

# NEWSLETTER

1<sup>st</sup> Issue January 2022



**FLAMINGo - Fabrication of lightweight aluminium metal matrix nanocomposites and validation in green vehicles**



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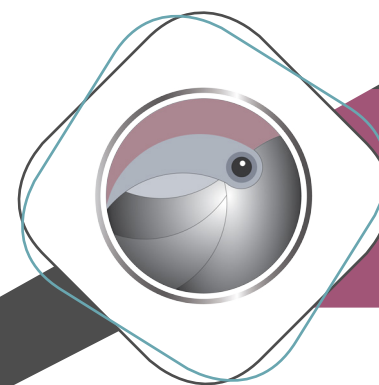
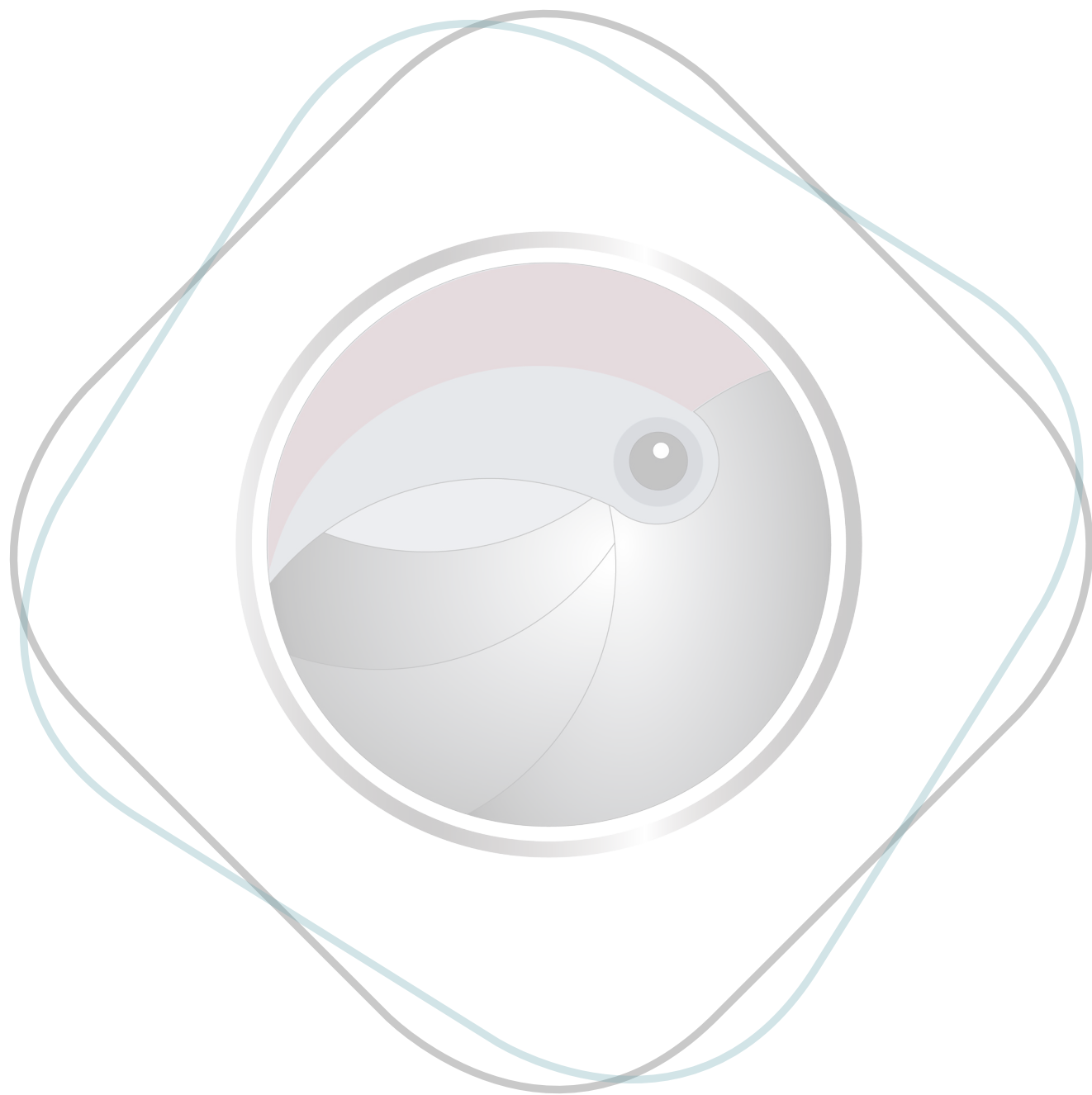
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Funding Scheme: H2020-LC-GV-202







## 1. Management Board Welcomes you



### Paolo Matteazzi - Project Coordinator

Prof. Ing. Paolo Matteazzi is the founder and president of MBN Nanomaterialia SpA, being constituted in 1994, and former Professor of Metallurgy at the mechanical engineering department of University of Udine - Italy. He has a consolidated and well-proven expertise in promoting, coordinating, and managing research projects at the National and European level, also acting as Chair of NANO futures ETIP (European Technology Innovation Platform), as well as in company management and B2B development with close attention to new market opportunities and industry needs. He is the main inventor of more than 20 patents in the field of powder materials and technologies, having a wide knowledge in powder metallurgy, nano phased and nanostructured materials. He contributed to the development of novel oxide dispersion strengthened materials, of ceramic-metal composites for thermal spraying, as

well as lightweight and high-temperature alloys for aerospace that are consolidated by extrusion and hot isostatic pressing. He is the project coordinator of FLAMINGo, contributing with his experience as an entrepreneur and metallurgist to the research development of Al-MMnCs materials and their direct application into industrial products.

### Peter Schumacher - Technical Director

Peter Schumacher is the technical manager of the FLAMINGo Project. Currently he is holding the chair of casting research at the Montanuniversität Leoben and he is the managing director of the Austrian Foundry Institute, ÖGI. Over 220 publications within the academic field, mainly in cooperation to an industrial environment, enabled him to gather a broad range of experiences in applied science and technology transfer. His background as a mechanical engineer and material scientist puts him in a unique position to guide the FLAMINGo team regarding technical questions and to help the transition from academia to industrial applications.



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## 1. Management Board Welcomes you



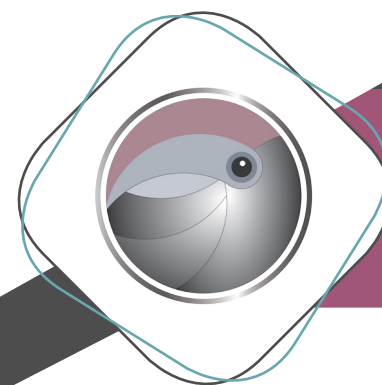
### Ioanna Deligkiozi - Exploitation Manager

Ioanna Deligkiozi is the CEO of AXIA Innovation. AXIA is a business, communication, and digital computational circularity tools development company, based in Munich, Germany. Dr. Ioanna Deligkiozi is a Chemical Engineer, with an M.Sc. degree in the field of Science and Technology of Materials. During her postgraduate degree studies she has been involved in the field of advanced composite materials. In 2012 she defended her Ph.D. thesis in the field of supramolecular chemistry. Since then, she has worked as a senior researcher and R&D manager in private companies and Research Institutes. She has been involved in more than 25 European research projects (FP7 and H2020) as senior researcher while in 8 of them she was the technical and innovation manager. In FLAMINGo project she is responsible for the Exploitation activities and the enhancement of the project's Innovation Cycle and Business Growth. Being

informed of Europe's Green Transformation which is of high importance especially to automakers a continuous innovation towards lightweight solutions is needed. According to Dr. Deligkiozi "FLAMINGo envisions to facilitate Sustainability along the entire value chain supporting governments in policy making, thus moving to combat climate change via CO<sub>2</sub> reduction strategies. This will only be achieved when industries will adopt new and less energy intensive manufacturing technologies to reduce pressure on the environment and decrease energy use."

### Ilias Gkotsis - Dissemination Manager

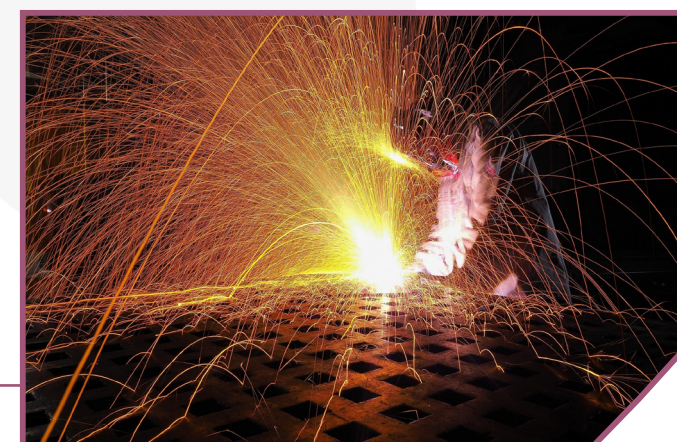
Ilias Gkotsis, is currently involved in business development and communication activities in several EU funded projects being a project manager at EXELISIS, a Greek-based consulting company of entrepreneurs and engineers. He owns a Master of Engineering (Meng) in chemical engineering while in FLAMINGo he is acting as Dissemination Manager. During the project implementation he will be responsible for the appropriate dissemination and communication of the project's results through several channels such as website, social media, events, and printed material to comply with the market and innovation potential of the project as well as to boost networking opportunities for the consortium.



## 2. Overview of the FLAMINGo project

In the everyday life of European citizens, the automotive industry plays a major role. However, there is an increased demand for safer, cost-effective, and lower energy consumption cars. This is supported by the European initiatives Clean Energy and Green Deal, targeting circular economy, recyclability, and the reduction of CO<sub>2</sub> emissions by 55% by 2030, towards efficient green transport. Therefore, sustainable electric vehicles are the next disruptive market force for the mobility sector in Europe. European Union will implement at least 30 million electric cars on its road by 2030. FLAMINGo is a European Union's Horizon 2020 project that proposes a novel industrial manufacturing solution for the efficient production of high-performance lightweight aluminium nano-composite materials thanks to a novel metallurgical and forming combined approach for making automotive parts. The goals of FLAMINGo are related to the manufacturing of strengthened aluminum metal matrix nanocomposites (Al-MMnC) with elevated properties, both in terms of strength and stiffness, and their validation throughout all the manufacturing chain, from cradle to cradle. In simple words, FLAMINGo will provide engineering solutions to substitute steel components in BEV automotive parts and achieve a substantial reduction of its weight. To be effective in introducing the new materials in the market the project will target the following development steps:

- o The production of Al-MMnC via solid-state mechanical alloying.
- o The casting of Al-MMnC components by inoculating the additives in an aluminium melt and homogenized by ultrasonication and electromagnetic stirring systems.
- o The production of smaller components (brackets and connectors) by Low-Pressure Die Casting (LPDC) and bigger components (subframes) by Green Sand Casting to demonstrate broader feasibility and applicability of Al-MMnC.
- o The extrusion of cast billets for making profiles for the body frame.
- o The weldability assessment of Al-MMnC using a range of welding technologies (MIG, resistance spot, and arc stud welding processes).
- o The topology optimisation/process simulation enabling the reduction of material per part without losing mechanical performances.
- o The usage of these components for substitution of steel and aluminium parts in electric vehicles, validation of components estimated service life, and installation on vehicles.
- o Validation of recycling of Al-MMnC components supported also by the use of secondary aluminium in the formulation.



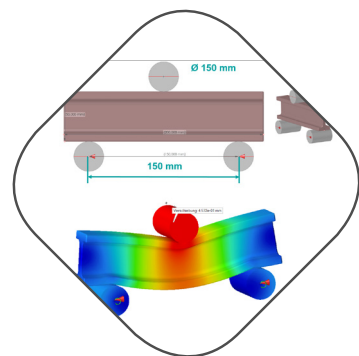




### 3. FLAMINGo Technologies

#### Metal Alloying

Mechanical alloying (MA) is a solid-state powder processing technique that involves repeated cold welding, fracturing, and re-welding of powder particles in a high-energy ball mill. In comparison to other similar techniques, MA is a simple technique with unique advantages. For example, it is very easy to obtain nano-structures in most cases. FLAMINGo applies MA to aluminium metal matrix nano-composites and combines MA with casting and extrusion to bring the new material to the automotive industry.

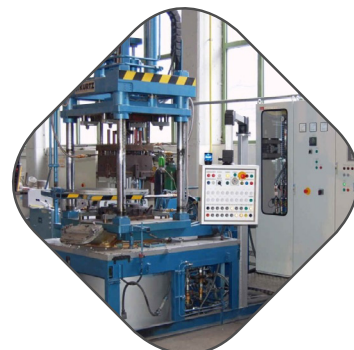


#### Topology Optimisation

The performance of a component can be maximised by using topology optimisation. The goal of optimisation is the reduction of weight or the improvement of structural stiffness. The optimisation process starts with defining boundary conditions like loads, construction space, and additional tasks according to a specific part. The importance of each element for the system will be evaluated and the design variables will be varied. After several iterations, an optimum design will be created.

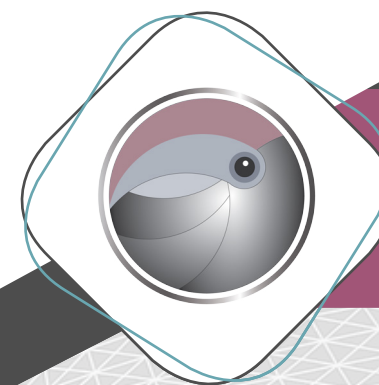
#### Low Pressure Die Casting

By using nanoparticles in aluminum casting, high strength values can be achieved without heat treatment. The particles are distributed in the melt by using ultrasound or other methods. The Low Pressure Die Casting (LPDC) process runs with the utilisation of dies, one half of the die is attached to a fixed machine plate and the other to a movable one on a die-casting machine that is vertically aligned. The method can produce components with complex geometries and high dimensional accuracy.



#### Green Sand Casting (GSC)

In the Green Sand Casting the molten metal is poured into molds. The metal is molten by utilizing induction furnaces. The molds are made of wet sand mixed with bentonite clay or organic binders. The molds can be easily created in automated assembly lines. GSC is the most widely used casting method for small volume components. On the other hand, green sand molds for casting don't have tight dimensional tolerance, and thus when precise dimensions are required or smooth surfaces the components should be further processed by machining and surface finishing.



### 3. FLAMINGo Technologies

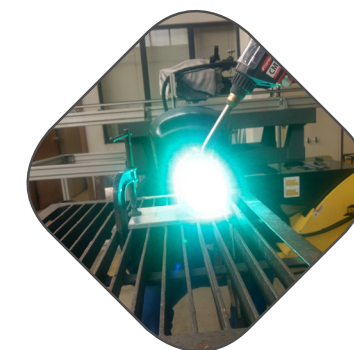
#### Extrusion

The extrusion method is to process complementary to casting, supporting the drawbacks and limitations that might occur in terms of processabilities and with improvements in the design of the component. Direct chill cast Al-MMnCs billets will be produced and sectioned prior to extrusion. Extrusion of parts is better applied if welding, where casting can be effectively demonstrated in smaller components and results transferred to the whole castable components.



#### Welding

Offers a key range of well-proven possibilities for the construction of aluminum vehicle body structures and closures, and therefore the weldability of the new nanoparticle-reinforced Al-MMnCs must be assessed and properly benchmarked against the more traditional alloys. Specifically, in the FLAMINGo project, MIG welding, resistance spot welding, and arc stud welding will be used. With MIG welding, the use of the pulsed current mode is the most preferred solution. Resistance spot welding is producing high-quality welds in aluminium and arc stud welding uses rather short welding cycles, conditions that may be potentially demanding from the metallurgic point.



#### NDT

For quality control (QC) of manufactured Al-MMnCs components, NDT techniques can be used. Non-destructive testing techniques, include among others: ultrasonic testing, thermography, shearography, and Eddy currents. Other valuable techniques can be also considered, such as process compensated resonance testing. Those NDT procedures can detect defects and discontinuities inside materials for quality control of the newly manufactured components and quality assurance during service.



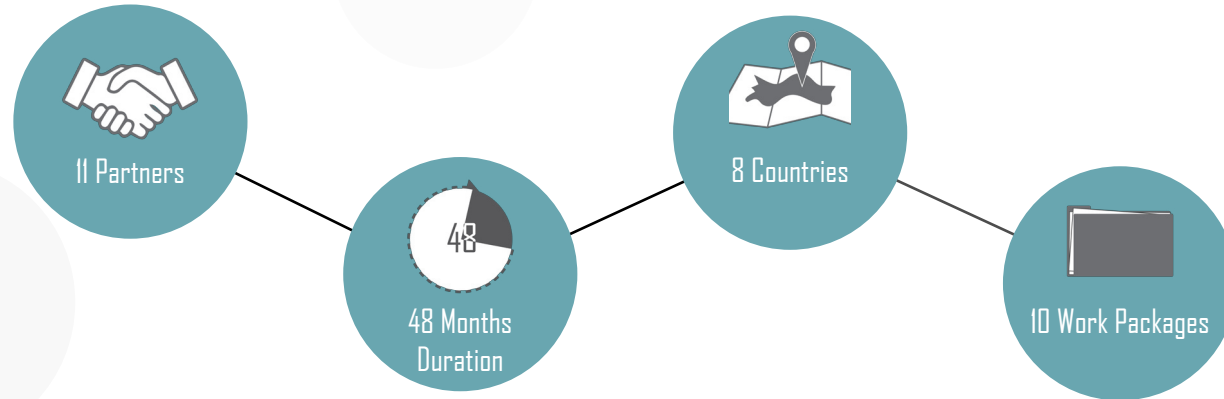
#### Recyclability

Al recycling begins with the separation of aluminium alloys from scraps before remelting and, nowadays, great endeavors are devoted to improving the quality and efficiency of this goal to obtain a final remelted product with tight elemental tolerances. After scrap sorting, remelting is carried out as the last step in the Al recycling value chain to requalify for future use. In the case of Al-MMnCs of FLAMINGo it is already known that the wettability and dispersion of the reinforcing nanoparticles cannot be maintained, for the high temperature and prolonged processing times.





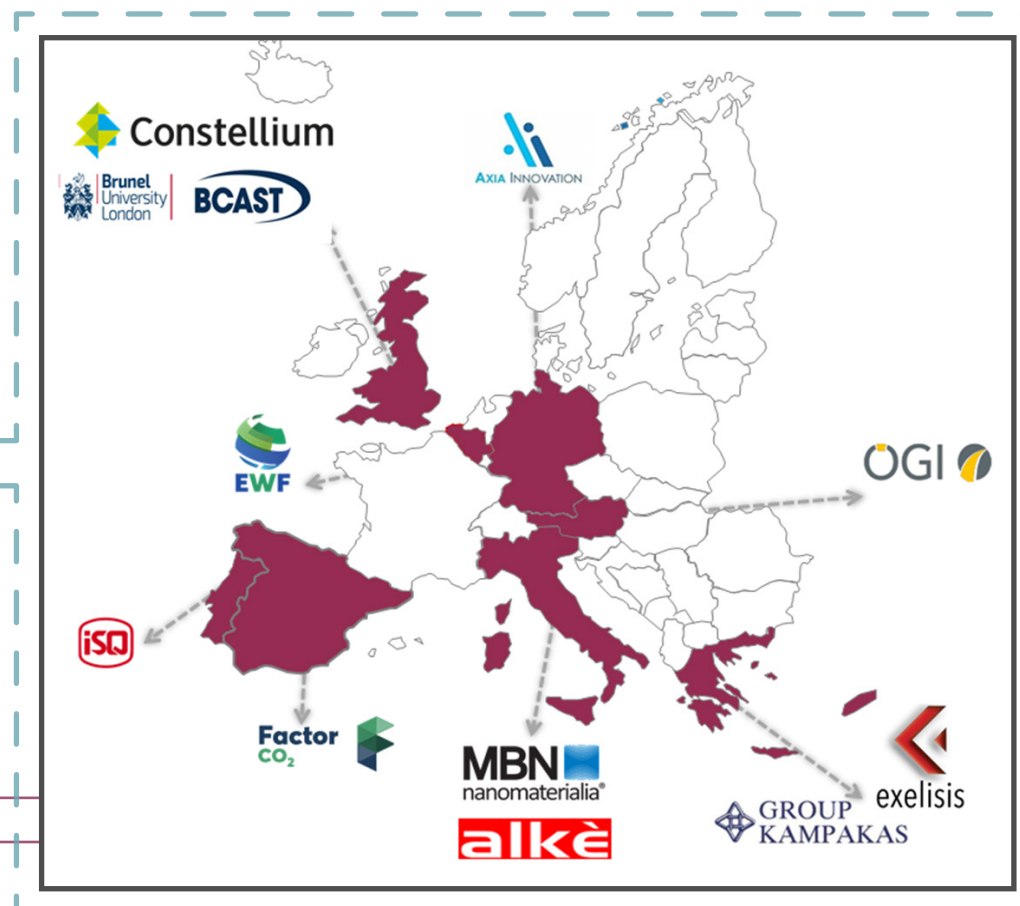
## 4. Project Indicators & Partners



### Current Progress

25%

### Partners



## 5. 1<sup>st</sup> year of FLAMINGo

**MBN**  
nanomaterialia®

Besides the project management role, MBN's technical contribution focuses on the manufacturing of Al-based nano-reinforced additives for the production of Aluminium Metal Matrix nano-Composites; these additives have been engineered to ease the dispersion of the nano-particulate in the melt pool, avoiding clustering, and hence enhancing the mechanical properties in the final material. To prove their efficacy and reliability, MBN has started to test several formulations with the manufacturing lines in ÖGI and Brunel University.

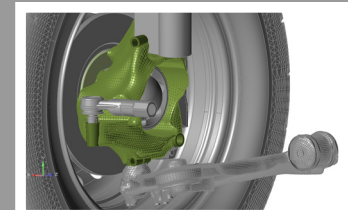
After processing different types of additives in casting trials, the first results of the characterisation on processed material are used as feedback to MBN to improve the additive composition and morphology. So far, 5 different types of additives formulation have been released, testing nanoparticles with different chemistry and sourcing (nano-Al<sub>2</sub>O<sub>3</sub>, and nano-SiC, among others). MBN is also working on combining in a single step the formulation of the additive and the synthesis of carbide nano-reinforcement through reaction-milling. This approach potentially brings several benefits: an improvement on the wettability of the nanoparticles by the aluminium matrix, a more homogeneous dispersion, and most of all a drastic price reduction of the casting additive, since the synthesis of the carbide reinforcement is made in a single step through very affordable raw materials.



Al masterbatches

**ÖGI**

The Austrian Foundry Research Institute (ÖGI) in the first 12 months of the FLAMINGo project was involved in the activities related to castings, providing feedback to the development of additives by MBN Nanomaterialia, and in the activities for topology optimisation of components for casting methods. Specifically, casting series with five plates for each cast have already started aiming to the characterisation of different additive formulations, tensile and hardness testing specimens were collected from the plates, and tested specimens (one from each series) were provided to MBN for further metallographic and SEM investigations. As regard topology optimization the design space and the simulation of load were carried out in 4 different cases, according to the max loads that ÖGI has chosen, (max braking, fully loaded, max turn angle, and combinations). Moreover, FEM simulation was performed, demonstrating that 58% of weight-saving was achieved through optimization only. Finally, a design concept including a runner system and a mould was finalised, while the component with the design concept was 3D-printed.



FEM simulation performed - Installed component



3D - printed component with casting concept

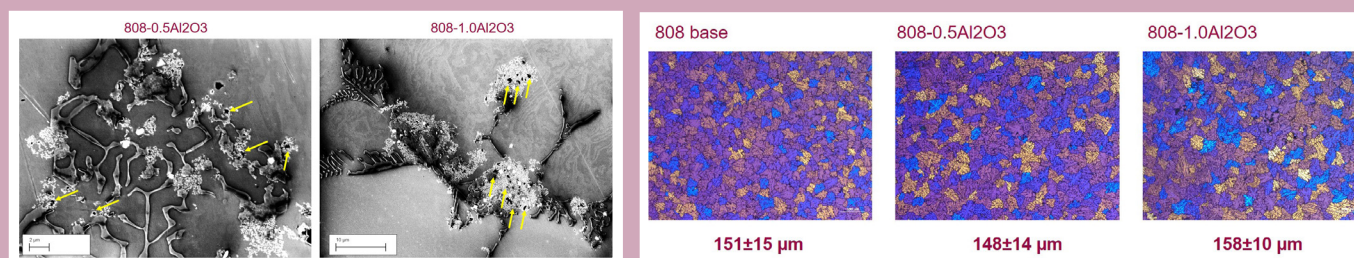




## 5. 1<sup>st</sup> year of FLAMINGo

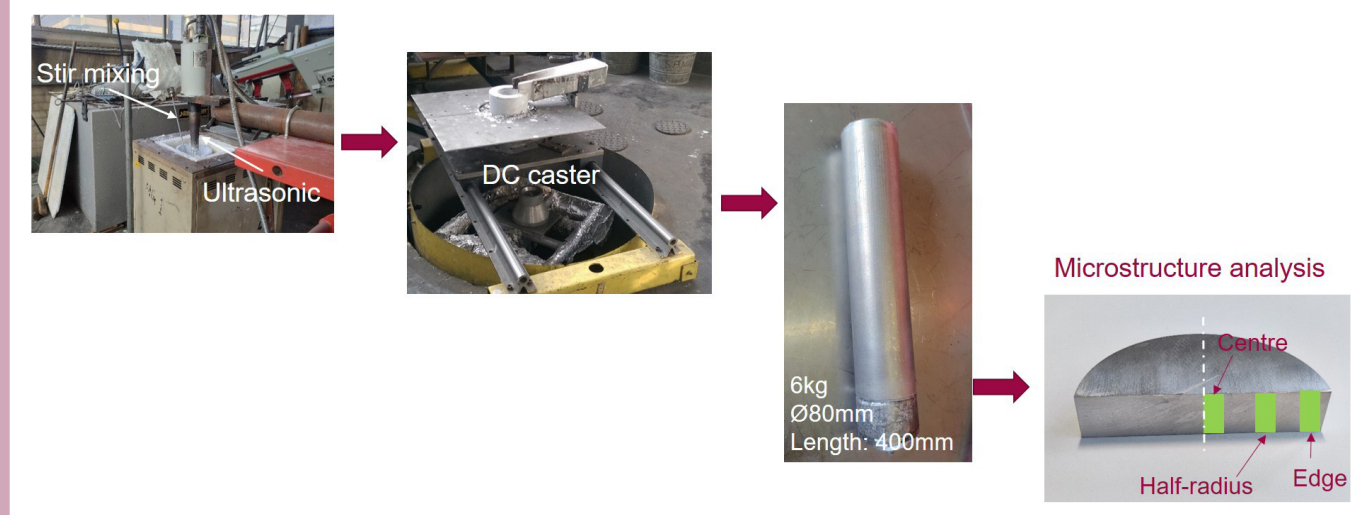


Brunel is mainly involved in the development of aluminium nanocomposite billets by direct-chilled casting. The billets will be extruded by Constellium to demonstrate the properties improvement, subject to the addition of nanoparticles. In the first year, Brunel has been working on lab-scale production of high-quality MMnC billet (80mm in diameter) with enhanced dispersion of nanoparticles, providing feedback to the ongoing developments of the additive formulation. So far, several DC casting trials were conducted and the Constellium HSA370, HSA340 and HCA300 alloys were produced. The reference alloy and the above-mentioned materials have been delivered to Constellium for a flow stress test, which is generally used to simulate the process in the actual extrusion process. In addition, Brunel has already produced several HSA370-Al<sub>2</sub>O<sub>3</sub> (amorphous phase in 0.5 and 1.0wt%) composite billets.

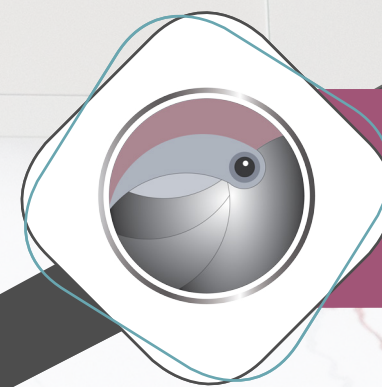


Distribution of Al<sub>2</sub>O<sub>3</sub> nanoparticles of the 808 (HSA370)

The grain size of DC casting in the position of half-radius



Lab-trial DC casting experiment



## 5. 1<sup>st</sup> year of FLAMINGo

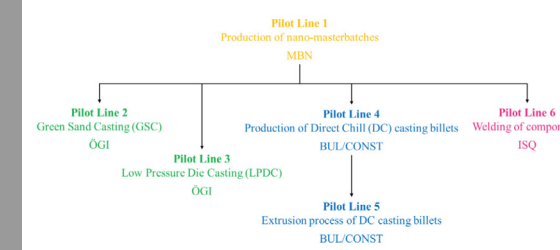


During the first year, the Constellium team focused on developing a concept to transfer the production of aluminium nanocomposites from laboratory to industrial scale with regard to the processing operations, such as Direct Chill (DC) casting, extrusion, aging, and joining. Moreover, Constellium concentrated on enabling the manufacturing of the extruded demonstrator i.e., a structural component of an electric vehicle, by optimizing its mechanical properties. In particular, understanding the effect of nanoparticles (NP) on the composites' extrudability, associated strengthening mechanisms and recyclability is of major importance. For the knowledge generation and feasibility assessment stage, a crash management system (CMS) was selected as the extruded reference demonstrator. Constellium identified the reference materials and shapes for extruded components and based on this selection, supplied the Brunel team with the raw materials, i.e. its 6000-series extrusion alloys Constellium HAS6® (high-strength) and Constellium HCA6® (high-crash) out of its automotive portfolio for defining and optimizing the casting production of the nanocomposite billets at laboratory scale. The overall target is for Constellium and Brunel to jointly define both the casting recipes and the upscaling process. Additionally, Constellium has also provided both advice and engineering support to the Brunel team. This includes support for processing and machining of lab-scale aluminum-based composite samples for tensile testing and assessment of flow stresses of the NP-composite formulations. Additionally, the design of the selected sections for manufacturing the proposed extruded demonstrator will need to be adapted to render it suitable for production, using the extrusion press capabilities at Brunel. Therefore, the Constellium design team is also in close collaboration with ALKE, to whom the initial redesign concept for the target components was proposed by Constellium.

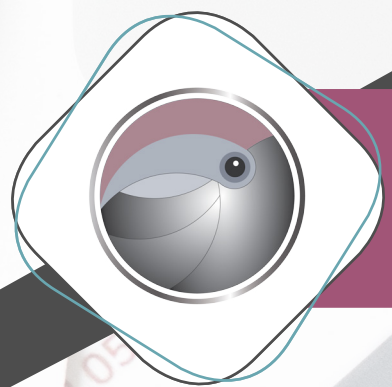


ISQ has contributed to the tasks related to two different subjects: non-destructive testing (NDT) and occupational risks associated with the use of nanotechnologies in FLAMINGo. A state-of-the-art analysis was performed to select the best NDT techniques that will be used to inspect the developed components. This study is very important as the NDT techniques present different probabilities of detection of the defects, principally of the micro defects. At the same time, a state-of-the-art study for in-service health monitoring was performed. In this study, the capability of providing data related to damage detection, precise location, quantification, and characterisation, was considered. The PZT sensors or

Eddy probes will be among the most appropriate sensors to be incorporated in the structures that will be produced. Concerning the assessment and management of potential occupational risks associated with the use of nanotechnologies, the Tier I of the stepwise methodology Tiered Approach of EN 17058 (2018) has been applied initially to the pilot line for additive production, although there is a total of six pilot lines that comprise the manufacturing of casted and extruded reinforced aluminium and welded components – see Figure. Tier I assessment has been done by gathering hazard and exposure qualitative data related to the nanomaterials and the manufacturing process. Hazard identification is based on the current knowledge of the specific nanomaterials used, i.e., the physicochemical properties and the toxicology or health effect data are obtained from safety data sheets, and REACH and PubChem databases. The close collaboration with MBN has enabled ISQ to understand the additive manufacturing process and the related activities, aiming to establish potential worker exposure scenarios. The hazard and exposure data gathered will be used as an input on Control Banding (CB) tools to determine an appropriate level of control strategy (i.e., the output of the CB tools).







## 5. 1<sup>st</sup> year of FLAMINGo



Group Kampakas, during the first year of the project, was mainly involved in the development of the specification report for recyclability and the support of partners with their tasks. Details about protocols and methods for the selection of scrap aluminum, compatible with the compositions selected in FLAMINGo were provided, as well as details on the current standard for Al recycling, and the nanoparticles limit in secondary aluminum. The report analysed the production of primary aluminium deriving from bauxite and the recycling process in the automotive sector. Except for this general information, the current regulatory environment was presented along with the ELV directive of the

European Parliament and Council. The main goal of this document was to outline the processes for the recycling of aluminum and how these will be applied to Al-MMnCs. Moreover, Kampakas contributed to the health and safety regulations review. Finally, Kampakas supported the development of additives with secondary raw Al by providing samples for processing tests (small and clean chips/swarfs).



ALKE has actively collaborated with other project partners to identify the 2 final demonstrators for both casting and extrusion scenarios (front steering knuckle and rear frame). Technical specifications have been set for the demonstrator components, providing also expected topology designs and describing working scenarios and other elements from an EV OEM perspective, which has been essential to set up further steps of the project development.

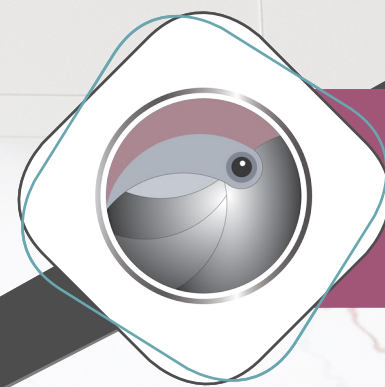


ALKE Electric Vehicle



From the beginning of the project, AXIA Innovation has worked intensively on the dissemination and exploitation activities. Regarding the dissemination activities, AXIA set up a complete and well-organised dissemination strategy for the duration of the project. AXIA worked on the project's identity (logo, template colors), developed the website of the FLAMINGo project, and was responsible for the update of its content related to deliverables, news, digital material, technology watch articles, etc. Complementary to this, the social media pages of the project were created (LinkedIn, Facebook, Twitter) and one post per week was uploaded. Moreover, the printed material (flyer, roll-up, poster, conference lanyard) was created, and 2

press releases, for the project, were announced by AXIA on the FLAMINGo website. The dissemination mapping of the partners' activities is also defined and updated throughout these months, with appropriate communication between the dissemination manager and the partners. Through the digital networking of FLAMINGo, AXIA successfully manages to expand its number of followers and subscribers to all social media platforms. Regarding the exploitation activities, during the first year of the project AXIA team was analysing the market landscape and potential indicators that might affect the environment of the project. They were mostly focused on the SWOT and PEST methodology. Moreover, they implemented a Data Management Plan internal training seminar to raise the awareness of the consortium on the research data and the FAIR principles. Recently, AXIA has started working on the methodology to be followed related to the IPR management of the project and successfully launched the first annual Newsletter edition.



## 5. 1<sup>st</sup> year of FLAMINGo



During the first year of the FLAMINGo project, EWF has successfully supported AXIA in the dissemination and communication activities. EWF attended and hosted a conference amongst their network, where the FLAMINGo project and its objectives were promoted. EWF started analysing the Standardisation and Regulatory issues within the project. The main objective of this task is to facilitate the acceptance and utilisation of the developed materials and processes by the market. Other objectives include the provision of input to the other partners, ensuring compatibility and interoperability with what already exists in the market through standards, as well as using the standardisation system as a tool for the

dissemination of the project results and interaction with the market stakeholders. Approaching the end of the first year, EWF has as next due to the "Report on the standardisation and regulatory landscape and applicable standards". This document compiles relevant standards and regulations related to the FLAMINGo project developments and technologies, making an early identification of the necessary requisites to deliver project activities a post-market implementation. Additionally, the early identification of Standards will also allow a future approach to possible standardisation gaps.



Factor has carried out a survey of the aluminium use situation in Europe, that includes the general magnitudes of secondary aluminium supply in different sectors, the impact that recycling has on the energy consumption in Al production, and financial information about the current and future market of the material. The report delves into the Greenhouse Gases (GHG) emissions derived from the development of the Al industry. It also focuses on the use of recycled aluminium in the automotive sector and on the positive effect recycling can have on these emissions and the vehicle performance in terms of efficiency. In this first year, Factor also has participated in the technical revision of the survey of market availability of raw

materials for AlMMnCs, about the material supply chain and Al sources and manufacturing activities of the project. Factor has defined the goals and scope of the Life Cycle Analysis and Life Cycle Cost Analysis in its first steps, based on internal research and documentation produced during the first year of FLAMINGo. Currently, Factor is working on the development of process diagrams that will help to define the components, materials, and operations that take place in the context of the project. These diagrams will be the basis for collecting the information needed for the LCA and LCCA, but also the impact assessment framed in the circularity and environmental sustainability work package.



EXE during the first year of the project has successfully supported AXIA Innovation on the dissemination and exploitation activities. EXE cooperated with AXIA on the design of the project identity, the development of the website of the FLAMINGo, and the update of its content related to public deliverables, news section, digital material, technology watch articles, etc. In addition, LinkedIn, Facebook, and Twitter accounts were built and a schedule of one post per week was established. Moreover, the printed material such as flyer, roll-up, Greek translated flyer version, poster, and conference lanyard was created, while 2 press releases were announced on the FLAMINGo website. Appropriate planning for the participation of partners in events

was mapped and continuous communication between EXE and the partners for the dissemination and communication activities was proved necessary. Moreover, EXE carried out the first citizen science activity of the project by organizing a communication event at a high school in Athens with over 45 students and teachers, where proportional material was also circulated. Related to the exploitation activities, close collaboration between AXIA and EXE was established. They successfully managed a Data Management Plan internal training seminar and currently, they are working on the exploitation planning of the project and the strategy to be followed regarding the IPR and Knowledge Management. Moreover, EXE has contributed to the development of the first Newsletter.





## 6. Deliverables submitted and Milestones achieved

### Deliverable 1.1 – Project Management Plan

(Contains a detailed Project Management Plan with a Gantt chart and a Work Breakdown Structure, with a schedule per task, responsible partner related subtasks, related deliverables, and dependencies on other tasks.)

### Deliverable 2.1 - Specifications report on materials to be used

(Included an extended table of materials and their properties referred to the Electric Vehicles components and the specific ALKE selected components, including a proposal of Al-MMnC composition that match with the application)

### Deliverable 2.2 - Specifications report on end-users' specifications and requirements

(A report about specific requirements for each selected component, including design, stresses, and cost targets. Moreover, a definition of the testing methodologies to evaluate the final component performances is included)

### Deliverable 2.3 - Specifications report on production methods

(A report regarding the processes constraints, production capacity (t/day), specific energy consumption (KWh/t), minimum/maximum batch sizes for all the processes)

### Deliverable 2.4 - Report on specification for recyclability

(This report includes protocols and methods of selection of scrap material, definition of nanoparticles limit in secondary Aluminium and review about current standard for Al recycling)

### Deliverable 3.1 - Market availability of raw materials for Al- MMnC production

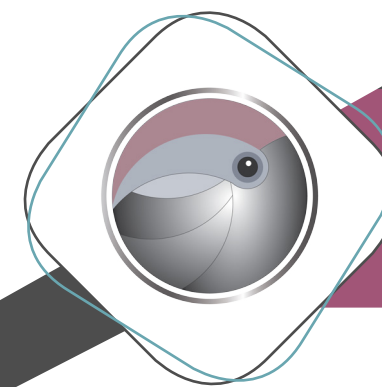
(Review of available sources of primary and secondary aluminium, including cost and supply chain analysis. It includes also cost and supply chain analysis for nanoparticles)

### Deliverable 9.1 - Project Web-portal, Blog and Social Media Groups

(Launch of the Project website dedicated to dissemination and communication of project results, registration of FLAMINGo accounts in social media groups)

### Deliverable 9.2 - Data Management Plan

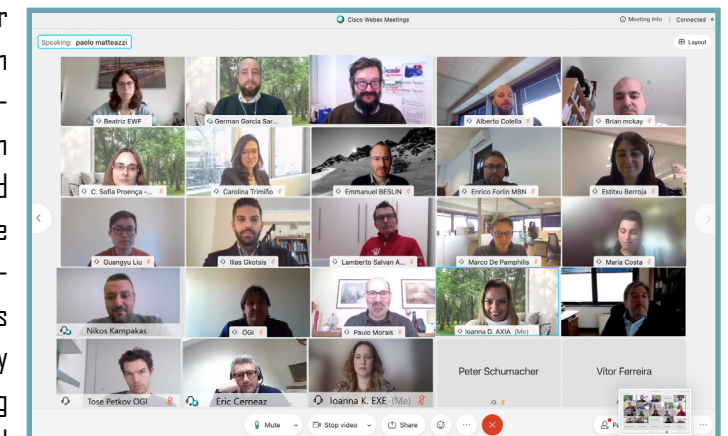
(The report identifies the methodologies of data repository for internal use of the partners as well as the data sources and structures, the data are collected to allows tracking sample and batch evolution and correlate LCA with performances)



## 7. Project Meetings

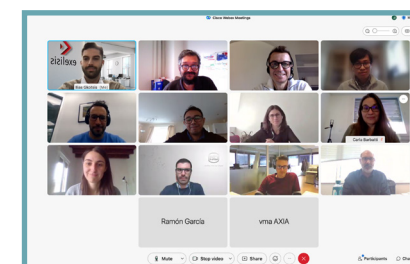
### ◆ Kick-off Meeting – February 2021

On the 18th of February 2021, the Kick-off meeting of the FLAMINGo H2020 Project took place remotely due to the COVID-19. The meeting was hosted by the Coordinator, MBN Nanomaterialia. Each partner presented their role in the project, and the action plan connected to the relevant Work Packages and Tasks. In addition, the Project Officer from the EC provided valuable advisory support to the Consortium related to the guidelines and procedures. In detail, the Project Coordinator thoroughly presented WPI, related to the coordination and management followed by WP2, related to the specification and design and topology optimisation, presented by ALKE. WP3 of the FLAMINGo project is about the production of aluminium metal matrix nano-composites masterbatches, led by MBN, and WP4 refers to the topology optimisation and process simulation, undertaken by DGI. Presentations continued with WP5 & WP6, covering the casting production and extrusion methods. Moreover, the validation and demonstration of materials and components were presented by DGI and Brunel University, respectively (WP7). Circularity and Environmental Sustainability is connected to WP8, led by Factor CO2, while Exploitation and Dissemination activities, as well as IPR management is connected to WP9, led by AXIA Innovation and supported by EXE.

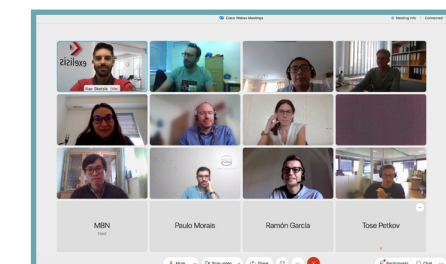


### ◆ Progress Meetings Roadmap

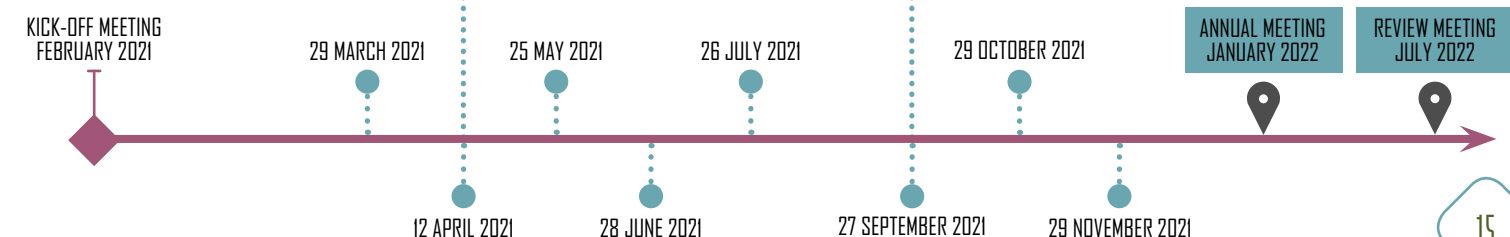
Monthly meetings took place in order to ensure the efficient management and timeline compliance of all work packages and tasks.



In April 2021, FLAMINGo consortium had their first progress meeting to discuss on updates of the project and the specification deliverables.



In September 2021 the FLAMINGo partners discussed on management issues and the production of Al-MMnCs under WPI & WP3, the topology optimisation and process simulation under WP4, safety activities in WP8 and the standardisation activities in WP9.







## 8. Dissemination Events 2021-2022

### 1st conference on FAST/SPS, October 25-26, 2021, Poznan, Poland (MBN)

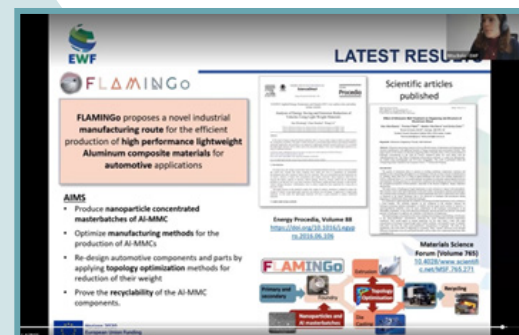


On the 25th -26th of October 2021 our Project coordinator MBN Nanomaterialia, participated in the 1st conference on FAST/SPS and discussed with different disciplines and industrial representatives on aluminium metal matrix nano-composites powders and the FLAMINGo project concept. The conference took place remotely and in-person in Poznan, Poland. Al-MMCs can be manufactured with several other ways than casting technology and Spark Plasma Sintering is one of these. As supplier of metal, nanostructured powder and active player in the powder metallurgy field, MBN has participated to the conference in order to promote the use of their powder for the next progressive SPS applications.

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### Online 59th General Assembly, November 16, 2021 (EWF)

On the 16th of November 2021, our EWF Colleague Rita Gomes Bola presented the FLAMINGo general concept and objectives of the project at the EWF 59th General Assembly that took place remotely. Rita presented the expected impact of FLAMINGo, as well as the EWF roles and tasks related to standardisation and regulatory issues. The estimated audience was more the 50 participants.



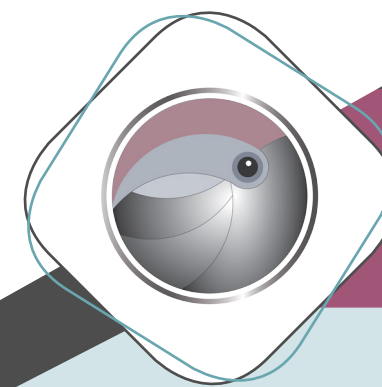
### Formnext 2021, November 16, 2021, Frankfurt, Germany (MBN)

**formnext**

Frankfurt, Germany,  
16 – 19 November 2021

As a material provider and with know-how in Al-MMC powder production, MBN has joined the Formnext 2021 in Frankfurt in order to establish B2B relationship with players operating in the automotive industry. The estimated audience was around 600 participants.

On the 16th of November 2021, MBN Nanomaterialia's Director Dr. Alberto Colella and Enrico Forlin, also involved in FLAMINGo, participated in the Formnext 2021 that took place remotely and physically in Frankfurt. Aluminium metal matrix composites (Al-MMC) are a game-changing material solutions when deployed in Additive Manufacturing, achieving outstanding material properties enabled by some peculiar features of AM technologies (e.g. drastic cooling rate), combined with a proper material design.



## 8. Dissemination Events 2021-2022

### European Die Casting Awards 2022, June 8-10, 2022, Nuremberg, Germany (DGI)

Our Partner, DGI will participate and set up a booth in the European Die Casting Awards 2022, to disseminate the FLAMINGo project. The 21st Die Casting award sets the course for the future of the die casting industry. In this award show, different activities will take place such as a die casting congress, a comprehensive spectrum of products such as die-casting moulds and metal alloys and the overall die casting value chain will be concentrated in one place.



### TMS 2022 Annual Meeting & Exhibition, February 27-March 3, 2022, Anaheim, California, USA (BRUNEL)



other professionals in the minerals, metals, and materials fields for a comprehensive, cross-disciplinary exchange of technical knowledge.

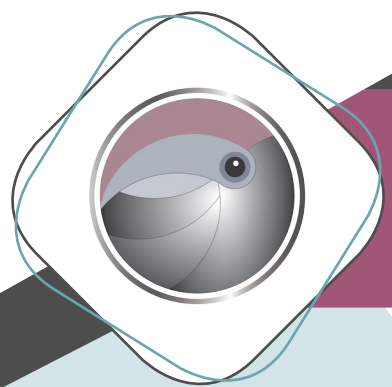
Brunel University of London will participate in the TMS 2022 and disseminate through a poster and presentation the FLAMINGo project. The TMS Annual Meeting & Exhibition brings together more than 4,000 engineers, scientists, business leaders, and

### 64th Austrian Foundry Congress, April 28-29, 2022, Leoben Austria (DGI)

Our Partner, DGI, will disseminate the project, with poster and oral presentation channels in the 64th Austrian Foundry Congress, that will take place in Leoben, Austria. The actual core competence of the foundry is about material and component development, as well as process metallurgy within separate series of lectures for iron and non-iron foundries. Under the motto "Economic upheavals and digital change in the foundry", top-class lecturers from science and practice will speak on topics such as digitisation, big data management, 3D printing and artificial intelligence, as well as the associated challenges and perspectives with regards to economic development.







## 8. Dissemination Events 2021-2022

### Online EuroBrake 2022, May 2022 (MBN)



In May 2022, FLAMINGo's Project Coordinator MBN will participate in the EuroBrake 2022 where several research works are presented. MBN will reach an influential audience of braking specialists, to share knowledge of the FLAMINGo project as well as to connect with decision-makers from leading companies around the world. The Eurobrake 2022 will have over 650 attendees and 100 technical presentations across 20 sessions.

### EuroCarBody 2022, 18-20 October 2022, Bad Nauheim, Germany (MBN)

Global Car Body Benchmarking Conference offers the most important forum for defining and discussing the state of the art in modern series car body engineering. In Bad Nauheim, the newest series of car bodies, representing the current model year, will be explained to the industry specialists in 50-minute presentations given by OEM engineers involved in their planning and realisation. Development, material and production concepts of the car bodies will be introduced in detail. The results presented will then be discussed with the speakers directly at the body-in-white. MBN will participate in this event and will promote the project FLAMINGo through several B2B meetings.

**EUROCARBODY**  
Global Car Body Benchmarking Conference  
EuroCarBody 2022

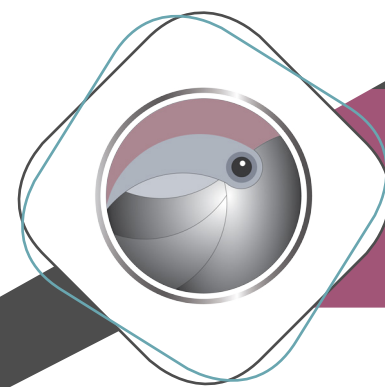
### 2nd Global Summit and Expo on Nanotechnology and Nanomaterials (GSENN2022), 13-15 June 2022, Copenhagen, Denmark (ISQ)

**GSENN2022**

June 13-15, 2022 | Copenhagen, Denmark

ISQ will disseminate the FLAMINGo project at the GSENN2022 in Copenhagen, Denmark. GSENN2022 aims to bring together researchers, scientists, and scholars to exchange ideas, present sophisticated research works and to discuss hot topics and share their experiences on all aspects of Nanotechnology and Nanomaterials. The GSENN2022 will

be a 3-day event that means gathering the key players of the Nanotechnology and Nanomaterials community and related sectors. ISQ will discuss with several researchers and scientists from the nanotechnology the FLAMINGo concept and they will also have an oral and poster presentation.



## 9. Project News & Industrial Updates



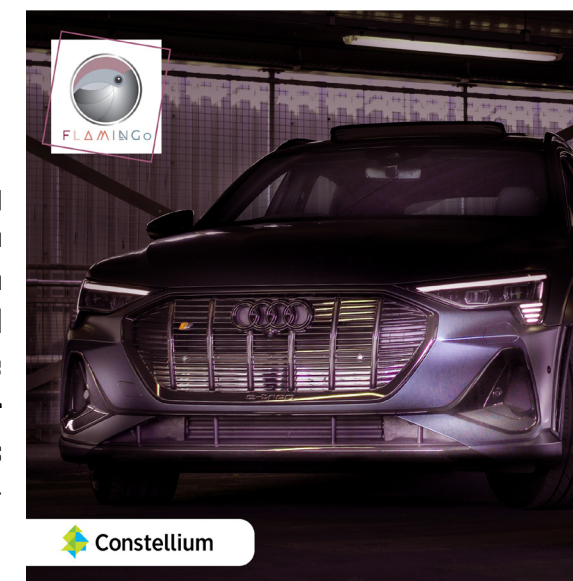
### Internal DMP training seminar, June 2021, Online

On June 2, 2021, the Exploitation and Dissemination partners of the Horizon 2020 FLAMINGo project, AXIA Innovation and EXELISIS, organised a Data Management Plan Training Seminar with the participation of the FLAMINGo Project H2020 Consortium. AXIA Innovation and EXELISIS collaborate and are responsible for the Business Plan activities and the Dissemination & Communication action plan of the

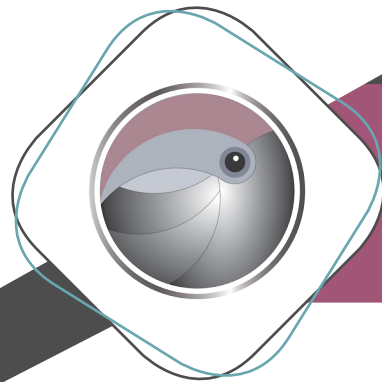
FLAMINGo project. One of their responsibilities is the Data Management Plan of the Project. This training session aimed to increase the awareness for the Data Management Plan and help the partners to define and handle properly the expected data to be produced within the project. Partners were informed about the target points of the European Union through the research activities, the obligations related to the research data and the scientific publications under H2020, and the first Data Management Plan for the FLAMINGo project. Specifically, the seminar focused on the EU regulation related to the H2020 research results and the Open Access to Scientific Publications and Research Data. The main pillars of the internal training were the general principles of the Data Management Plan (DMP) and the suggested DMP strategy to be followed in the FLAMINGo project.

### Constellium supplies advanced aluminium solutions for the electric Audi e-Tron GT

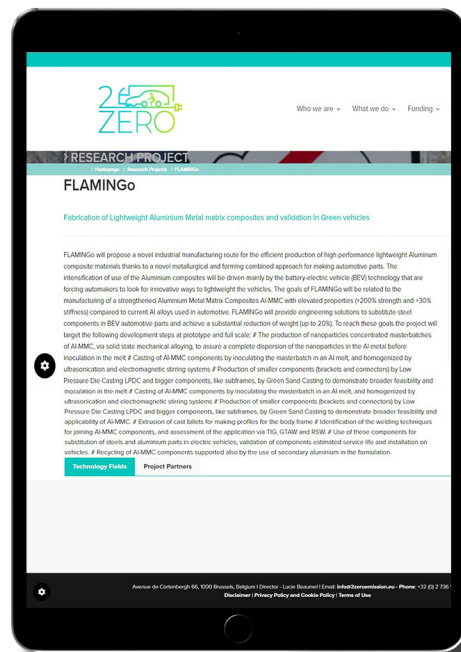
Our partner Constellium has announced that it has expanded its longstanding partnership with Audi to supply advanced aluminium solutions for the Audi e-tron GT. The FLAMINGo H2020 Project partner, Constellium supplies with high strength lightweight 6XXX alloys the electric Audi e-Tron GT SUV, that provides additional strength in case of a crash. Specifically, these components are aimed for the e-tron's battery enclosure and side impact beams. This is contributing to lower emission and improved fuel economy. Constellium within the FLAMINGo project, is the leader of Task 6.1: Preparation of extrusion masterbatches, in close collaboration with Brunel University London and MBN Nanomaterialia.







## 9. Project News & Industrial Updates



### Green Vehicles project Portfolio with EG VIA

FLAMINGo was recently included in the project portfolio of EG VIA. The European Green Vehicles Initiative Association for the 2Zero partnership (EG VIAfor2Zero) is an international non-profit association engaged with the European Commission into the 2Zero partnership in order to represent the Partners other than the Union.

Created in 2021, EG VIAfor2Zero currently regroups 99 members from the automotive, smart systems, smart grid industries and logistics companies and freight transport users, research centres and universities. The association is continuously growing, testifying to the attractiveness of the 2Zero partnership in the road transport community. The 2Zero program targets zero emission road transport covering Battery Electric Vehicles (BEV) and Fuel Cell Electric Vehicles (FCEV). The FLAMINGo H2020 project has been included in the project portfolio of EG VIA website among several other projects related to zero emissions on mobility and electric vehicles.

### EXE organised a Citizen Science engagement event for FLAMINGo at a School December 3, 2021, Athens, Greece (EXE)

On Friday, 3rd of December 2021, our partner EXELISIS organised a citizen science event at a high school in Athens, Greece, to communicate the FLAMINGo H2020 Project to more than 50 students and teachers participated in the event. Ilias Gkotsis from EXELISIS, who is involved in the Dissemination and Exploitation activities, presented the concept and scope of the project and its technologies. Teachers and students were informed about the production of lightweight aluminium metal matrix composites for electric vehicles and the recycling of aluminium, as well as about the importance of Exploitation and Dissemination activities within the European Research and Innovation projects. Moreover, the audience familiarised with the general principles of the Green Deal, Innovation in Europe, the H2020 and Horizon Europe framework programme. The presentation was interactive with ongoing questions from the audience, while questionnaires were also distributed after the completion of the presentation. Moreover, 54 FLAMINGo flyers and pens were given out to all teachers and students.



## 10. Contact Info

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# The Consortium



**FLAMINGo - Fabrication of lightweight aluminium metal matrix nanocomposites and validation in green vehicles**



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