in line with the needs of the metallurgy industry and study their profitability and environmental sobriety with their help.

- **(*) Description of the expertise /proposed (up to 1000 characters)**

CTIF has metallic high-level expertise including: ▪ **Alloy design** based on 3 key skills: a team of materials and process experts, experimental means (computing centre for advanced design and simulation, foundry R&D platform, analysis laboratory), digital tools and material databases; ▪ **R&D work on the microstructure simulation** of steels and aluminium based on commercial code (CAFÉ module) and by recalibrating the calculation data with experimental data on test specimens; ▪ **Development of α-screen** (2021): an in-house genetic algorithm (python libraries) than allow to select (via Thermo-Calc and inner data bases) best alloys (characteristics, price, ability to be shape) for a given end-user needs. Use of multi-objectives algorithms (NSGA-III, SPEA-II) for better compromise; ▪ **R&D work on quality control**: development of automated indication detection algorithms for automotive production control by tomography (laboratory environment); ▪ **Development of industrial solutions for product design/sizing and process simulation** (mechanical, thermal, thermomechanical, thermochemical, fluid mechanics…) integrating environmental and energy improvements.

- **(*) Keywords describing the expertise /proposed (up to 10 words)**

Simulation, multi-scale optimization, product/process prediction, microstructure simulation, laboratory characterization, interface with end-user needs, algorithms, foundry, forge, additive manufacturing

Organisation information

(*) Organisation and country: CTIF Technical Centre for Foundry Industries - France
(*) Type of organisation: **☐ Enterprise ☐ SME ☐ Academic X Research institute ☐ Public Body ☐ Other: Association**
Former participation in FP European projects? **☐ Yes**
Web address: https://www.ctif.com
Description of the organisation: Founded in 1946, CTIF is a French Industrial Technical Centre specializing in metallurgy and metal processing. Its historical profession is the foundry. For many years, CTIF has extended its scope of collective action to other businesses such as metal refining, alloy production, additive manufacturing or metal recycling. CTIF has also developed skills in

forging, stamping and metal tools. In summary, CTIF is involved in the entire metal cycle after the extraction and reduction phases of the ore. At the very heart of the metal materials transformation sector, CTIF and its some 100 employees aim to unite the actors of the foundry and metallurgy sector (transformers, users, scientific and technical partners, designers) through industrial R&D and innovation activities and to develop in the fields of design and metallurgy, consulting and innovation, laboratory analyses and training. CTIF's roadmap and R&D programme are based on 3 priority areas: alloy design and new metallurgies, simulation/multi-scale optimisation and recycling/upgrading, and environmental and energy transition. CTIF's skills include knowledge and expertise in liquid and solid metallurgy, meta-materials, hot forming processes, numerical simulation tools (thermochemistry, “alloy design”, process simulation, functional product calculation, material behaviour prediction, etc.), and standards, means and methods for characterizing metallic products and materials. CTIF is a member of the French Carnot Institute for Energy and Environment in Lorraine (ICÉEL), which has been accredited since 2007 by the French Ministry of Higher Education and Research in recognition of its effective research collaborations with socio-economic partners.

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