

## DISSEMINATION EVENTS

### ♪ EUROGUSS – International Trade Fair for Die Casting 2016

in Nürnberg (Germany) | 12<sup>th</sup> - 14<sup>th</sup> January 2016

Tuesday, 12<sup>th</sup> January 2016

15:30 Mehrschichtiges kognitives System zur Überwachung und Optimierung des Druckguss- und Spritzgussverfahrens / Multi-layers control & cognitive system to drive metal and plastic production line for injected component

Nicola Gramegna - EnginSoft S.p.A., Padova (IT)

Wednesday, 13<sup>th</sup> January 2016

10:30 Experimentelle und numerische Untersuchungen zur Vorhersage thermischer Ermüdungsrisse in Druckgusswerkzeugen / Experimental and numerical study for thermal fatigue appearance prediction in HPDC

Borja Zabala - IK4 Tekniker, Eibar, Gipuzkoa (ES)

Thursday, 14<sup>th</sup> January 2016

11:30 Korrelation von Prozessparametern mit Qualitätsmerkmalen bei Druckgussteilen / Correlation between process parameters and quality characteristics in aluminum high pressure die casting

Martina Winkler - Hochschule Aalen

### ♪ THERMEC 2016 – International Conference on Processing & Manufacturing of Advanced Materials

in Graz (Austria) | 29<sup>th</sup> May – 3<sup>rd</sup> June 2016

### ♪ LUBMAT 2016 – Lubrication, Maintenance & Tribology

in Bilbao (Spain) | 7<sup>th</sup> and 8<sup>th</sup> June 2016

### ♪ HTDC 2016 – High Tech Die Casting Conference 2016

in Venice | 22<sup>nd</sup> - 23<sup>rd</sup> June 2016

Sponsorship and mini-course about "Process Control"

#### MUSIC Survey on High Pressure Die Casting Market in Europe

Collaborate with us participating in the project survey using the Questionnaire Form or going to [music.eucoord.com/Survey/body.pe](http://music.eucoord.com/Survey/body.pe)

**Starting date:** 1<sup>st</sup> September 2012

**Duration:** 48 months

**Total Person Months:** 936

**Total costs:** 9.302.070,00 €

**EC funding:** 6.135.000,00 €

**Call identifier:** FP7-2012-NMP-FoF-ICT

**Objective:** FoF-ICT-2011.7.1 – Target outcome c)

**Collaborative Project**

**Grant agreement no:** 314145

**Coordinator:**

Enginsoft S.p.A

**Reference person:**

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# Partner



ELECTRONICS



Aalen University



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DEGLI STUDI  
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Research Alliance

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FRECH

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MOTUL TECH  
Baraldi  
HPDC Division of the MOTUL Group

saen

ASSOMET  
Associazione Nazionale  
Industrie Metalli non Ferrosi

## Smart Factories: Energy-aware, agile manufacturing and customization



**M**ulti-layers control & cognitive System to drive metal and plastic production line for **I**njected **C**omponents

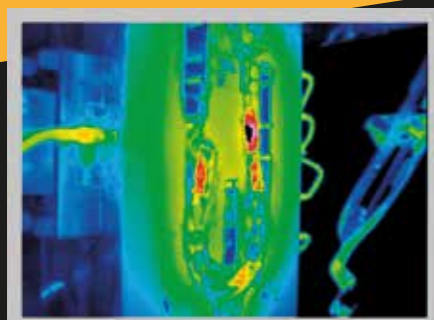
For High Pressure Die Casting and Plastic Injection Moulding

Contract no. 314145 - Collaborative IP project - FoF-ICT-2011.7.1

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**High Pressure Die Casting (HPDC)** of light alloys and **Plastic Injection Moulding (PIM)** are two of the most representative large-scale production-line in manufacturing field, which are strategic for the EU-industry largely dominated by SMEs. Due to the high number of process variables involved and to the non-synchronisation of the process control units, HPDC and PIM are most “defect-generating” and “energy-consumption” processes in EU industry showing less flexibility to any changes in products and in process evolution. In both, sustainability issue imposes that machines/systems are able to efficiently and ecologically support the production with higher quality, faster delivery times, and shorter times between successive generations of products. Therefore, the MUSIC is strongly aimed at leading EU-HPDC/PIM factories to cost-based competitive advantage through the necessary transition to a demand-driven industry with lower waste generation, efficiency, robustness and minimum energy consumption. The development and integration of a completely new ICT platform, based on innovative Control and Cognitive system linked to real time monitoring, allows an active control of quality, avoiding the presence of defects or over-cost by directly acting on the process-machine variables optimisation or equipment boundary conditions. The Intelligent Manufacturing Approach (IMA) will work at machine-mould project level to optimise/adapt the production to the specific product and can be extended at factory level to select/plan the appropriated and available production line. The sensors calibration and quality measurements will be the pre-requisite of Intelligent Sensor Network (ISN) to monitor the real-time production and specific focus will be also devoted to Standardisation issues. The challenge of MUSIC is to transform a production-rate-dominated manufacturing field into a quality/efficiency-driven and integration-oriented one to exploit the enormous (and still underestimated) potential of HPDC/PIM through collaborative research and technological development, along the value chain with research groups, design, engineering and manufacturing companies and through advances in manufacturing, ICT and model process technologies.

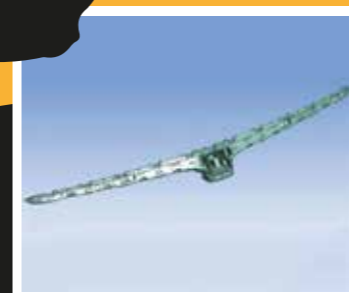


### PROJECT RESULTS:

The project results have been organized and addressed starting from the basic level, devoted to **Fundamental Research**. At this stage all investigated issues have been assessed, which are the defect classification in view of the standardization, the analysis of product and process requirements as well as of experimental data to support and validate the following intermediate level of **Applied Research**.

At this stage all devices and elements, necessary for the development of the next final objectives, have been built, tested and verified. The project now has an Intelligent Sensor Network (ISN), the Database and the Control & cognitive System (C&CS), self-adaptive equipment and advanced devices for products traceability, as well as the real-time prediction of quality, energy and cost.

The last objectives are the real **Breakthrough Manufacturing & ICT** results which aim at a proper integration on the industrial demonstrator plants of the C&CS software and platform in order to obtain the estimated impacts and to elaborate adequate CEN Documents on HPDC defects and tooling to reach an International standardization.



From Music to Symphony in Smart Factory

### PROGRESS BEYOND THE STATE OF THE ART

Introducing intelligent manufacturing systems in HPDC, made available by autonomous and self-adaptive devices, will totally change the actual organisation and potential of this process. According to the experience of MUSIC Partners, which are well-established players in the HPDC and PIM manufacturing scenario, **six main challenges** have to be faced for the progress in this field which can be identified in terms of :

1. leading HPDC and PIM processes to “zero-defect environment”
2. introducing real-time tools for process control
3. monitoring and correlating all the main process variables
4. making the process set up and cost optimisation a knowledge-based issue
5. involving to multi-disciplinary R&D activities
6. impacting on EU HPDC and PIM Companies, by dissemination and standardization activities

### EXPECTED END RESULTS AND INTENTIONS FOR USE AND IMPACTS:

The Intelligent System coming from MUSIC will lead to an optimised and intelligent design and manufacturing of HPDC/PIM components for different industrial sectors. The consequences of this are manifold: weight reduction of products, better use of natural resources, new applications (in automotive and in other fields) of materials. The positive impacts will affect all categories in a transversal way:

#### SMEs:

- ♪ increased efficiency of HPDC/PIM manufacturing will give the bases for increased production, sales and use of these components
- ♪ competence/know-how developed in the project will be further utilised in EU manufacturing industry, contributing to improving the quality of their products, to win the competition with low cost/low quality products coming from some Asian Countries;
- ♪ increase in the process yield and in the quality content of castings (these are their specific MUSIC outcomes) will lead to new applications;
- ♪ for **SMEs** engineering companies, the availability of the Intelligent System will give them more reliability since the design stage, thanks to an improved material and process knowledge.

#### Industries:

- ♪ for end-users industrial companies, the possibility of employing new-concept components will improve the technological margin of their products (improved reliability and safety, cost optimisation).

#### Universities and Research Centres:

- ♪ for universities and research centres, leading the diffusion of a new knowledge based approach in manufacturing & engineering, developing specific educational programmes, is a demanding challenge.

The **benefits for consumers** are clear: “zero-defect manufacturing” for HPDC/PIM products means increased safety (for any kind of product considered) and decreased costs (no scraps, better efficiency in processes, less energy consumption).