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We would like to present you our AMULET newsletter.

As you know, **AMULET project is a a cross-regional partnership** with ten EU countries involved that includes **seven clusters, four RTOs and 2 SMEs**. AMULET will **focus on the following three advanced materials: light metal alloys, ceramic matrix composites, polymer-based composites** and their implementation in **four sectors: building, aerospace&aeronautics, energy and automotive**.

Manufacturing is nowadays striving for a wiser change into a more sustainable future for post-pandemic world. As environmental concerns become increasingly important to consumers, many market sectors are shifting toward greater energy consciousness and sustainability.

**The scope of the newsletter is to provide updates on project progress** and inform you about highlights.

All **AMULET partners would like to thank you** for your interest in our project, your support on each activity, and your active involvement.

The AMULET Consortium.

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AMULET 2nd OPEN CALL RESULTS!

# TIMELINE

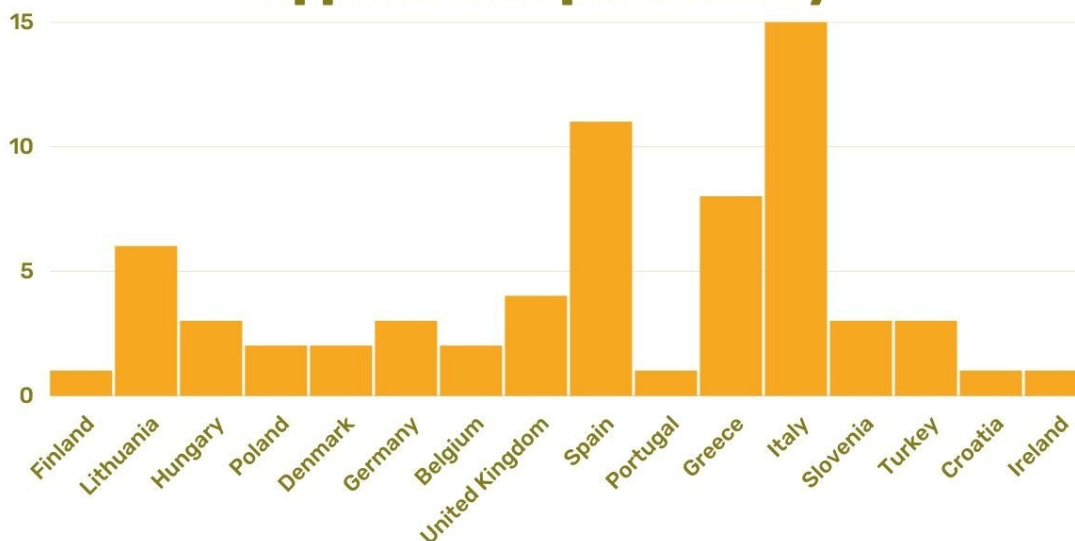
## 2<sup>ND</sup> OPEN CALL



European SMEs have been numerous to apply, with 37 submitted application and selected 31 involving 66 entities from 16 countries. 3 countries stand out among others – Italy (15 applicants) as one of the top source countries, then Spain (11 applicants) and Greece (8 applicants).

Other countries: Finland (1), Lithuania (6), Hungary (3), Poland (2), Denmark (2), Belgium (2), United Kingdom (4), Portugal (1), Germany (3), Slovenia (3), Turkey (3), Ireland (1), Croatia (1).

### Applications per country



Two sectors dominated among the applicants and preselected applications concern challenges of aerospace&aeronautics sector - 11 applications (35,5%) and building – 10 applications (32,3%). Less popular were challenges of energy - 5 applications (16,1%) and automotive - 5 applications (16,1%) sectors.

APPLICATIONS PER SECTOR



32,3%



35,5%



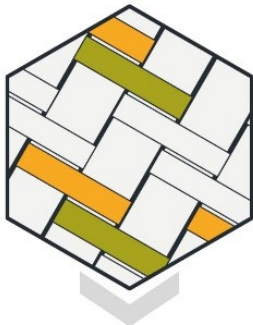
16,1%



16,1%

Among materials selected by preselected applicants one stands out among others: polymer-based composites material constitutes the largest percentage 51,6% of applications (16 applications). The second is light metal alloys – 29% (9 applications). Third material –ceramic matrix composites – gathered 6 applications which is 19,4% of all applications.

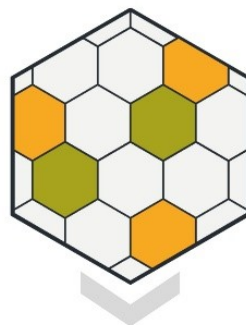
APPLICATIONS PER MATERIAL



19,4% CERAMIC MATRIX COMPOSITES



51,6% POLYMER-BASED COMPOSITES



29% LIGHT METAL ALLOYS



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## AMULET 2nd Open Call Finalists

## Energy

**ADAPTANK**

Adaptable compressed hydrogen storage tank system for vehicle space optimization

Coordinator: Go Ahead Engineering SL (Spain)

Partner: ADENITE ILERI MÜHENDISLIK TEKNOLOJILERI AS (Turkey)

Material: Polymer-based composites

Challenge: 18

ADAPTANK aims to develop a hydrogen storage system with an innovative shape that parametrically optimises the storage of hydrogen on-board of aircrafts and other mobility applications, allowing for longer operational range and/or lighter vehicles.

**H2sandwich**

Synergistic material design of H2 tanks

Coordinator: Composite Designers Ltd (United Kingdom)

Partner: Addcomposites Oy (Finland), M Brujn Consult bv (Belgium)

Material: Polymer-based composites

Challenge: 18

We redesign conventional high-pressure H<sub>2</sub>-gas tanks to reduce tank weight per volume. We achieve this by optimising and redistributing non-linear stress distributions inside tank walls through material re-design and use of novel production methods.\*

**CarbonWeave**

Recycled carbon fiber non-woven for a lightweight composite

Coordinator: PANGAIA GRADO ZERO S.R.L. (Italy)

Partner: SEASCAN MARINE S.R.L. (Italy)

Material: Polymer-based composites

Challenge: 20

Creation of a lightweight composite with high-performance. Recycled carbon fibers will be used to produce a non-woven adapting textile techniques. This material will be suitable for further processing to create a composite for various applications.



## AMULET 2nd Open Call Finalists

## Automotive

**ZinAl**

Zinc removal from Al-melt

Coordinator: InsPyro NV (Belgium)

Partner: konzept GmbH - Engineering Services (Germany)

Material: Light Metal Alloys

Challenge: 12

The project will apply existing zinc removal processes in non-ferro industry to aluminum for which the presence of Zn is problematic. The solution will use the metallurgical properties of both zinc and aluminium to refine the aluminium melt.

**COSADA**

COMposite Solid structural ADhesive for Automotive

Coordinator: TMBK Partners Sp. z o.o. (Poland)

Partners: ADAMANT AERODIASTIMIKES EFARMOGES EPE (Greece)

Material: Polymer-based composites

Challenge: 12

COSADA is a combination of Adamant Composites' adhesive films and TMBK's thermoplastic nonwovens into ready-to-use solid adhesive for joining composites and metals allowing for consistent, lighter designs, and enhanced new functionalities.

**Duolight**

Duolight - Aluminum foams with 3D printed technopolymer

Coordinator: NIKA s.r.l. (Italy)

Partner: Consorzio MUSP (Italy)

Material: Polymer-based composites

Challenge: 39

Duolight project combine flexibility and sustainability of 3D additive polymers printing with capability of aluminum foam in terms of lightweight and absorption (insulation, impact, dynamic stiffness) to create new opportunities for EV.

## AMULET 2nd Open Call Finalists

## Energy

**TITEC**

3D-Printed Ti-Turbopumps at Extreme Conditions

Coordinator: Pangea Aerospace S.L. (Spain)

Partner: Aenium Engineering S.L. (Spain), Diendo GmbH (Germany)

Material: Light Metal Alloys

Challenge: 6

Novel application of the lightweight titanium alloy Ti-5Al-2.5Sn to turbopump components for cryogenic liquid rocket engines through LASER-AM process and materials engineering that allows cross-sectoral use of titanium to hydrogen-based sectors.

**AIR-HGEN**

Optimization of hydrogen storage tank with control over manufacturing uncertainties

Coordinator: DELTA-MPIS (Greece)

Partner: B&T Composites (Greece)

Material: Polymer-Based Composites

Challenge: 18

AIR-HGEN will deliver an optimal design of the Type 4 composite pressure vessel, targeting on reducing weight, taking into account defects, coming from real case manufacturing scenarios monitored by a digital twin.



## AMULET 2nd Open Call Finalists

## Building

**3DFit4Connectors**

3D Manufacturing of Fit4Purpose Connections

Coordinator: Efficiencyerising, Lda. (Portugal)

Partners: KIESELSTEIN International GmbH (Germany)

Material: Light Metal Alloys

Challenge: 24

The project aims to demonstrate the Product-Service 3DFit4Connectors: designing fit-for-purpose connectors and selection the best 3DP process, based on economic, environmental and technical assessment, with connectors manufacturing and parts supply.

**ReMaREFRACT**

Reuse of Magnesium-based by-products and slags for refractory materials

Coordinator: ADDITIO D.O.O. (Slovenia)

Partner: EKSTERA d.o.o (Slovenia)

Material: Ceramic Matrix Composites

Challenge: 26

Project ReMaREFRACT aims to reuse Mg by-products and slags from the steel industry by pulverizing them into dust, removing residues, and pressing/binding dust into a new product (or alternatively 3D printing with MgO dust-based filament) and sintering it.

**RecuMgased**

Recuperation of Mg-based wastes in new materials

Coordinator: Fundación Innovarcilla (Spain)

Partners: Fundación CIAC (Spain)

Material: Ceramic Matrix Composites

Challenge: 26

This project aims to explore the utilization of industrial waste in construction materials. The goal is to reduce waste generation and environmental impact while creating new value-added products.

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## AMULET 2nd Open Call Finalists

## Aerospace &amp; Aeronautics

## AF-SAS

Aluminium Foam Structures for Aero&amp;Space

Coordinator: Innobay Hungary Ltd. (Hungary)  
Partner: Technoplast Group Ltd. (Hungary)

Material: Light Metal Alloys

Challenge: 7

Aluminium foam is a game-changer for aerospace, and Innobay Hungary, Technoplast, and Skycruiser Autogyro can provide space-qualified skin-reinforced versions for space cameras. These materials are perfect for aerospace where weight is crucial.

## WET-LAYUP-WASTE-REDUX

REDUCING WASTE IN WET LAYUP

Coordinator: AFormX llc (Slovenia)  
Partner: izt d.o.o. (Croatia)

Material: Polymer-based composites

Challenge: 1

The project will focus on reducing the material and time waste produced in the wet layup process. Through the improvements in the process the result will be a test panel with measured superior mechanical properties.

## ECO

grEen Cabin Interiors

Coordinator: BEES - BE Engineers for Society (Italy)

Partner: BALTA Srl (Italy)

Material: Polymer-based composites

Challenge: 29

ECO project is aimed to develop and demonstrate in relevant environment the feasibility and financial affordability of novel concepts and methodologies enabling regeneration of composite materials to produce Cabin and Cargo aircraft interior items.



## AMULET 2nd Open Call Finalists

## Aerospace &amp; Aeronautics

## ALMAS

Advanced Lightweight Mechanics for Applications in Space

Coordinator: LUPEON, S.L. (Spain)  
Partner: UARX Space, S.L. (Spain)

Material: Light Metal Alloys

Challenge: 7

Aluminium foam is a game-changer for aerospace, and Innobay Hungary, Technoplast, and Skycruiser Autogyro can provide space-qualified skin-reinforced versions for space cameras. These materials are perfect for aerospace where weight is crucial.

## AMULET 2nd Open Call Finalists

## Aerospace &amp; Aeronautics

## PRACTISE

Production monitoring and Quality Control of composite parts based on machine vision

Coordinator: STAM S.r.l. (Italy)  
Partner: Viska Automation Systems Ltd. (Ireland)

Material: Polymer-Base Composites

Challenge: 30

PRACTISE's autonomous machine vision system detects defects in composite parts during manual production and at the finished product stage, allowing manufacturers to benefit from reduced costs, improved production efficiency and inspection accuracy.

## CUP2

Custom pre-pregs for ceramic matrix composites

Coordinator: PETROCERAMICS Spa (Italy)  
Partner: K3rx s.r.l. (Italy)

Material: Ceramic Matrix Composites

Challenge: 9

Phenolic resin systems will be developed and tested with the aim to improve the thermal and mechanical properties of CMCs produced by means of the liquid silicon infiltration (LSI) process.

## HTCF

High Temp. CMC Fan Blade

Coordinator: Seyid Fehmi DILTEMIZ SFD Mühendislik (Turkey)

Partner: KIM TECHNOLOGIES (Turkey)

Material: Ceramic Matrix Composites

Challenge: 8

The objective of this project is to create, manufacture, and showcase a CMC fan blade composed of oxides, and implement an appropriate attachment method to the disc.

Get to know our beneficiaries:

<https://amulet-h2020.eu/2nd-open-call/>

PARTNERS

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## For more information, contact:

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