D3.6 Research management/ administrative training

Grant Agreement Number: 952463

Project Acronym: UMA³

Project title: Unique Materials for Advanced Aerospace Applications

Starting Date: 01/09/2020

Project Duration: 36 months

Project Officer: Antonio Vecchio

Project Coordinator: University of Miskolc (UniMi)

Author(s): Eva Vicente-Barragán, Antía Fernández, Santiago Cuesta-López

Contributing partners: -

Due Submission Date: 28/02/2022

Actual Submission Date: 28/02/2022

Status	
Draft	
Final	X

Type		
R	Document, report	X
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patent fillings, videos, etc.	
ETHICS		

Dissemination Level		
PU	Public	
CO	Confidential, only for members of the consortium (including the Commission Services)	X

Revision History

Date	Lead Author(s)	Comments
15/01/2022	ICAMCyL	Draft
28/02/2022	UniMi	Approved

This project has received funding from the European Union's Horizon2020 research and innovation programme under grant agreement No 952463

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1. INTRODUCTION

This deliverable aims to summarise the content developed under "T3.6. Training in research & project management and administration", lead by ICAMCyL.

The training content was designed according to the Grant Agreement description and particularly given to the staff of the research management/administration division of UniMi-FMSE, so that it can develop the high-level skills and competences considered vital in project management and administration at an international level. The training was performed on 27th 28th and 29th April 2021 as a continuation of the seminar held on 21st April 2021, and it was entitled "A next horizon for Europe: the new research and innovation programme".

The training sessions were hold online, reducing timing compared to face-to-face events, but this fact allowed partners to organise and synchronise all the subtasks expected and increase the number of topics covered; Seminar (T4.1b) was set the base and then new items were allowed to be included, e.g. Brainstorming for incoming project ideas and the need of circular economy approach in aeronautics and aerospace were included). ICAMCyL organised the modules of the training, but all the partners were invited to participate and some of them attend not only as audience but also as speakers (UniBo, LTSM, Fraunhofer-IFAM, etc.)

The training content given by UMA3 partners comprised the following modules stated in the Grant Agreement, that were adapted and increased according to the UniMi-FMSE and partners needs:

Grant Agreement initial description	Training performed
• Proposal writing for research and innovation projects (2 days - UniBo-CIRI) • Project planning and organization (2 days - ICAMCyL) • Effective project coordination, management and administration (3 days - LTSM)	"Training over the general administration of European projects" ✚ "Brainstorming for incoming project ideas" "The need of circular economy approach in aeronautics and aerospace"

The sections described below aim to compile the content developed under the different modules performed.

2. TRAINING SESSION 1

2.1 PROGRAMME SESSION 1

The first out of the three sessions of the training programme followed this agenda:

Table 1- Agenda of training session 1

SESSION 1: "Training over the general administration of European projects"		
27th April 2021 (15:30-18:00 CET) Online: https://zoom.us/j/97542420844 Meeting ID: 975 4242 0844		
15:30 – 15:35	**1. Connection to the webinar**	-
15:35 – 15:40	**2. Opening of the session 1** *Official welcome, presentation of the agenda*	Santiago Cuesta-López (ICAMCyL)
15:40 – 16:25	**3. Important aspects of project planning and organisation** • *Gender equality and DNSH principle* • *Fulfilling the Grant Agreement. H2020 and Horizon Europe.* • *Particular aspects to take into account for European projects*	Ana Losa Rincón (ICAMCyL) Eva Vicente Barragán (ICAMCyL)
16:25 – 17:10	**4. Proposal writing for research and innovation projects** • *Writing a winning proposal* • *Particular aspects in Horizon Europe and Horizon 2020 on the implementation and innovation for the impact*	UniBo
17:10 – 17:55	**5. Effective project coordination, management and administration** • *Basic principles for an efficient project coordination, management and administration* • *The importance of dissemination and communication* • *Changes for Horizon Europe: Open science*	Dionysios Markatos (LTSM-University of Patras) LTSM Gerhard Pauly (Fraunhofer IFAM)
17:55 – 18:00	**6. Wrap-up and closure**	Santiago Cuesta-López (ICAMCyL)

2.2 PARTICIPANTS

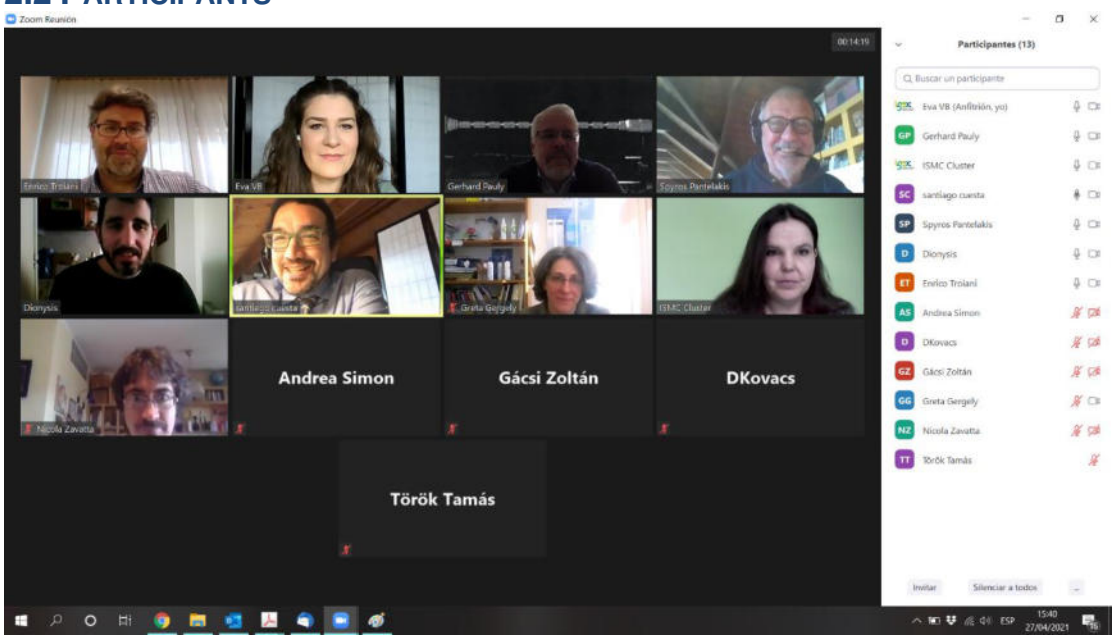


Figure 1-Family photo of session 1 training

2.3 CONTENT

The following slides compile all the content developed under session 1 of the training (ICAMCYL, UniBo, LTSM, Fraunhofer-IFAM).

Unique Materials for Advanced Aerospace Applications

WP3: Training and education

T3.6 Training g in research & project management and administration

WORKSHOP 1-SESSION 1: "TRAINING OVER THE GENERAL ADMINISTRATION OF EUROPEAN PROJECTS"

27th April 2021

Ana M. Losa Rincón

Eva Vicente Barragán

ICAMCYL
Centro internacional de materiales avanzados y materias primas
International center for advanced materials and raw materials

European Commission

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 952463

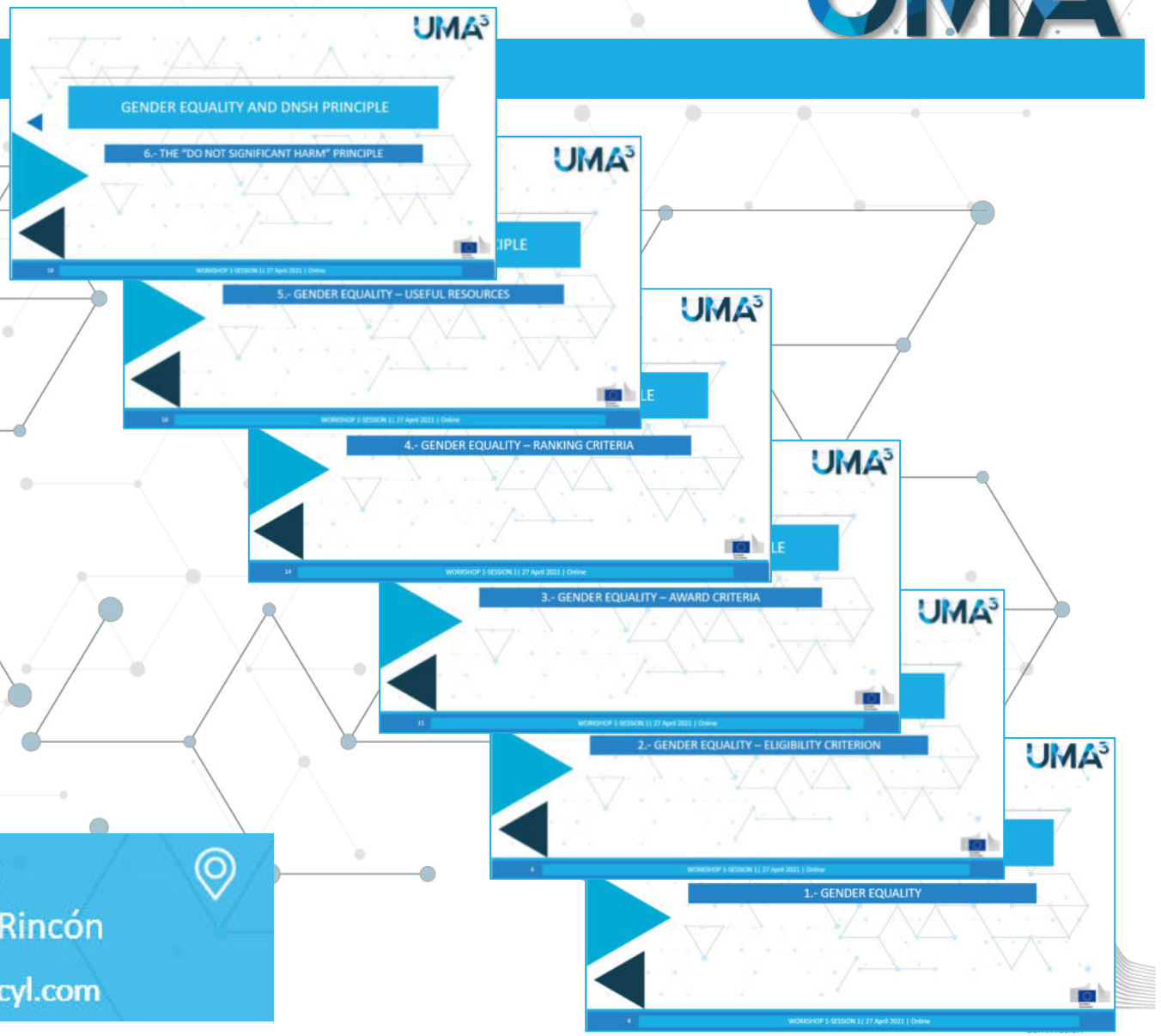
Content Overview

Important aspects of project planning and organisation

- GENDER EQUALITY AND DNSH PRINCIPLE
- FULFILLING THE GRANT AGREEMENT. H2020 AND HORIZON EUROPE
- PARTICULAR ASPECTS TO TAKE INTO ACCOUNT FOR EUROPEAN PROJECTS

GENDER EQUALITY AND DNSH PRINCIPLE

1. Gender equality
2. Eligibility criterion
3. Award criteria
4. Ranking criteria
5. Useful resources
6. The DNSH principle



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GENDER EQUALITY AND DNSH PRINCIPLE

1.- GENDER EQUALITY

Gender Equality

Eligibility: Gender Equality Plan

Award Criteria: Integration of the gender dimension

Ranking Criteria: Gender balance

GENDER EQUALITY AND DNSH PRINCIPLE

2.- GENDER EQUALITY – ELIGIBILITY CRITERION

Eligibility criterion

Gender Equality Plan (applicable from 2022 onwards)

Participants that are **public bodies, research organisations** or **higher education institutions*** established in a Member State or Associated Country **must have a gender equality plan** in place, fulfilling **mandatory process-related requirements.**

- A self-declaration
- Entity validation process

* Private-for-profit entities (incl. SMEs), NGOs, CSOs, as well any type of organisations from non-associated third countries, are exempted for the criterion
See legal categories definitions in the Funding & Tenders Portal here

Mandatory GEP process requirements

Public document

- Formal document
- Signed by top management
- Published on the institution's website
- Disseminated through institution

Dedicated resources

- Funding for gender equality positions or teams
- Reserved time for others to work on gender equality

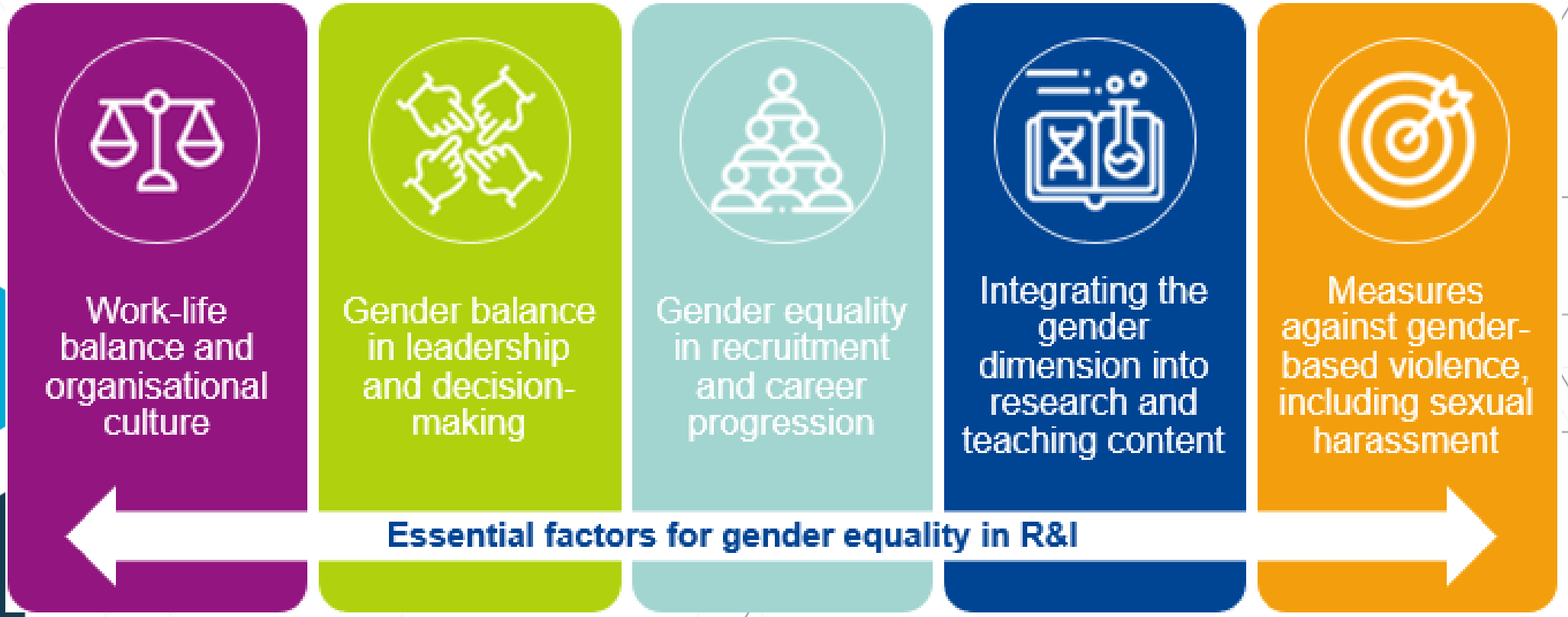
Data collection and monitoring

- Data on sex or gender of staff across roles and leadership
- Annual reports and evaluation of progress and outcomes

Training and capacity building

- Whole organisation engagement
- Tackle gender biases of people and decisions
- Joint action on specific topics

Recommended GEP content areas



The eligibility criterion steps

Self-declaration by Horizon Europe applicants through GEP eligibility criterion questionnaire*

The GEP must be in place for the signature of the Grant Agreement (for calls with deadlines from 2022 onwards)

Equivalent strategic documents may meet the GEP eligibility criterion

Grant Agreement commits beneficiaries to taking measures to promote gender equality in implementation of action and, where applicable, in line with their GEP

Random eligibility compliance checks on beneficiaries during Horizon Europe

GENDER EQUALITY AND DNSH PRINCIPLE

3.- GENDER EQUALITY – AWARD CRITERIA

Award Criteria: Integration of the gender dimension

EXCELLENCE criterion for RIAs/IAs

- ✓ Clarity and pertinence of the **project's objectives**, and the extent to which the proposed work is ambitious, and goes beyond the state-of-the-art.
- ✓ **Soundness of the proposed methodology**, including the underlying concepts, models, assumptions, inter-disciplinary approaches, **appropriate consideration of the gender dimension in research and innovation content**, and the quality of open science practices including sharing and management of research outputs and engagement of citizens, civil society and end users where appropriate.

Integration of the gender dimension in R&I content

Gender dimension

Addressing the gender dimension in research and innovation content entail taking into account sex and gender in the whole research & innovation process

The **integration of the gender dimension** into R&I content is **mandatory**, unless it is explicitly mentioned in the topic of description

GENDER EQUALITY AND DNSH PRINCIPLE

4.- GENDER EQUALITY – RANKING CRITERIA

Ranking Criteria for ex aequo proposals

By order of priority

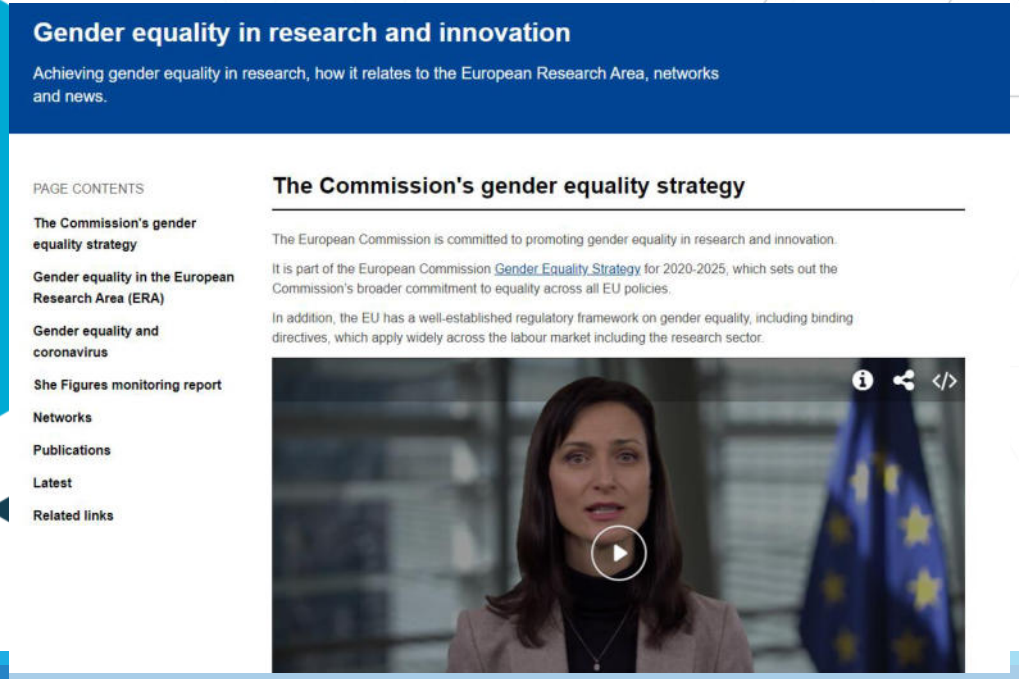
1. Aspects of the call that have not otherwise been covered by more highly ranked proposals
2. Scores on ‘Excellence’ then on ‘Impact’ (for IAs, scores on ‘Impact’ then ‘Excellence’)
3. Gender balance among personnel named in the proposal who will be primarily responsible for carrying out the research and/or innovation activities, and who are included in the researchers table in the proposal
4. Geographical diversity
5. …

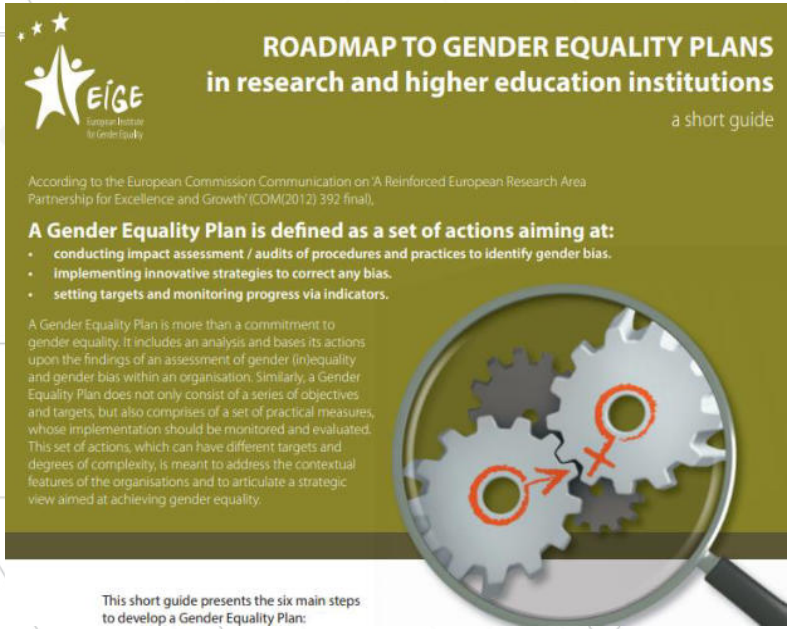
GENDER EQUALITY AND DNSH PRINCIPLE

5.- GENDER EQUALITY – USEFUL RESOURCES

Useful resources

1. The GEAR tool ('Gender Equality in Academia and Research')
2. Factsheet on key Gender Equality provisions under HE
3. Gender Equality in R&I policy page





GENDER EQUALITY AND DNSH PRINCIPLE

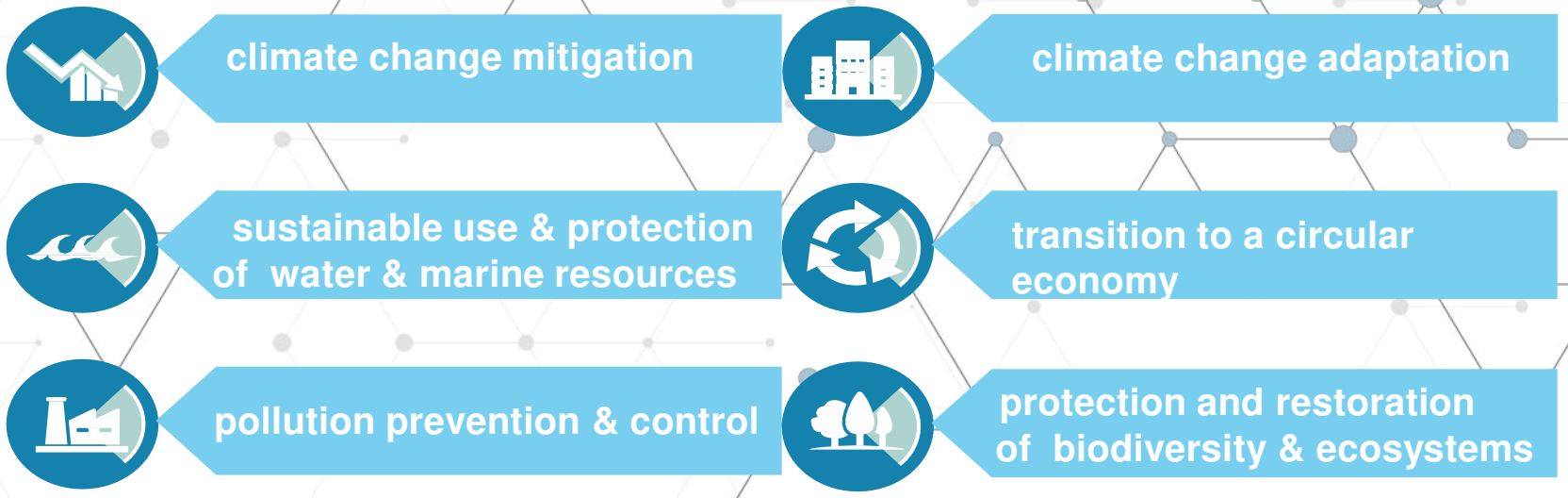
6.- THE “DO NOT SIGNIFICANT HARM” PRINCIPLE

Policy issues - DNSH

Relevance:

R&I activities **should** comply with the DNSH principle

NOT activities that make a significant harm to any of the **six environmental objectives**.



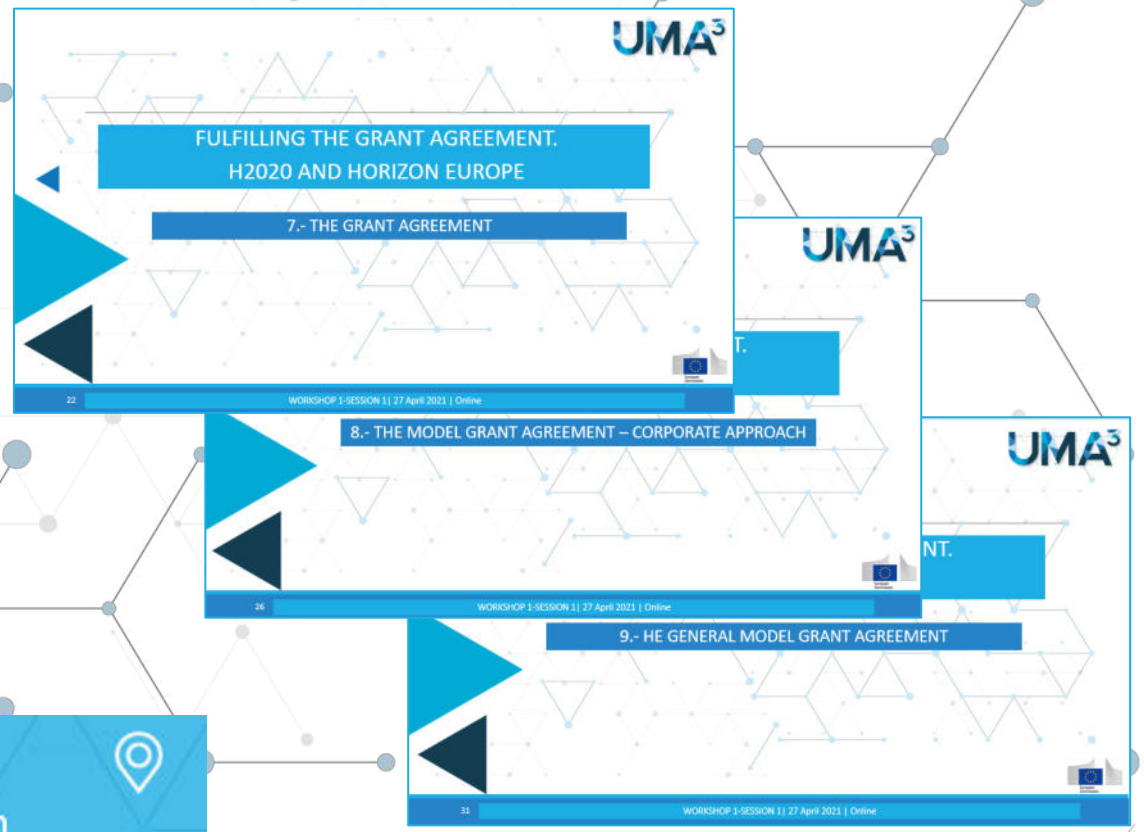
Policy issues – DNSH (2)

- **Scope**: Compliance needs to be assessed both for activities carried out during the course of the project as well as the expected life cycle impact of the innovation at a commercialization stage (where relevant).
- Particular consideration of activities compliance with the DNSH principle is expected for **Cluster 4, 5, and 6**.
- **Impact application and evaluation process**: Proposal part B: section 1 – Excellence (Methodology) and Proposal part B: section 2 – Impact (project outcomes and impacts).

➢ The DNSH principle needs to be taken into **consideration** when assessing the methodology and impact of the project. However, compliance is not mandatory unless explicitly stated

FULFILLING THE GRANT AGREEMENT.
H2020 AND HORIZON EUROPE

7. The Grant Agreement
8. The MGA – Corporate approach
9. HE General MGA



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FULFILLING THE GRANT AGREEMENT. H2020 AND HORIZON EUROPE

7.- THE GRANT AGREEMENT

What is the Grant Agreement?

The grant agreement is the **contractual document** signed with a 'granting authority' (e.g. the Commission or one of its executive agencies) defining

YOUR RIGHTS

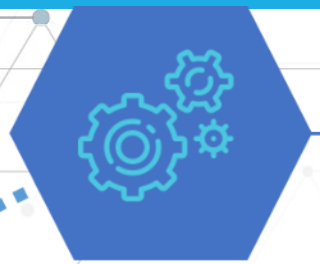
YOUR OBLIGATIONS

HOW MUCH MONEY YOU CAN GET

How can I participate in the GA

Beneficiary

- Signs the project
- Has all rights and obligations



Affiliated entity

- With a legal or capital link with the beneficiary
- Does work and may declare costs

Third party providing contributions

- Does NOT do work just give in-kind contributions
- The beneficiary may declare the costs of the contributions

Associated partner

- Does work but can NOT declare costs

Subcontractor

- Does work and invoices the beneficiary
- The beneficiary may declare the invoice

How does the Horizon Europe GA look like?

e-GRANT

Fully electronic

CORPORATE STRUCTURE

Corporate Model Grant Agreement

SPECIFIC ANNEX 5

Security, ethics…

FULFILLING THE GRANT AGREEMENT.
H2020 AND HORIZON EUROPE

8.- THE MODEL GRANT AGREEMENT – CORPORATE APPROACH

Corporate features of the HE Model Grant Agreement

More user-friendly structure and readability

- Data Sheet
- Common numbering
- Common labelling ('granting authority'; 'affiliated entity')
- Grouping of provisions for
  - Types of participants and their roles
  - Rules concerning project implementation
  - Payments and recoveries
  - Certificates (CFS, SPA)

Improved content & features

- Reporting explicitly divided into continuous and periodic reporting
- Amendment procedure for BEN termination, GA suspension + GA termination by consortium (instead of Formal Notification)
- Less descriptive provisions (reference to published templates)

Alignment with new Financial Regulation (FR 2018)

- Reduction/suspension/ termination grounds
- Receipts (only for-profit legal entities)

Corporate structure of the HE Model Grant Agreement

Core Part

Datasheet

a summary of the specific data of the grant agreement

1. General Data
2. Participant
3. Grant
4. Reporting, payment and recoveries
5. Consequences of non-compliance, applicable law and dispute settlement forum
6. Specific rules Annex 5 & Standard time-limits after project end

Articles

grouped in six chapters

Chapter 1 – General (Articles 1-2)
Chapter 2 – Action (Articles 3-4)
Chapter 3 – Grant (Articles 5-6)
Chapter 4 – Grant Implementation (Articles 7-26)
Chapter 5 – Consequences of non-compliance (Articles 27-35)
Chapter 6 – Final provisions (Articles 36-44)

Corporate structure – Annex 2

A. PERSONNEL COSTS

- **A.1** Employees
- **A.2** Natural persons under direct contract
- **A.3** Seconded persons
- **A.4** SME owners and natural person beneficiaries

B. SUBCONTRACTING COSTS

C. PURCHASE COSTS

- **C.1** Travel and subsistence
- **C.2** Equipment
- **C.3** Other goods, works and services

D. OTHER COST CATEGORIES

- **D.1** Financial support to third parties
- **D.2** Internally invoiced goods and services
- *[**D.3** Transnational access to research infrastructure unit costs]*
- *[**D.4** Virtual access to research infrastructure unit costs]*
- *[**D.5** PCP/PPI procurement cost]*
- *[**D.6** Euratom Cofund staff mobility costs]*
- *[**D.7** ERC additional funding]*
- *[**D.8** ERC additional funding (subcontracting, FSTP and internally invoiced goods and services)]*

E. INDIRECT COSTS

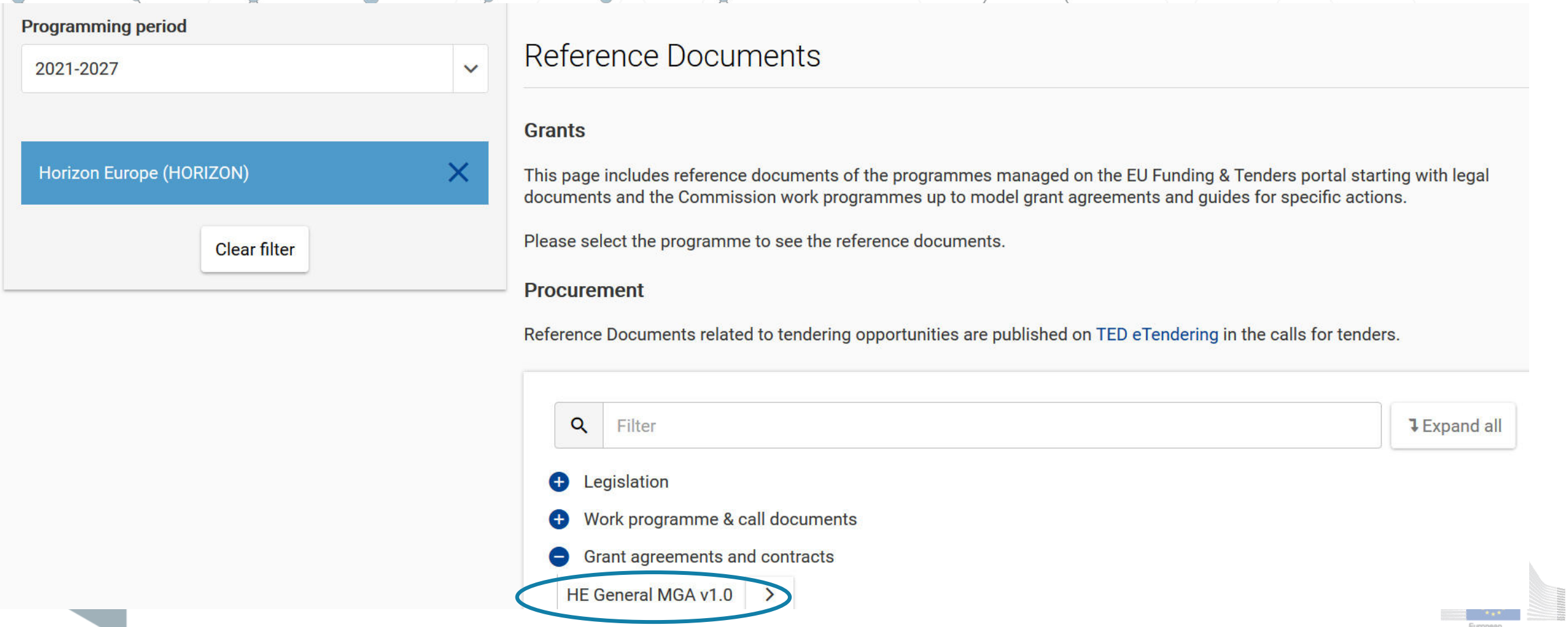
Corporate structure – Annex 5

1. **Security** (Article 13)
2. **Ethics** (Article 14)
3. **Values** (Article 14)
4. **IPR** (Article 16)
5. **Communication, Dissemination, Open Science and Visibility** (Article 17)
6. **Specific rules for carrying out the action** (Article 18):
   - recruitment and working conditions
   - specific rules for access to research infrastructure actions
   - specific rules for PCP and PPI procurements
   - specific rules for co-funded partnerships
   - specific rules for ERC actions
   - specific rules for EIT-KIC actions
   - specific rules for MSCA actions
   - specifc rules for EIC actions

FULFILLING THE GRANT AGREEMENT.
H2020 AND HORIZON EUROPE

9.- HE GENERAL MODEL GRANT AGREEMENT

Horizon Europe General MGA



THANK YOU!

"European funding best practices. Succeeding into the new research and innovation programme Horizon Europe". SEMINAR 1| 21 April 2021 | Online

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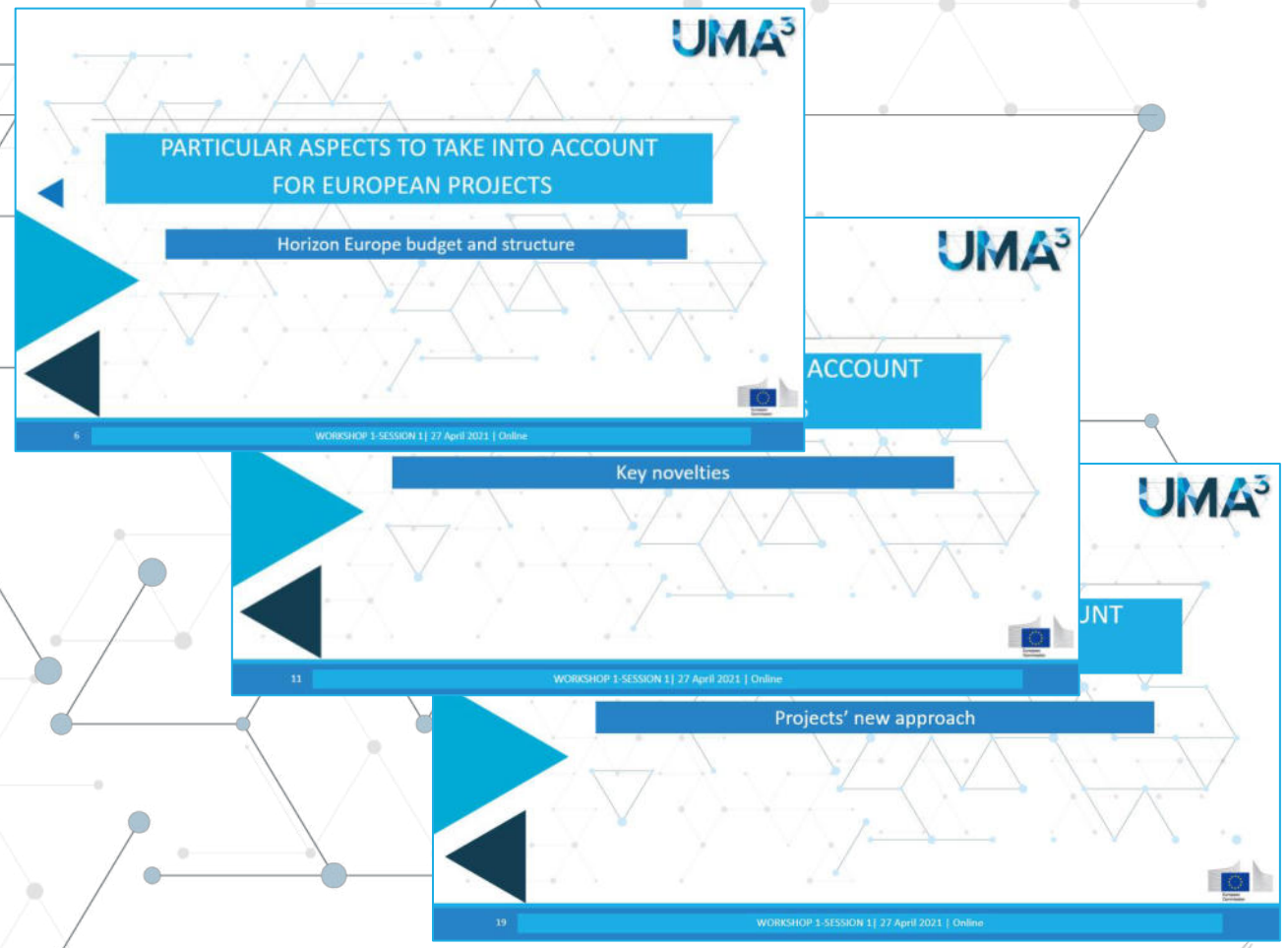
PARTICULAR ASPECTS TO TAKE INTO ACCOUNT FOR EUROPEAN PROJECTS

1. Horizon Europe structure and budget
2. Key novelties
3. Projects' new approach



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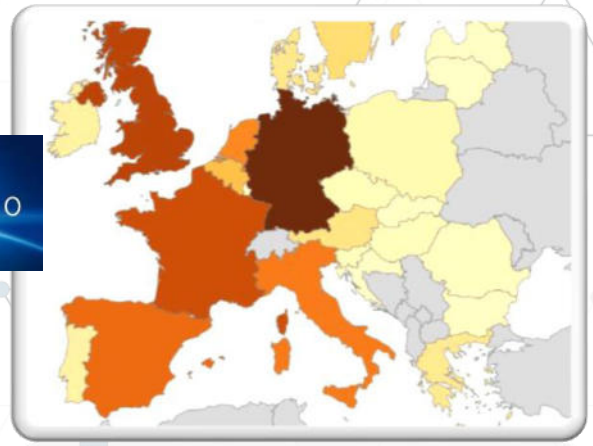
PARTICULAR ASPECTS TO TAKE INTO ACCOUNT FOR EUROPEAN PROJECTS

Horizon Europe budget and structure

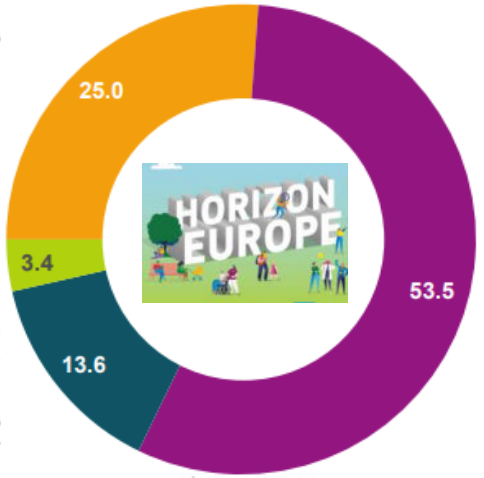
Horizon Europe budget

€95.5 billion (2021 – 2027)

H2020 contribution among Member States
47,2 M€ (2014-2019)



(provisional results)



Political agreement December 2020
€ billion in current prices

- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA

Including €5.4 billion from Next Generation Europe – programme of EU for Recovery from COVID-19 crisis

Horizon Europe structure

PILLAR I - Excellent Science

- European Research Council
- Future & Emerging Technologies
- Marie Sklodowska Curie Actions
- Infrastructures

PILLAR II - Industrial Leadership

- ICT
- Nano - Materials
- Access to Risk Finance
- Biotech
- Space
- Innovation in SMEs

PILLAR III - Societal Challenges

- 1 - Health
- 2 - Food - Agriculture
- 3 - Energy
- IEE
- 4 - Transport
- 5 - Climate Change
- 6 - Inclusive societies
- 7 - Secured societies

HORIZON EUROPE

SPECIFIC PROGRAMME: EUROPEAN DEFENCE FUND

Exclusive focus on defence research & development

- Research actions
- Development actions

SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT*

Exclusive focus on civil applications

Pillar I – EXCELLENT SCIENCE

- European Research Council
- Marie Skłodowska-Curie
- Research Infrastructures

Pillar II – GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Mobility
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre

Pillar III – INNOVATIVE EUROPE

- European Innovation Council
- European Innovation Ecosystems
- European Institute of Innovation & Technology*

WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA

- Widening participation & spreading excellence
- Reforming & Enhancing the European R&I system

EURATOM

- Fusion
- Fission
- Joint Research Center

Changes in pillars

PILLAR I

- Continuity

>25 M€

- The European Research Council (ERC) has launched calls before the publication of the Work Program (WP)

PILLAR II

- 6 clusters accounts for ~96% of PII
- Collaborative projects
- Missions and partnerships may influence the calls

PILLAR 3

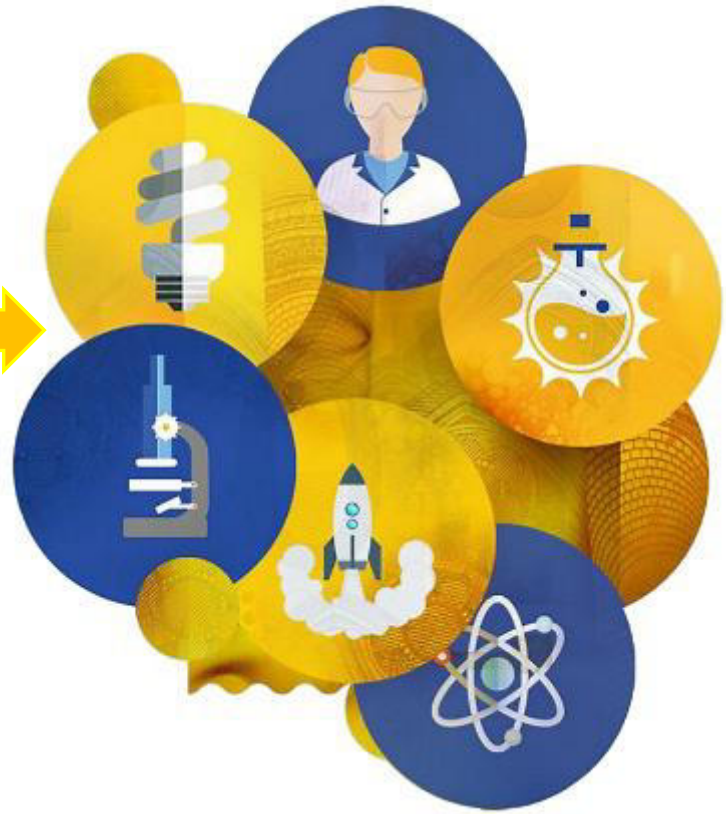
- Scale European companies that own EU technology >13M€
- Connect national and regional innovation ecosystems
- Strengthen more inclusive knowledge communities (KICs)

Horizon Europe pilar II: 6 clusters

Pillar II
GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Mobility
- Food, Bioeconomy, Natural Resources, Agriculture & Environment



Missions, clusters, impacts and Key Strategic Orientations os Horizon Europe→ All linked

PARTICULAR ASPECTS TO TAKE INTO ACCOUNT FOR EUROPEAN PROJECTS

Key novelties

Key novelties based on lessons learnt

Lessons Learnt

- Support breakthrough innovation
- Create more impact through mission-orientation and citizens' involvement
- Rationalise partnerships' landscape
- Reinforce openness
- Strengthen international cooperation
- Encourage participation

Adaptation

Key Novelties

- European Innovation Council
- EU Missions
- New approach to partnerships
- Open science policy
- Extended association possibilities
- Spreading Excellence

European Innovation Council

Support to innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors (**70% of the budget earmarked for SMEs**)

Complementary instruments bridging the gap from idea to market

PATHFINDER
R&I grants (from early technology to proof of concept)

TRANSITION
R&I grants (proof of concept to pre-commercial)

ACCELERATOR
Grants & investment (via EIC Fund) for single SMEs & start-ups (from pre-commercial to market & scale-up)

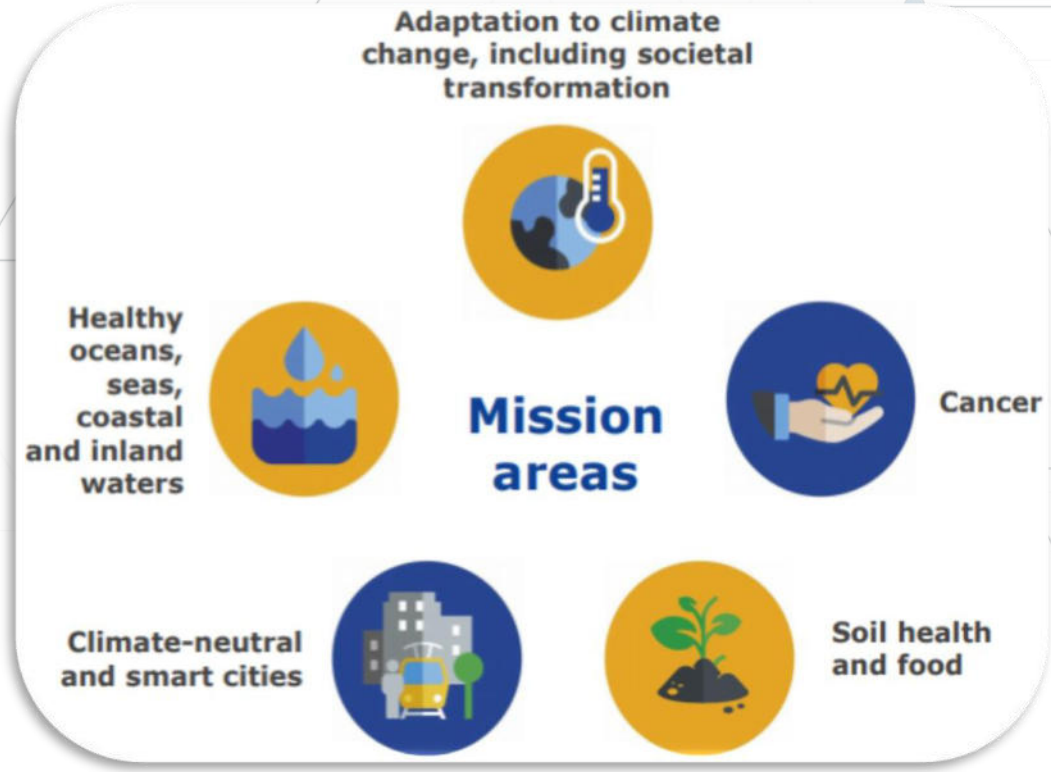
European eic INNOVATION Council

EU Missions

R&D Missions…

To bring EU's research and innovation better to society and citizens needs; with strong visibility and impact

…and 5 mission areas



New approach to European Partnerships

New generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives

Key Features

- **Strategic orientation**
- **Systemic approach**
- **Simple architecture and toolbox**
- **Common set of criteria for the life-cycle**

CO-PROGRAMMED
Based on Memoranda of Understanding/contractual arrangements; implemented independently by the partners and by Horizon Europe

CO-FUNDED
Based on a joint programme agreed and implemented by partners; commitment of partners for financial and inkind contributions

INSTITUTIONALISED
Based on long-term dimension and need for high integration; partnerships based on Art 185/187 of TFEU and the EIT legal acts for 2021-2027

49 candidate European Partnerships

PILLAR II - Global challenges & European industrial competitiveness

CLUSTER 1: Health

- Innovative Health Initiative
- Global Health Partnership
- Transformation of health systems
- Chemicals risk assessment
- ERA for Health
- Rare diseases*
- One-Health Anti Microbial Resistance*
- Personalised Medicine*
- Pandemic Preparedness*
  Co-funded or co-programmed

CLUSTER 4: Digital, Industry & Space

- Key Digital Technologies
- Smart Networks & Services
- High Performance Computing
- European Metrology (Art. 185)
- AI-Data-Robotics
- Photonics
- Made in Europe
- Clean steel – low-carbon steelmaking
- Processes4Planet
- Global competitive space systems**

CLUSTER 5: Climate, Energy & Mobility

- Clean Hydrogen
- Clean Aviation
- Single European Sky ATM Research 3
- Europe's Rail
- Connected and Automated Mobility (CCAM)
- Batteries
- Zero-emission waterborne transport
- Zero-emission road transport
- Built4People
- Clean Energy Transition
- Driving Urban Transitions

CLUSTER 6: Food, Bioeconomy, Agriculture, …

- Circular Bio-based Europe
- Rescuing Biodiversity to Safeguard Life on Earth
- Climate Neutral, Sustainable & Productive Blue Economy
- Water4All
- Animal Health & Welfare*
- Accelerating Farming Systems Transitions*
- Agriculture of Data*
- Safe & Sustainable Food System*

Institutionalised Partnerships (Art 185/7)
Institutionalised Partnerships / EIT KICs
Co-Programmed
Co-Funded

* *Calls with opening dates in 2023-24*
** *Calls with opening dates not before 2022*

PILLAR III – Innovative Europe

EIT (KNOWLEDGE & INNOVATION COMMUNITIES)

- InnoEnergy
- Climate
- Digital
- Food
- Health
- Raw Materials
- Manufacturing
- Urban Mobility
- Cultural and Creative Industries

SUPPORT TO INNOVATION ECOSYSTEMS

- Innovative SMEs

CROSS-PILLARS II & III

- European Open Science Cloud

International Cooperation

International Cooperation

Tackling together global societal challenges; access to the world's best talents, expertise and resources; enhanced supply and demand of innovative solutions

Association to Horizon Europe

- Third countries with good capacity in science, technology and innovation
- Taking into account objective of driving economic growth in Europe through innovation

- Intensified targeted actions
- Strengthened support to multilateral cooperation
- Openness to international participation balanced with the promotion of EU strategic autonomy

Open Science across the programme

Open Science

Mainstreaming of open science practices for improved quality and efficiency of R&I, and active engagement of society

Mandatory immediate Open Access to publications: beneficiaries must retain sufficient IPRs to comply with open access requirements.
Data sharing as 'open as possible, as closed as necessary': mandatory Data Management Plan for FAIR (Findable, Accessible, Interoperable, Reusable) research data.

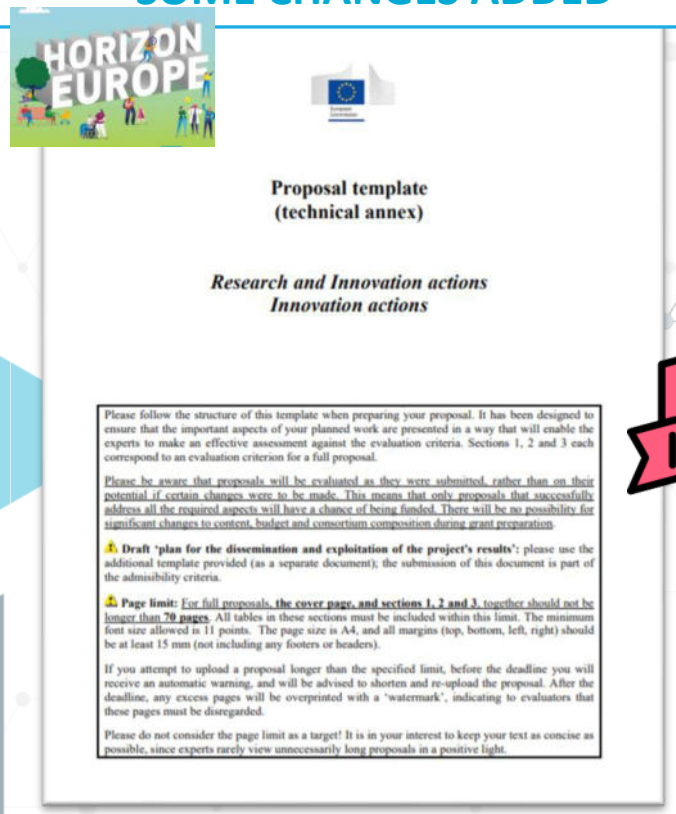
- Work Programmes may incentivize or oblige to adhere to **open science practices** such as involvement of citizens, or to use the **European Open Science Cloud**
- Assessment of open science practices through the **award criteria** for proposal evaluation
- Dedicated support to **open science policy actions**
- **Open Research Europe** publishing platform

PARTICULAR ASPECTS TO TAKE INTO ACCOUNT FOR EUROPEAN PROJECTS

Projects' new approach

News in the proposal structure

SOME CHANGES ADDED



NEW ITEM

NEW FIELDS IN PART A

- Researchers table – needed to follow up researchers' careers
- Role of participating organisation
- Self-declaration on gender equality plan

FIELDS MOVED FROM PART B TO PART A

- Ethics self-assessment
- Security questionnaire (new, in all he proposals)
- Information on participants' previous activities related to the call

NEW IN PART B

- Glossary of terms.
- Consistency on the use of terminology is ensured in all project phases
- Extensive explanations on what exactly should be included in each section.

News in the evaluation process (1/2)

Same criteria as in H2020

Excellence, **Impact** and **Quality and efficiency of the implementation**. Excellence only for ERC.

Adapted following lessons learnt:

- The number of '**aspects to be taken into account**' have been **reduced**
- **Open Science** practices assessed as part of the scientific methodology
- New approach to impact: **KIPs**
- The assessment of the **quality of applicants** is assessed under 'implementation'
- Assessment of **management structures** has been removed.

News in the evaluation process (pilots) –(2/2)

Standard evaluation process

Individual evaluation → Consensus group → Panel review → Finalisation

Experts assess proposals **individually**.

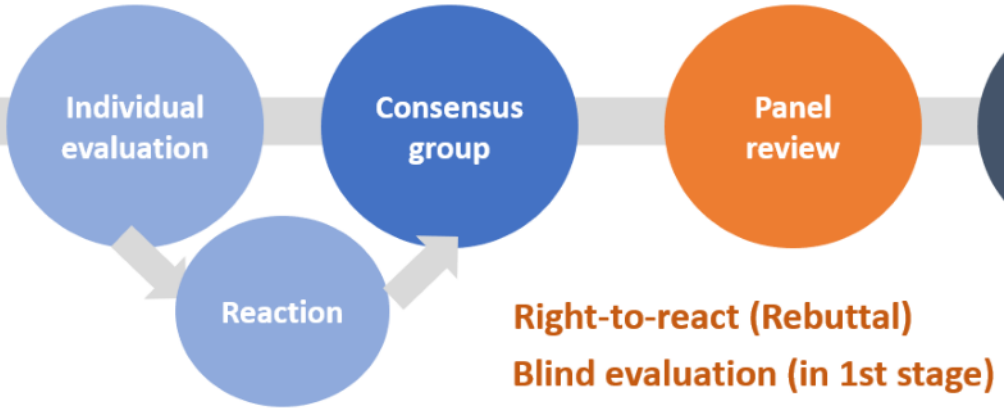
3 experts per proposal.

All individual experts discuss together to agree on a **common position.**

The panel of experts reach an **agreement**, checking **consistency** across the evaluations.

The Commission/Agency reviews the results and puts the **final ranking list.**

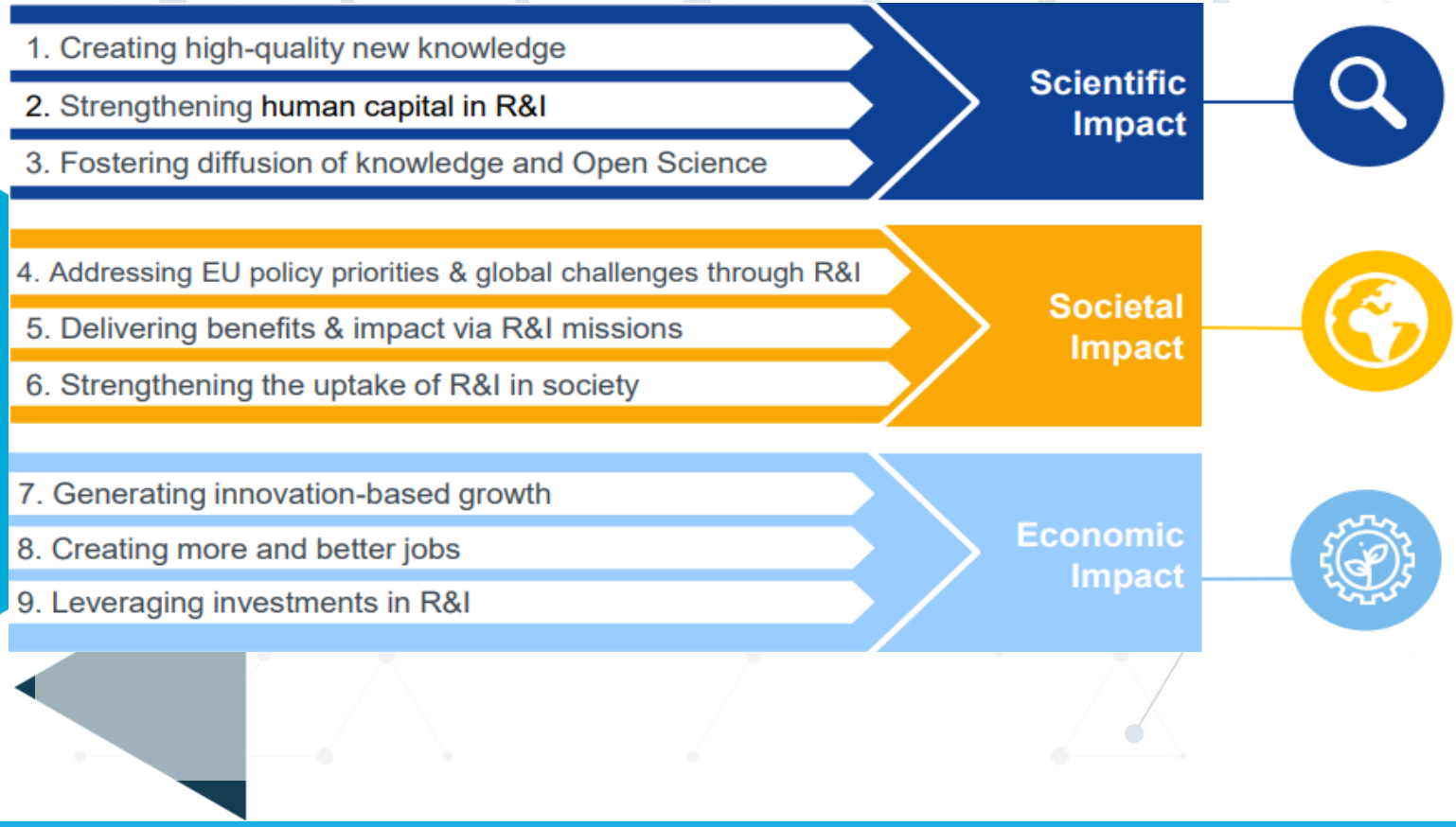
New pilots based on lessons learnt



Right-to-react (Rebuttal)

Blind evaluation (in 1st stage)

Key Impact Pathways (KIPs)



- Proximity from an overview to continuous monitoring of each project.
- Attribution details about most specific details.
- Better traceability of multiple data minimising reporting burden.
- Holistic approach knowing how each part of the programme contributes to its impact.

Other changes

Time-to-grant

Results after 5 months from closing, signing of the agreement in 8 months

Gender equality plan

Mandatory to meet eligibility criteria (for public entities, research centers, universities, etc.)

Dissemination plan

Draft in the proposal phase and **updated** six months later if the project is financed

Security scrutiny

It will be checked **systematically** in all Horizon Europe proposals (use or generation of EU classified information, misuse of results, subject to national security restrictions, etc.)

THANK YOU!

"European funding best practices. Succeeding into the new research and innovation programme Horizon Europe". SEMINAR 1| 21 April 2021 | Online

Eva Vicente Barragán

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León Technology Park- Main Building

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Acknowledgement

The research leading to these results has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 952463.

3. TRAINING SESSION 2

3.1 PROGRAMME SESSION 2

The second out of three sessions of the training programme followed this agenda:

Table 2- Agenda of training session 2

SESSION 2: "Brainstorming for incoming project ideas"		
28th April 2021 (15:30-18:00 CET) Online: https://zoom.us/j/98662878542 Meeting ID: 986 6287 8542		
15:30 – 15:35	**1. Connection to the webinar**	-
15:35 – 15:40	**2. Opening of the session 2** *Official welcome, presentation of the agenda*	Santiago Cuesta-López (ICAMCyL)
15:40 – 16:05	**3. Topic 1: "Ensuring circularity of composite materials" (HORIZON-CL4-2021-RESILIENCE-01-01)** *Open discussion*	ALL
16:05 – 16:30	**4. Topic 2: "Paving the way to an increased share of recycled plastics in added value products" (HORIZON-CL4-2021-RESILIENCE-01-10)** *Open discussion*	ALL
16:30 – 16:55	**5. Topic 3: "Advanced lightweight materials for energy efficient structures" (HORIZON-CL4-2021-RESILIENCE-01-11)** *Open discussion*	ALL
16:55 – 17:20	**6. Topic 4: "Safe- and sustainable-by-design metallic coatings and engineered surfaces" (HORIZON-CL4-2021-RESILIENCE-01-12)** *Open discussion*	ALL
17:20 – 17:45	**7. Topic 5: "Next generation digital aircraft transformation in design, manufacturing, integration and maintenance" (HORIZON-CL5-2021-D5-01-06)** *Open discussion*	ALL
17:45 – 18:00	**8. Wrap-up and closure**	Santiago Cuesta-López (ICAMCyL)

3.2 PARTICIPANTS

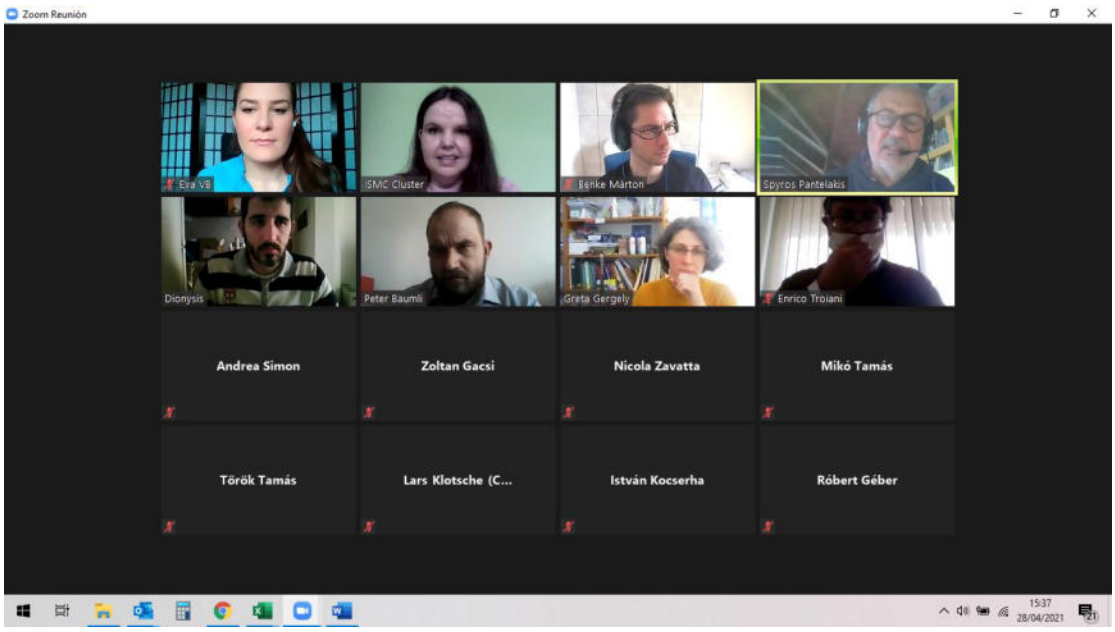


Figure 2-Family photo of the session 2 training

3.3 CONTENT

The following slides compile the brainstorming debate ideas developed under session 2 of the training, where all the partners were involved.

Brainstorming for incoming project ideas

OUTLINE

Topics	Proposing entity
1. Ensuring circularity of composite materials (HORIZON-CL4-2021-RESILIENCE-01-01)	LTSM
2. Paving the way to an increased share of recycled plastics in added value products (HORIZON-CL4-2021-RESILIENCE-01-10)	ICAMCyL
3. Advanced lightweight materials for energy efficient structures (HORIZON-CL4-2021-RESILIENCE-01-11)	ICAMCyL + LTSM
4. Safe- and sustainable-by-design metallic coatings and engineered surfaces (HORIZON-CL4-2021-RESILIENCE-01-12)	ICAMCyL
5. Next generation digital aircraft transformation in design, manufacturing, integration and maintenance (HORIZON-CL5-2021-D5-01-06)	LTSM

1. Ensuring circularity of composite materials
(HORIZON-CL4-2021-RESILIENCE-01-01)

BRIEF DESCRIPTION

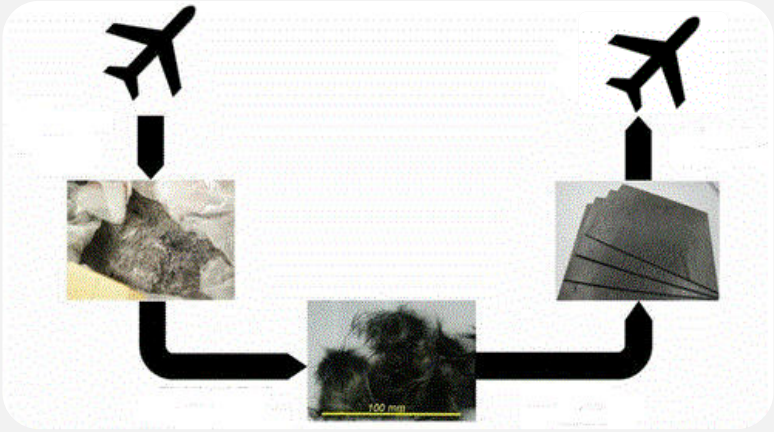
Expected Outcome: Projects are expected to contribute to the following outcomes:

- Reuse of composite material and recovery of secondary raw materials with higher value than currently available;
- Reduction of waste sent to landfill and positive environmental impact
- Creation of new value streams through new technologies with potential for commercial exploitation; new business opportunities and revenue flows for recycling companies, benefiting particularly SMEs which dominate this sector of the market;
- Increased uptake of novel composites materials in industrial applications e.g. enhanced lightweight designs for transport, currently limited due to costs and adherence by industry to environmental legislation and the end of life directive.

1. Ensuring circularity of composite materials (HORIZON-CL4-2021-RESILIENCE-01-01)

LTSM POTENTIAL PROPOSAL

1 **Ideal scenario**: closed-loop recycling (from aviation industry to aviation industry)



2

Critical steps to close the loop of CFRP

- **Develop economic and environmentally-friendly CFRP recycling techniques, leading to reclamation of recycled fibers with properties close to the virgin ones**
- Recycled fiber alignment is currently a major challenge
- Composite remanufacturing methods must be developed/modified – recycled composite properties must be close to the virgin one

3 **LTSM-UP** is working on the development of a novel solvolysis (chemical degradation) process

- Chemical degradation of CFRP occurs under appropriate solvents – process is enhanced through external energy sources, e.g. microwave [1], ultrasonic [2]
- Optimization will be made with regards to environmental, cost and quality aspects
- Creation of proof of concept (POC) at laboratory scale
- Development of a pilot model

- According to **Miskolc University** track record and background, physicochemical and mechanical characterisation of the retrieved fibers, as well as post-processing (e.g. development of alignment methods) could be potentially undertaken by UoM - an opportunity to enter in the area of polymers and composites

UMA3

[1] Zabihi et al., 2020. Development of a low cost and green microwave assisted approach towards the circular carbon fibre composites. Composites Part B: Engineering 184, 107750

[2] Das et al., 2016. A Novel Sonochemical Approach for Enhanced Recovery of Carbon Fiber from CFRP Waste Using Mild Acid–Peroxide Mixture. ACS Sustain Chem Eng 4, 2080–2087.

2. Paving the way to an increased share of recycled plastics in added value products (HORIZON-CL4-2021-RESILIENCE-01-10)

BRIEF DESCRIPTION

Expected Outcome: Circularity and the increase of the content of recycled plastics in value-added products

Projects are expected to contribute to several of the following outcomes:

- Establish EU broadly accepted definition of recyclate and develop relevant verification methods for recycled content in products.
- Establish EU broadly accepted procedures to control the consistent quality of recyclates; characterise their suitability for specific applications and trace the recyclates back to their origin;
- Deliver a clear approach to prevent some potentially hazardous substances to enter the recycled plastics system;
- Enhancing ownership and engagement of the society through active collaboration and empowering people and communities as actors of the circular plastic transition. At medium term, to fulfil the growing demand for recycled plastic content in market products;
- At a longer term, to pave the way toward recyclable-by-design plastics.

2. Paving the way to an increased share of recycled plastics in added value products (HORIZON-CL4-2021-RESILIENCE-01-10)

ICAMCyL
POTENTIAL PROPOSAL

- Circularity and the increase of the content of recycled plastics in value added products are central to the European Strategy for Plastics, and it is expected to establish EU broadly accepted procedures to control the consistent quality of recyclate, to prevent some potentially hazardous substances to enter the recycled plastics system and to enhance ownership and engagement of the society. The recovery of these plastics in different value chains is crucial, but the different and maybe **winning proposal will be the one involving pilots in the aeronautics sector**, allowing recycled plastics to be more promptly taken up as raw material for new products.

- For that aim, ICAMCyL proposes to search for key partners in the aerospacial/aeronautics recycling field. He also has in mind some partners that could fit perfectly to this topic (Teruel Airport / TARMAC aerosave)

3. Advanced lightweight materials for energy efficient structures (RIA) (HORIZON-CL4-2022-RESILIENCE-01-11)

BRIEF DESCRIPTION

Expected Outcome: The positive environmental impact of lightweight composite materials most often occur due to benefits during the use-phase. The overall life-cycle benefits are often reduced as a consequence of negative environmental impacts associated with the manufacturing (energy consumption) and inherent challenges to regain the high-value components (fibre and matrix) at industrial scale. Development of new chemistries for fast curing resins, new bio-based composites (including fibres and core materials), joining technologies between composites and other materials and associated novel production techniques are expected to result in:

- Reduced cost for production of renewable lightweight materials, 25 % lower cost than currently used materials;
- Light-weight products containing >50% sustainable, bio-based materials;
- Up to 30% lightweight potential through tailored functionality for a range of extreme environment (energy, infrastructures, aeronautics, space) applications and in surface transport;
- Reduction in CO2 emissions (LCA) of at least 20 %;
- Business models and circular value chains for lightweight bio based components;
- Improved time-to-market for European providers of lightweight solutions.

3. **Advanced lightweight materials for energy efficient structures (RIA)** (HORIZON-CL4-2022-RESILIENCE-01-11)

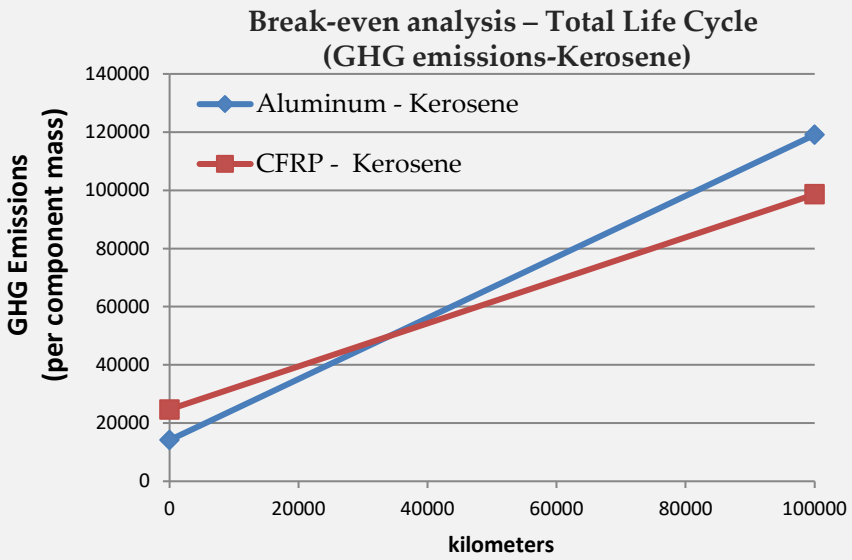
ICAMCyL
POTENTIAL PROPOSAL

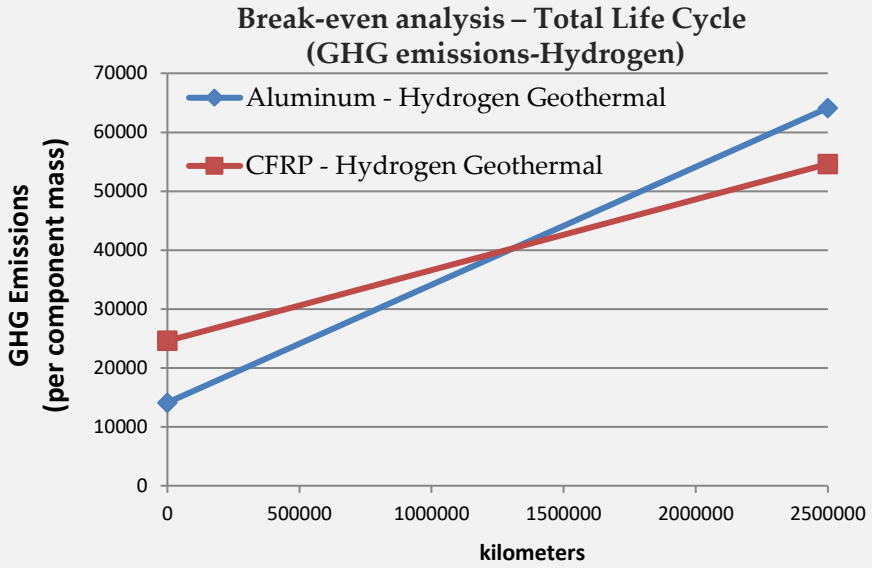
- The positive environmental impact of lightweight composite materials most often occur due to benefits during the use-phase. The overall life-cycle benefits are often reduced as a consequence of negative environmental impacts during manufacturing. Basing on the outcomes created as a consortium in UMA3, a possible proposal in this topic could be **to export lightweight material knowledge** to energy efficient structures that will have a positive environmental impact.

3. Advanced lightweight materials for energy efficient structures (RIA) (HORIZON-CL4-2022-RESILIENCE-01-11)

LTSM POTENTIAL PROPOSAL

The positive environmental impact of lightweight composite materials occur mainly due to benefits during the use-phase - energy consumption is directly related to greenhouse gas emissions





- To compensate for material properties variation between the investigated materials, thickness (and by extension, the mass) of the component must be varied in order to achieve the equivalent tensile properties of the selected component/part
- Regarding CFRP, new recycling techniques and EoL strategies must be developed - EoL benefits and drawbacks are overlooked in LCA approaches
- Re-entry of metals (e.g. through development of advanced metallic alloys) may be imminent

4. Safe- and sustainable-by-design metallic coatings and engineered surfaces (HORIZON-CL4-2021-RESILIENCE-01-12)

BRIEF DESCRIPTION

Expected Outcome: New metal coating systems, free of toxic substances (e.g. hexavalent Chromium), HREEs (heavy rare earth elements), LREEs (light rare earth elements), and PGMs (platinum group metals). A major challenge is the accumulation of metallic materials over the long term in the environment where they tend to have adverse reactions with the ecosystem. On the other hand, the coatings are needed for preservation of the products to prevent for instance corrosion and (bio)fouling. To ensure safety and sustainability of new metal coatings a systems approach that integrates safety, circularity and functionality of advanced materials throughout their lifecycle is required.

Projects are expected to contribute to the following outcomes (among others):

- At least 2 novel materials with improved (or at least comparable) efficiency as compared to traditional materials, associated with a reduction in metal (CRM) usage of at least 15%;
- Materials modelling, assisted by advanced methods (e.g. physics-based methods, machine learning and artificial intelligence methods), integrated with safe- and sustainable-by-design models;
- Integration of eco-design and circularity concepts in the design of new metal coatings and provide recommendations for the end-of-life of the new material.
- Innovative strategies for improving recovery, recyclability, purification and re-use products at the end of life.
- An online or/and standalone decision support tool to guide industry (especially SME) for the implementation of safe- and sustainable-by-design approaches tailored to their needs;
- Integration into the standardisation process and development of a roadmap to achieve full standardisation (of e.g. methods, protocols)

4. Safe- and sustainable-by-design metallic coatings and engineered surfaces (HORIZON-CL4-2021-RESILIENCE-01-12)

ICAMCyL
POTENTIAL PROPOSAL

- Santiago's suggestions are to take into account a proposal that cover sectors involving all the actors in the value chain, applying metal and coating engineering to **develop safe, sustainable and biocompatible surfaces, ensuring that the end-of-life products are by-design secure.**

5. Next generation digital aircraft transformation in design, manufacturing, integration and maintenance (HORIZON-CL5-2021-D5-01-06)

BRIEF DESCRIPTION

Expected Outcome(s):

• Deliver transformative digital technologies that will allow flawless entry into service of future European aircrafts (including engines, structures and systems) of all platforms. The outcomes should be in-line with technologies for future climate-neutral aircraft configurations and their integration. Multi-disciplinary model-based digital twins that cover the complete aircraft lifecycle, scaled-prototypes, representative rigs and unique research infrastructures fall within the expected outcomes.

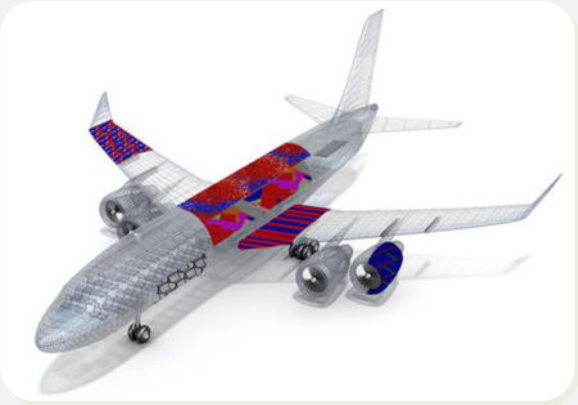
• Deliver new technologies and methodologies for model-based validation and certification, measurement and prediction of hardware and software reliability and impact on flight safety for commercial aviation, new standards and alternative methods of compliance.

• Reduce the lifecycle greenhouse gas impact of aircraft materials (including rare earth elements) and explore the fastest path towards their economical substitution. Advance further recovery and recycling methods in order to extend the useful life of materials, reduce the carbon footprint and produce new high-quality parts for new applications. Enable a clear path towards a fully circular aircraft.

• Deliver transformative digital and eco-efficient manufacturing technologies, advance further composite manufacturing, maintenance-repair-overhaul (MRO) and health assessment processes and procedures (including Health & Usage Monitoring Units) that will allow flawless entry into service and continuous airworthiness of European aircrafts of all platforms. Optimised manufacturing and MRO processes and tools, as well as onboard and on-site sensors and communication platforms are within the expected outcomes.

5. Next generation digital aircraft transformation in design, manufacturing, integration and maintenance (HORIZON-CL5-2021-D5-01-06)

LTSM POTENTIAL PROPOSAL



Advanced Aircraft Component Design:

Conceptual Design, Analysis and Optimization

Current Status: Aircraft components that currently are at end-of-life were designed decades ago; consequently concepts involving sustainability and EoL issues were not taken into account during the component development process

Digital solutions are more needed than ever – Digital solutions enhance circularity

Proposed Strategy

- Determine the requirements and specifications of the primary aircraft component (geometry, boundary conditions, performance, integration)
- Adopt design methodologies focused on approaches to develop the new components more sustainable - design for disassembly (DFD), design for environment (DFE), design for rebirth (DFRe), design for recycling (DFR), etc.
- Development of numerical/virtual models for the simulation and optimization of the A/C component, considering holistic LCA methods and approaches, with regard to environmental, financial and quality aspects
- Digitalizing and optimizing composites parts manufacturing processes aid companies to enter the era of Factories of the Future

UMA3

4. TRAINING SESSION 3

4.1 PROGRAMME SESSION 3

The last of the sessions of the training programme followed this agenda:

Table 3- Agenda of training session 3

SESSION 3: "The need of circular economy approach in aeronautics and aerospace"		
29th April 2021 (09:00-12:30 CET) Online: https://zoom.us/j/98824830144 Meeting ID: 988 2483 0144		
09:00 – 09:05	**1. Connection to the webinar**	-
09:05 – 09:15	**2. Opening of the session 3** *Official welcome, presentation of the agenda*	Santiago Cuesta-López (ICAMCyL)
09:15 – 09:45	**3. "Holistic approaches in designing and manufacturing of aircraft components under environmental and economic points of view"**	Spiros Pantelakis (LTSM)
09:45 – 10:15	**4. "The importance of Critical raw Materials in the aerospace industry, from advanced materials and fabrication to circular economy"**	Santiago Cuesta-López (ICAMCyL)
10:15 – 10:45	**5. "Environment-friendly advanced materials in space"**	Tamás Bárczy (ADMATIS)
10:45 – 11:15	**6. "Alloys and recycling in aerospace sector"**	Tamás Kékesi (University of Miskolc)
11:15 – 11:45	**7. "Ecological and economic optimization of engineering components"**	Christina Garcia Lars Klotsche (Capgemini-Engineering)
11:45 – 12:15	**8. "Powder Analysis for Additive Manufacturing"**	Claus Aumund-Kopp (Fraunhofer-IFAM)

12:15 – 12:30	**9. Wrap-up and closure**	Santiago Cuesta-López (ICAMCyL)

4.2 PARTICIPANTS

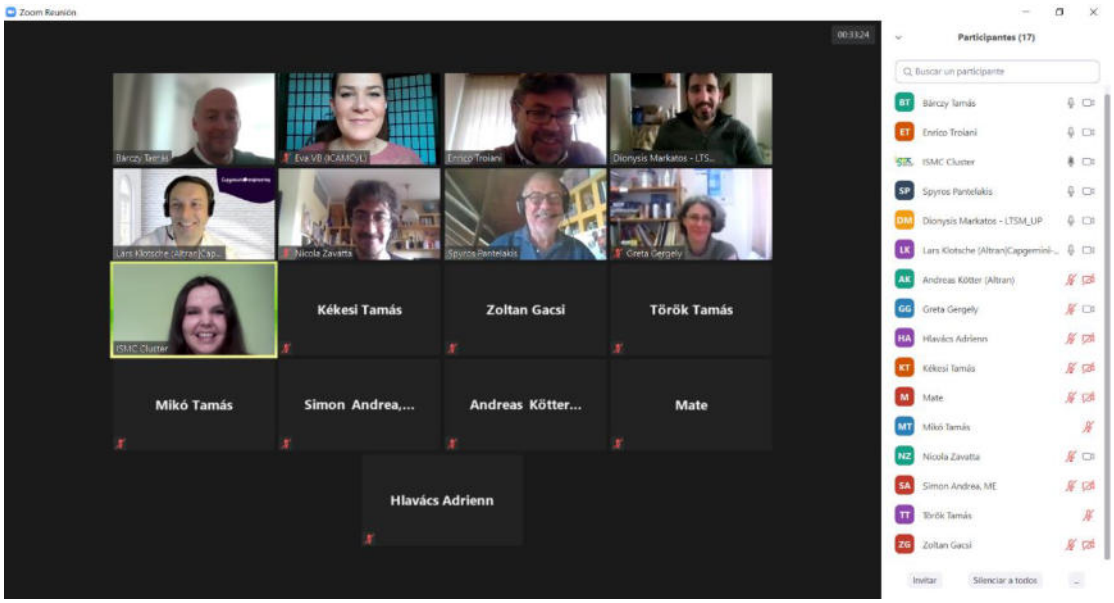


Figure 3-Family photo of session 3 training

4.3 CONTENT

The following slides compile the ICAMCyL presentation developed under session 3 of the training. Other speakers were invited to give their view, and all the partners were involved.

ICAMCYL

Centro internacional de materiales avanzados y materias primas
International center for advanced materials and raw materials

Dr. Santiago Cuesta-López

Director General

FUNDACION ICAMCyL: Centro internacional en materiales avanzados y materias primas de Castilla y León

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The importance of Critical raw Materials in the aerospace industry, from advanced materials and fabrication to circular economy

Critical Raw Materials and the aerospace value chain

Dr. Santiago Cuesta-López

Director General

FUNDACION ICAMCyL: Centro internacional en materiales avanzados y materias primas de Castilla y León

ICAMCYL & IBERIAN SUSTAINABLE MINING CLUSTER

ICAMCyL (Internacional Center for Advanced Materials and Raw Materials of Castilla y León)

Non-profit research foundation created by the main industries of Castilla y León region (Spain) in the sectors of automotive, manufacturing, advanced materials, engineering, mining and processing of raw materials.

It constitutes a singular Competence Center with the objective of aligning and working towards regional Smart Specialisation Strategies (RIS3) and international policies

BUILDING A FUTURE IN RAW MATERIALS

XXI CENTURY SUSTAINABLE MINING

SCIENTIFIC INTERESTS

ADVANCED MINING TECHNOLOGIES

- Exploration
- Classification
- Processing

CIRCULAR ECONOMY

- Waste
- Recycling
- Valorisation

SUSTAINABILITY

- New production methods
- Eco-innovation
- Resource efficiency

NANOMATERIALS

- Carbon-based
- MOFs
- Composites
- Alloys

FABRICATION

- Additive manufacturing
- Pilot lines
- Industry

ENERGY & CLIMATE CHANGE

- Batteries / fuel-cells
- CO_2 capture
- Smart cities

EXPERTISE AND CAPACITIES

ENGINEERING & DESIGN · RAW MATERIALS RECOVERY · CRMs · MARKET · SUSTAINABLE PRODUCTION · ENVIRONMENTAL PROTECTION · DIGITAL MINE · RECYCLING · MODELLING & SIMULATION · FRAMEWORK POLICIES · WASTE VALORISATION · STAKEHOLDER ENGAGEMENT · VALUE-CHAIN DESIGN · INDUSTRY · CLUSTERING ACTIVITIES · END USERS INVOLVEMENT · RESOURCE MANAGEMENT · ECOSYSTEMS · LCA

EUROPEAN PROJECTS

MIREU · RawMaterials · tarantula · INNOCAT · NEXTOWER · Interreg Europe · cost · SMARTY Interreg Europe · CRM · MINEA · ENGAGER · Join the SMART SPECIALISATION PLATFORM

ISMC (Iberian Sustainable Mining Cluster)

MISSION & VISION

The Iberian Sustainable Mining Cluster (ISMC) has been created to halt the current decline of the mining sector in Spain, with special attention to the region of Castilla y León and the mining areas of the Province of León, in Northwest Spain. This decline affects the whole value chain as well as social acceptance of mining operations.

ISMC currently includes around 50 companies, research and institutional entities joining efforts to consolidate the strengths of the mining sector and its associated services, promoting sustained economic growth for its members, with special attention to SMEs.

OBJECTIVES

- ❑ Boost the mining sector and related services
- ❑ Promote growth and competitiveness
- ❑ Foster cooperation across industries
- ❑ Attract business and commercial opportunities
- ❑ Promote technological innovation and sustainability

EXPERTISE OFFER

- ❑ ISMC covers the whole mining value chain
- ❑ Wide coverage of raw materials & CRMs
- ❑ Pilots and new lines of research
- ❑ Stakeholders participation
- ❑ Clustering and matchmaking activities

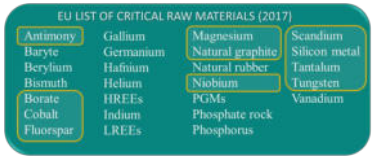
ECONOMY · ENVIRONMENT · SOCIETY

ISMC & THE MINING VALUE CHAIN

ISMC has members across the whole mining value chain, from mineral extraction, exploration and production to business development, recycling and other services.

RAW MATERIALS & THE CIRCULAR ECONOMY

ISMC members cover a wide range of raw materials, including some essential critical raw materials (CRMs) used in high added-value, innovative products.1

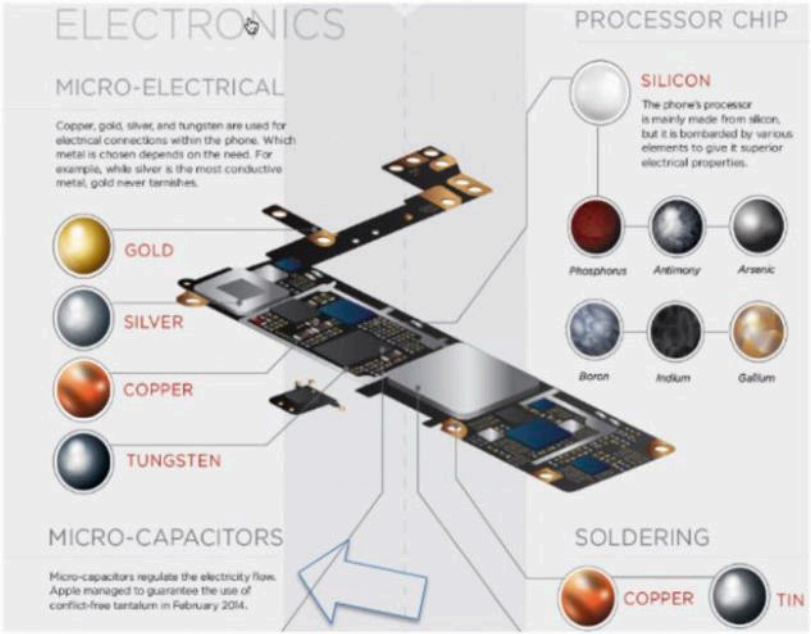


The development of a sustainable, low environmental impact mining will only occur through the improvement and integration of new methods, techniques and processes that allow the use and valorisation of raw materials and their by-products, always according to the principles of sustainability and circular economy.

Research & exploration → Deposit appraisal → Design of mining complex → Mining operations → Site restoration

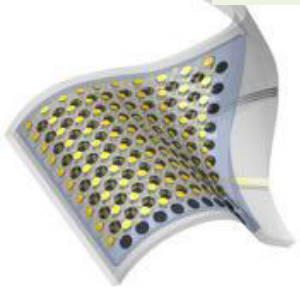
Raw Materials are essential

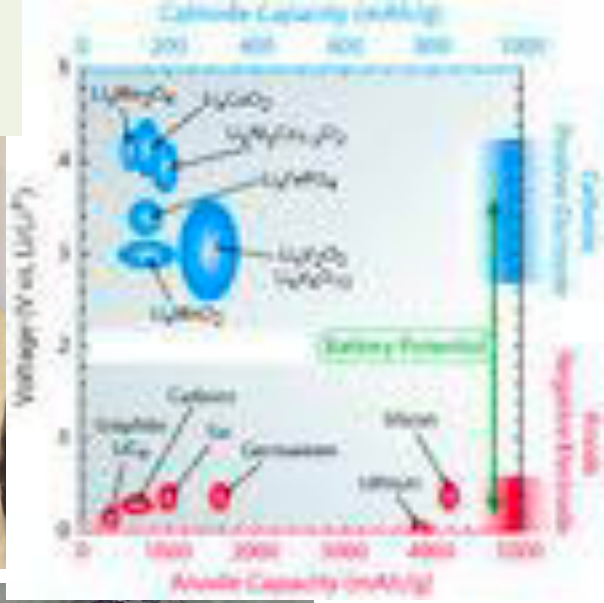
"Of the 83 elements in the periodic table, a total of 62 different types of metals go into the average mobile handset."



IBERIAN SUSTAINABLE MINING CLUSTER

SUSTAINABLE FUTURE IS HERE AND IT NEEDS RAW MATERIALS





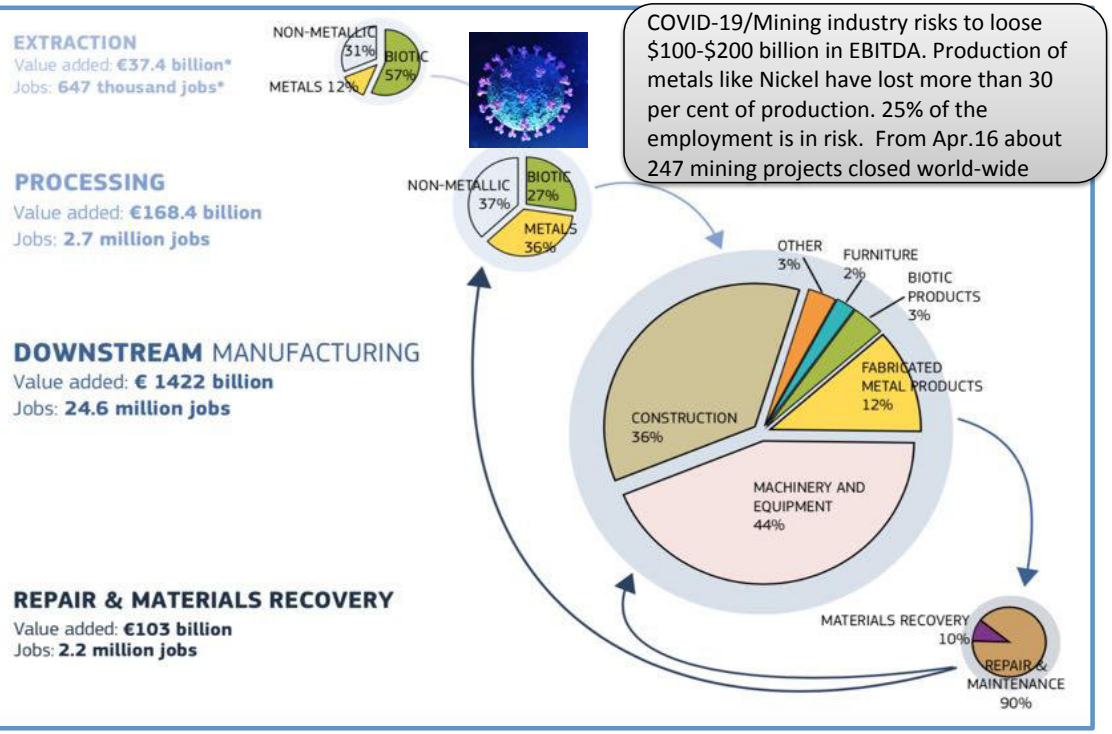
Raw Materials Value chain is crucial for present and future EU economy, employment and well-being

Raw materials extractive and processing industries provided more than EUR 206 billion of value added and **3.4 million jobs**

Downstream industries generated around EUR 1 422 billion and **25 million jobs.**

Repair and materials recovery provided EUR 103 billion and **2.2 million jobs.**

Sustainable raw materials production is the basis of the EU economic security and autonomous, all technology development and needed to achieve EU targets in Green Deal



COVID-19/Mining industry risks to loose $100-$200 billion in EBITDA. Production of metals like Nickel have lost more than 30 per cent of production. 25% of the employment is in risk. From Apr.16 about 247 mining projects closed world-wide

EU-28 as trade bloc is the 1st top 10 global **exporters of mining equipment, close to 20 billion USD**. Total R&D investment for the sector represents > EUR 2.7 billion EUR. EU generates an average of 1200 patent applications/year

EU raw materials industries are **leaders in sustainability and corporate social responsibility.** About 24 % of the Global Reporting Initiative reports are from companies with headquarters in the EU.

Only EU sustainable mobility and associated Li batteries value chain will need for 2025 > 400.000 t for cathode materials ; > 250.000 t for anode materials; > 235.000 t in electrolytes Including Ni, Co, Al, Mn, Graphite, and Li.

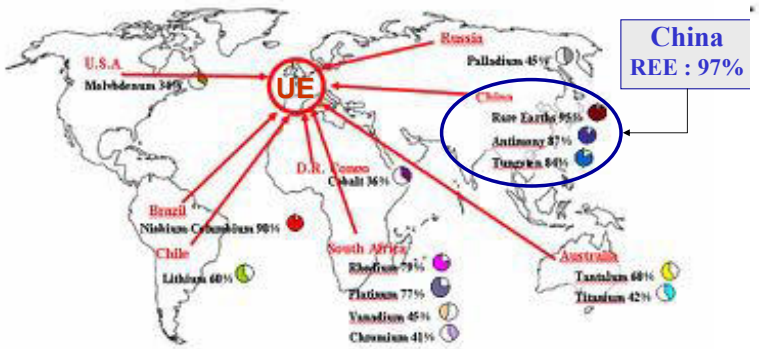
FIGHT FOR RARE EARTH

From iron ore to timber, China relies on foreign supplies to fuel its growth. But when it comes to rare earth metals—essential for clean energy and electronics—China dominates. The rest of the world is worried.

REUTERS

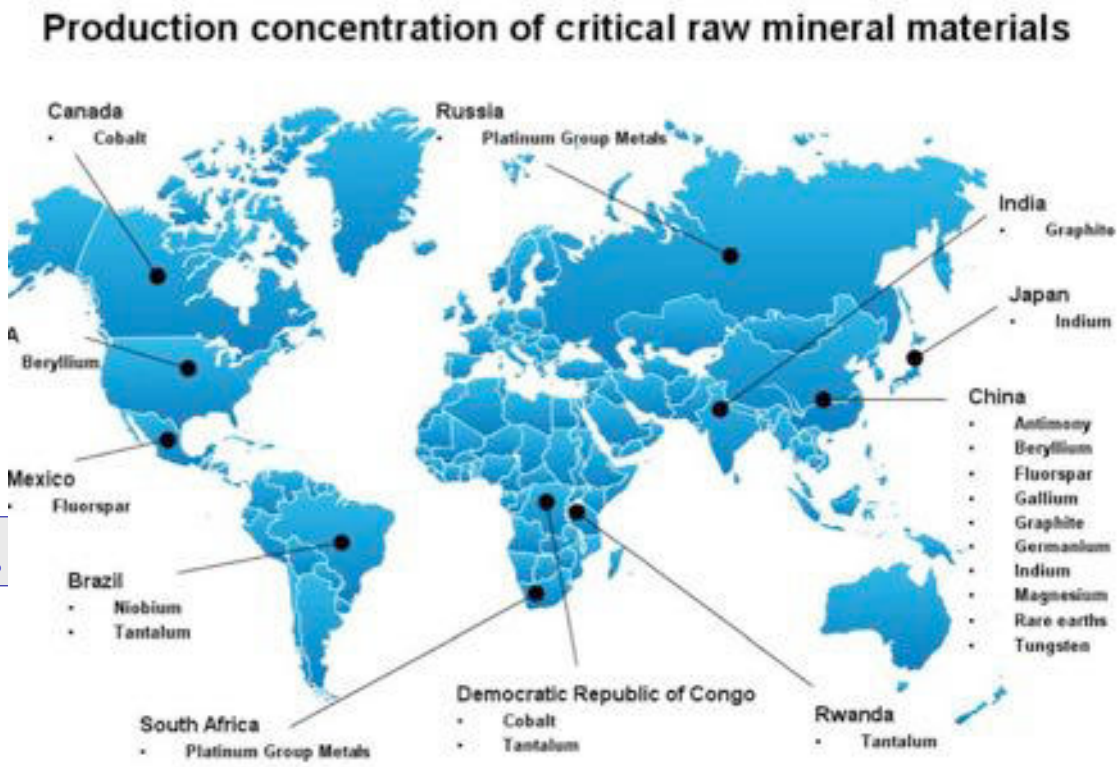
Rare Metals

A strong UE importation dependancy &
Some countries with a monopolistic production



China
REE : 97%

CRMs are a clear world-wide problem …
Rare Earths "*the 21th gold fever*"?



Environment/Social: Extraction has social and environmental consequences, making these materials not so green!

Cobalt mining in the DRC

Graphite mining in China

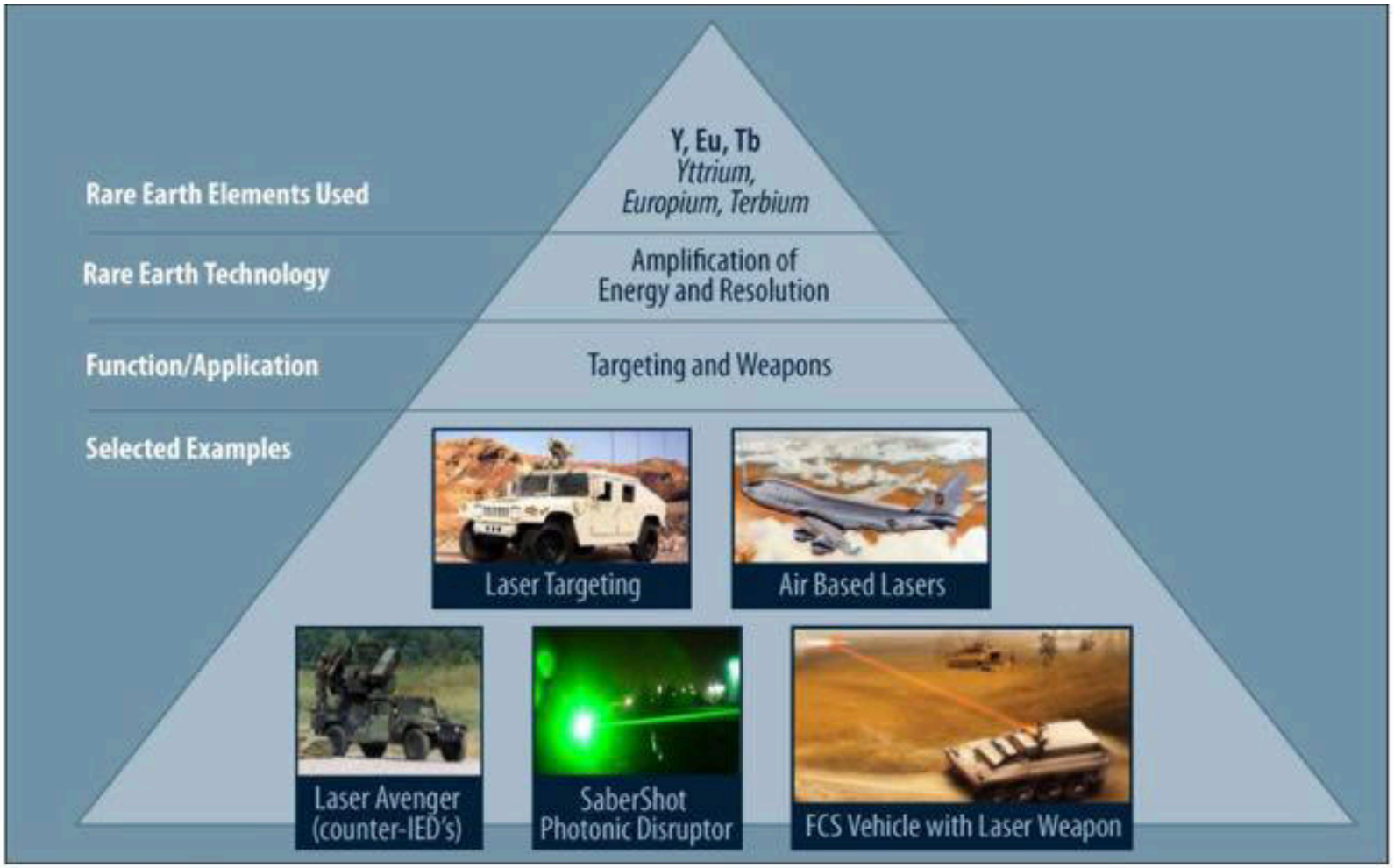
Lithium extraction in Chile

REE mining in China

… But Rare Earth Elements are extremely critical in high technology for defense

- each SSN-774 Virginia-class submarine would require approximately 9,200 pounds of rare earth materials
- each DDG-51 Aegis destroyer would require approximately 5,200 pounds of these materials
- each F-35 Lightning II aircraft would require approximately 920 pounds of these materials.

Rare Earth Elements in Targeting and Weapon Systems

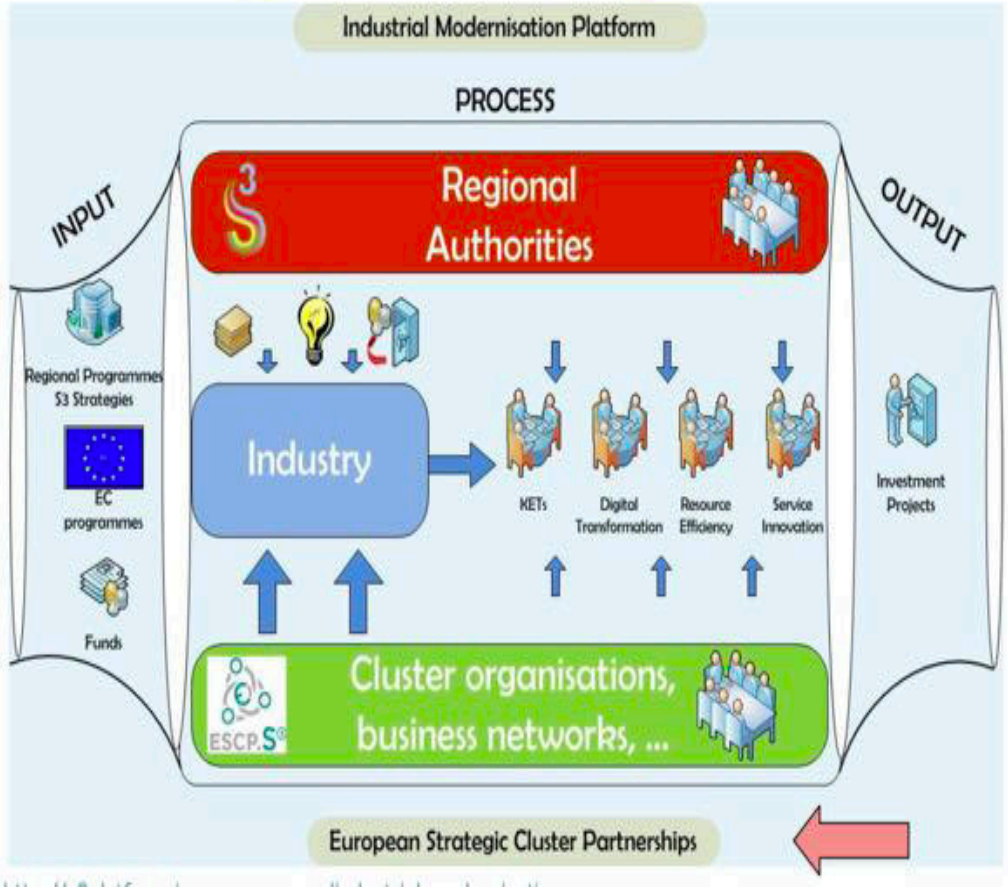


Source: Compiled from presentations by the Rare Earth Industry and Technology Association, the United States Magnet Manufacturing Association, and David Pineault, "Global Rare Earth Element Review," Defense National Stockpile Center, spring 2010.

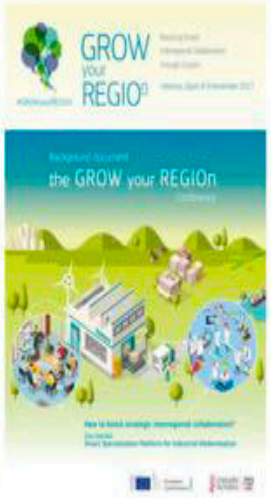
Raw Materials Alternate Recycle Extract


A future for people
Revitalising our regions
Technology leading the way
EU funding opportunities for industry:
Investment Plan, Horizon 2020, COSME, and
European Structural and Investment Funds

Strategic cross-regional collaboration



GROW your REGIOn background document



INTRODUCTION: S3P

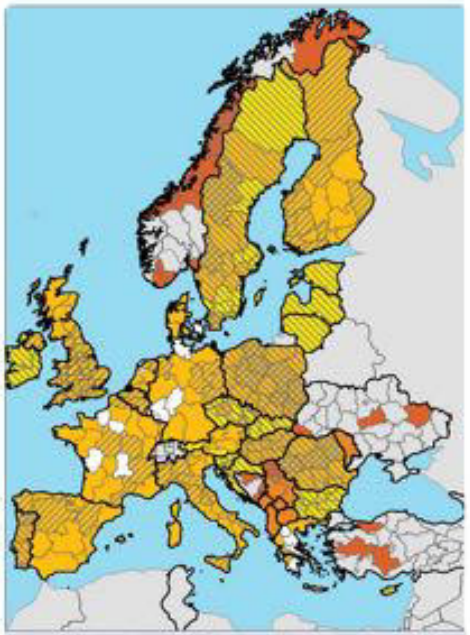
Why? The S3 Platform assists EU countries and regions to develop, implement and review their **Research and Innovation Strategies for Smart Specialisation (RIS3)**. Provide **information, methodologies, expertise and advice** to national and regional policy makers, as well as promote mutual learning, trans-national co-operation and contribute to academic debates around the concept of Smart Specialisation.

How? Thematic S3 Platform provide **a multi-level support mechanism, combining efforts at regional, national and European level. Interregional collaboration** by opening-up regional smart specialisation strategies.

Thematic S3 Platforms on
Energy
Agri-Food
Industrial Modernisation

http://s3platform.jrc.ec.europa.eu/

Join the SMART SPECIALISATION PLATFORM



- **EU Countries registered in S3P: 18**
- **EU Regions registered in S3P: 178**
- Non-EU Countries registered in S3P: 6
- Non-EU Regions registered in S3P: 16
- S3P Peer-reviewed Countries: 16
- S3P Peer-reviewed Regions: 72

Participation in other S3P-Industry Platforms

"Advanced Materials for Batteries"

http://s3platform.jrc.ec.europa.eu/batteries

Part of the Strategic Action Plan on Batteries

26 regions involved

ICAMCYL Pilot 2 leader: "Sustainable Raw Materials Extraction & Processing"

6 pilots

Outcome: PP investment projects industry-driven

"Mining Industry"

http://s3platform.jrc.ec.europa.eu/mining-industry

Approved Feb 2019 - KOM March 2019

Matching & Scoping note next

Key themes:

- Critical raw material production
- Empowerment of SMEs in Global Value Chains
- New technologies and sustainable mining
- Social acceptance of mining through stakeholder involvement
- Education and training in mining and related industries

70 regions involved in 12 thematic areas under the Smart Specialisation Platform for Industrial Modernisation

S3P-Industrial Modernisation: Thematic areas

Advanced manufacturing for energy applications

3D Printing

Innovative use of non-food biomass

Efficient & Sustainable Manufacturing

Nano-Enabled Products

SMES to the Industry 4.0

Textile Innovation

Medical Technology

Sports Innovation

Photonics

Digitalisation and Safety for Tourism

European Cyber Valleys

Social Economy

Artificial Intelligence & Human Machine Interface

Personalised medicine

Chemicals

Safe and sustainable mobility

Advanc manufact for ene applicat

Nano-Enabled Products

- ADVANCED MATERIALS FOR BATTERIES
- MINING RAW MATERIALS AND ASSOCIATED VALUE CHAINS

SMES to th Industry 4

Digitalisation and Safety for Tourism

European Cyber Valleys

- Should we create a new EU regional innovation hub in circular economy for aerospace?

YES !!!!!

S3P-Industrial modernisation

Industrial modernisation requires important investment efforts:
Regional Smart Specialisation Strategies (RIS3)

The **Smart Specialisation Platform for Industrial Modernisation** (S3P-Industry) aims to support EU regions committed to generate a pipeline of industrial investment projects following a bottom-up approach - implemented through:

INTERREGIONAL COOPERATION

CLUSTER PARTICIPATION

INDUSTRY INVOLVEMENT

RESEARCH INSTITUTIONS, ACADEMIA AND CIVIL SOCIETY

Such interregional cooperation with allow **scaling up** towards larger impact and more effective collaboration along **industrial value chains**.

A CHANGE OF VIEW IN VALUE CHAINS (N-VC / RM-VC)
DRIVING A CHANGE IN THE SECTOR BY KEY CONCEPTS AND ENABLERS

SUBSTITUTION (TRANSVERSAL CONCEPT)

FATE OF A CRM

EXTRACT/ MINE

RECYCLE

MANAGEMENT / USE

Drivers of change

Environmental
- Growing concern
- Climate change

Technological
- Increased rate of technolog. change

Societal
- Higher fairness
- Democratization
- Generat. change
- Concern for ASM

Geopolitical
- Potential resource nationalization

Geographies
- Mining in more remote regions / new frontiers
- Declining grades

Themes of transition

Principles framing the end-state

Environment/ climate | Fair value & development | Transparency & human rights | Health & wellbeing

Supply & Operating Model

1. Resource base
2. Strategy & operating model
3. Technology & innovation
4. People & workforce
5. External relationships

Demand (Value chains)

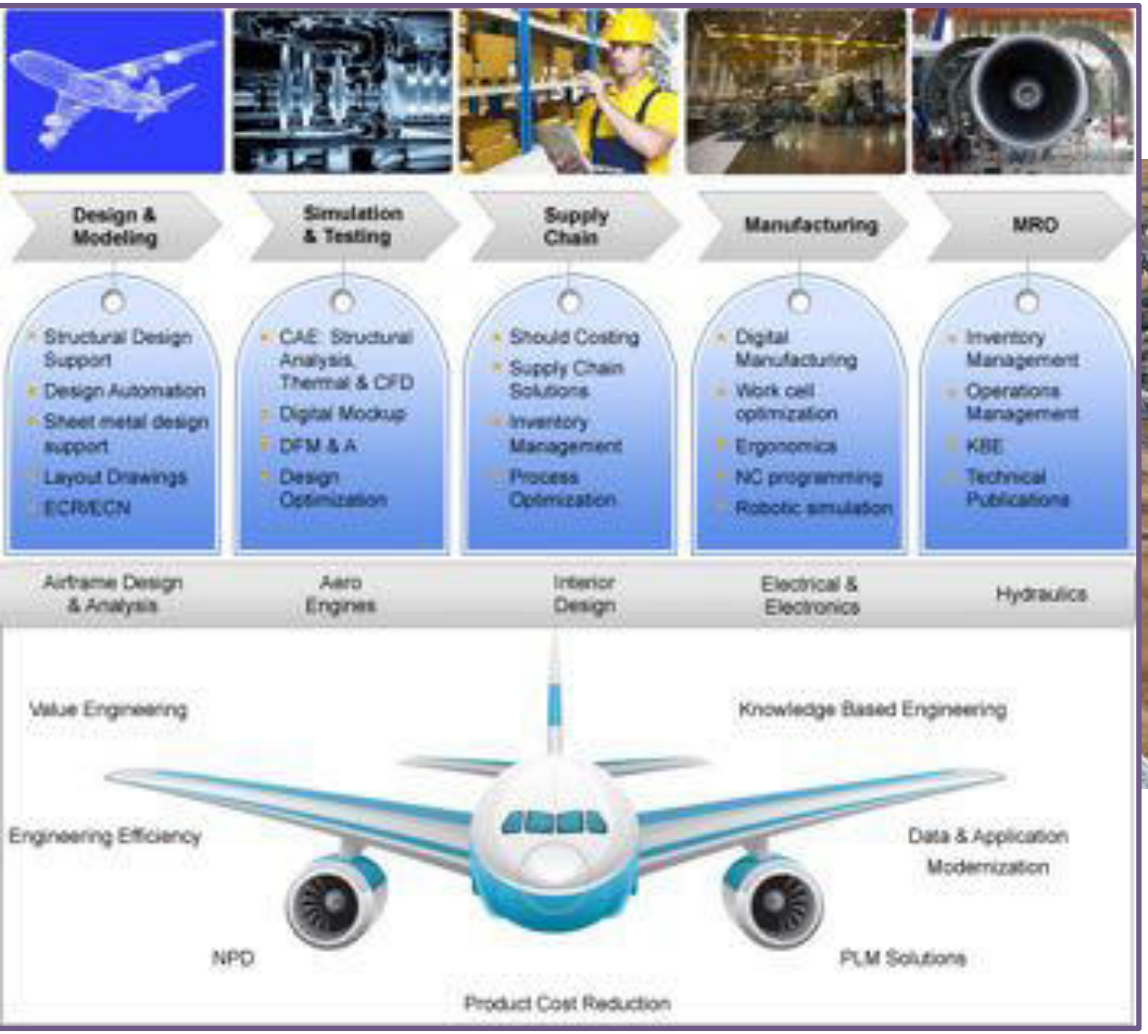
6. Demand in a Sustainable World 2050

Scenarios on the future of resources

Roadmap/actions

Metals
Mining
Government
Communities
Investors
Civil Society

INTRODUCE CIRCULARITY IN THE DESIGN PHASE



INTRODUCE CIRCULARITY IN FULL LIFE CYCLE OF A PLANE

KEY CHALLENGE #1: RECOVERING rubber and metals from airplane tyres

KEY CHALLENGE #2: RECOVERING METALS FROM ENGINES

CRMS in JET engines

CRM	Application use in 2018 (t)	EU apparent consumption[1] (t)	% (R1)	Waste and losses	Expected application use in 2035 (t)	% of expected use vs current EU total (R2)
V	130	71,000	0%	NA	730	1%
Si	1	582,000	0%	360,000	5	0%
Nb	60	10,400	1%	2,100	350	3%
Co	10	13,000	0%	9,000	80	1%
W	10	13,400	0%	10,600	80	1%
Ta	3	100	3%	NA	15	15%
Hf	30	33,000	0%	NA	180	1%
B	0.2	74,000	0%	80,000	1	0%

KEY CHALLENGE #3: RECOVERING COMPLEX PRODUCTS - METALS

Targeted raw materials:

Be
Cr
Mo
Ta
W
Ni
Co
Ti

Cobalt - L-605 Bar. Spec: AMS 5759. L-605 Bar AMS 5759. Nominal Composition: **Cobalt 50%, Chromium 20%, Tungsten 15%, Nickel 10%**

Waspaloy Bar. AMS 5706. UNS N07001. Nominal Composition: **Nickel 58%, Chromium 19%, Cobalt 13%, Molybdenum 4%, Titanium 3%, Aluminum 1.4%**

Aviation goals and requirements

Titanium based alloys

Alloy	Main alloying elements (% wt)	Ultimate Tensile Strength (MPa)	Young Modulus (GPa)	Density (g/cm^3)	Elongation at fracture (%)
Ti-6Al-4V Grade 5	89.4% Ti – 6% Al – 4% V – 0.4% Fe – 0.2%O	950	114	4.43	14
Ti-5Al-2.5Sn Grade 6	90.6%Ti - 5%Al – 3%Sn – 0.1%C – 0.2%O – 0.05%Fe- 0.05%N – 0.02%H	861	110	4.48	16

Nickel – based alloys

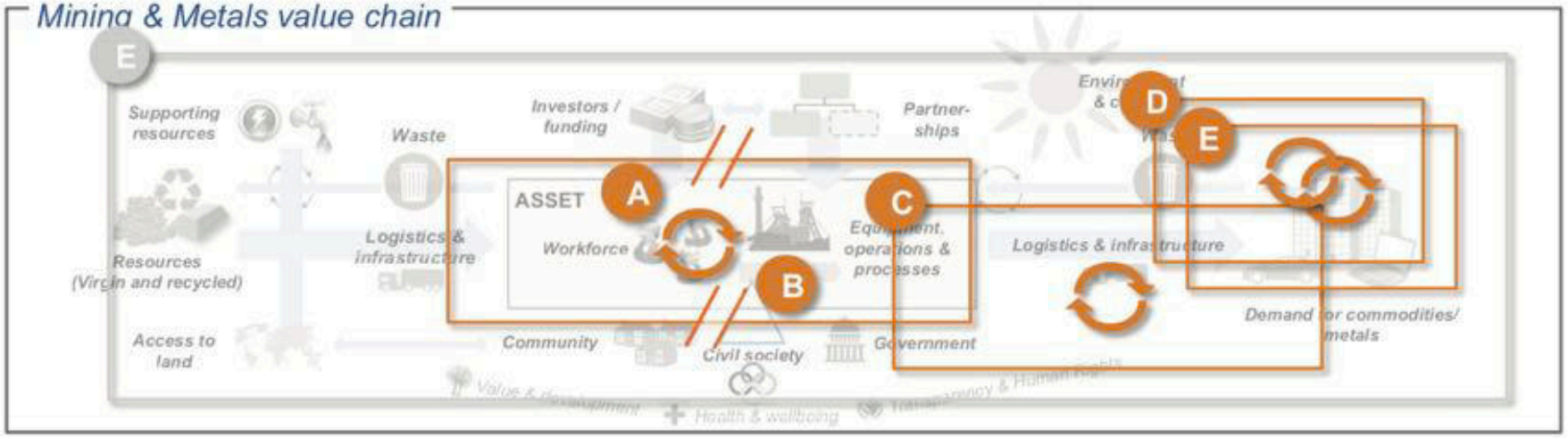
Alloy	Main alloying elements (% wt)	Ultimate Tensile Strength (MPa)	Young Modulus (GPa)	Density (g/cm^3)	Elongation at fracture (%)
INCONEL X-750	70%Ni – 15%Cr – 7.5%Fe – 2.5%Ti – 1%Nb – 1%Co – 1%Mn – 0.5%Cu – 0.5%Si – 1%Al	1250	214	8.28	30
NIMONIC 80A	69%Ni – 21%Cr – 2%Ti – 2%Co – 2%Fe – 1%Mn – 1%Si – 1.8%Al – 0.2%Cu	1250	222	8.19	30

KEY CHALLENGE #4: RECOVERING COMPLEX PRODUCTS – NON-METALS

Aeronautical Structural Materials		Density (gr/cm^3)	Specific Young modulus ($MPa*cm^3/gr$)	Specific strength ($MPa*cm^3/gr$)
Metals	2024 T3	2.78	26290	161.15
	7075	2.81	25510	203.55
	6063	2.70	25518	89.25
	AZ31C-F	1.77	25420	146.89
	Ti-6Al-4V Grade 5	4.43	25730	214.44
	INCONEL X-750	8.28	25845	150.96
Composites	Kevlar fiber reinforced epoxy resin	1.38	46086	927.53
	Carbon fiber reinforced epoxy resin	1.55	89873	1443
	Carbon fiber reinforced thermoplastic (CFRTP)	1.57	85350	915.50

A problem pending to be solved !

SOLUTION #1: KNOWLEDGE TRANSFER FROM THE MINING SECTOR & VALUE CHAIN



A	**Waste retreatment** *"Tailings on mine"*	How will waste be optimized and reused within mine processing
B	**Scrap treatment** *"Home / new scrap in metals production"*	How will scrap be collected and reused in metal (component and end-product) production
C	**Recycling (from downstream)** *"Old scrap"*	Recycling of materials used in end-industry / final products
D	**Reuse through redesign[1]** *(within downstream)*	Design for reuse of components after end of life of product (instead of recycling); reuse could be within or outside same industry
E	**Different ownership models** *(within downstream and x-value chain)*	Increase of life through different ownership – shared economy, leasing, for-use renting or cross-value chain ownership

SOLUTION #2: DESIGNING NEW MATERIALS AND CREATING AN EU ECOSYSTEM

UMA3

Unique Materials for Advanced Aerospace Applications

European Commission

UMA3 is receiving financing from EU Commission H2020 program under GA 952463

PVD coatings	Properties
Application for machining tools	
TiAlN/VN nano-multilayer	High-speed tools coated with TiAlN/VN nano-multilayered coating resulted in lifetime increasement (by a factor of 3.5), significantly reduced the cutting force and improved the surface finish during lubricant-free high-speed milling of Al7010-T7651 aerospace wrought alloys.[12]
TiAlCN/VCN nano-multilayer	TiAlCN/VCN nano-multilayered coating resulted a longer tool lifetime during dry machining of aerospace grade Al710-T7651 alloy.[13]
TiSiN/TiAlN nano-multilayer	TiSiN/TiAlN nano-layer coated tool showed improved resistance to sliding friction and fatigue impact under low feed rate cutting of Ti6Al4V alloy.[14]
Diamond-like carbon (DLC) coating	DLC coated high-speed tools coated with DLC coating exhibited a longer lifetime (by a factor of 3.4) and resulted in clean cutting edge and lower cutting force during dry high-speed milling of Al7010-T7651 aerospace alloys.
Application on aerospace alloys	
Diamond-like carbon (DLC) coating	The deposition of DLC coating on the surface of 7075-T6 Al alloy guarantees good corrosion resistance and proper tribological behavior without deteriorating the mechanical properties of the alloy.[15]

SOLUTION #2: DESIGNING NEW MATERIALS AND CREATING AN EU ECOSYSTEM

Unique Materials for Advanced Aerospace Applications
Acronym:
UMA^3

European Commission

UMA3 is receiving financing from EU Commission H2020 program under GA 952463

Al based alloys	Properties
5% Cu, 1.2 Si, 0.8% Mg, 1.2% Mn (Alloy Al 2014)	This alloy ranks among the strongest heat treatable products available. It combines excellent strength with good machinability. Alloy 2014 is an excellent forging alloy for aircraft parts such as landing gears and hydraulic cylinders.[17]
0.25% Cr, 1.9% Cu, - 2.5% Mg, 2,6%Si, 6, % Zn (Alloy Al 7475)	It is often used in high performance aerospace applications that require high resistance to fracture. Providing uncompromising strength and crack fatigue resistance, Alloy 7475 offers the industry's best fracture toughness. It has been frequently used for components such as wing spars, wing skins, and fuselage bulkheads.
0.25% Cr-1.5% Cu- 0.5% Fe-2.5% Mg -0.4%Si - 5% Zn (Alloy Al 7075)	The addition of a higher percentage of zinc to this alloy makes 7075 one of the highest strength and hardest alloys available. It finds its most common use in the aircraft industry, especially where highly stressed parts are used. If annealed, this alloy is highly formable and may be flash or spot-welded. Heat-treating increases its strength considerably. In the "Alclad" condition, 7075 is highly resistant to corrosion.
4.2% Li – 0.2% Zr- 0.1% Si-0.12% Fe (Alloy Al 8024)	It has low density, high specific modulus, and excellent fatigue and cryogenic toughness properties. Aerospace industry uses include wing leading and trailing edges, fuselage bulkhead webs and internal framework parts. Al-Li is being considered for many applications in advanced aircraft including wing structures

SOLUTION #2: DESIGNING NEW MATERIALS AND CREATING AN EU ECOSYSTEM

UMA3

European Commission

Unique Materials for Advanced Aerospace Applications
Acronym:
UMA³

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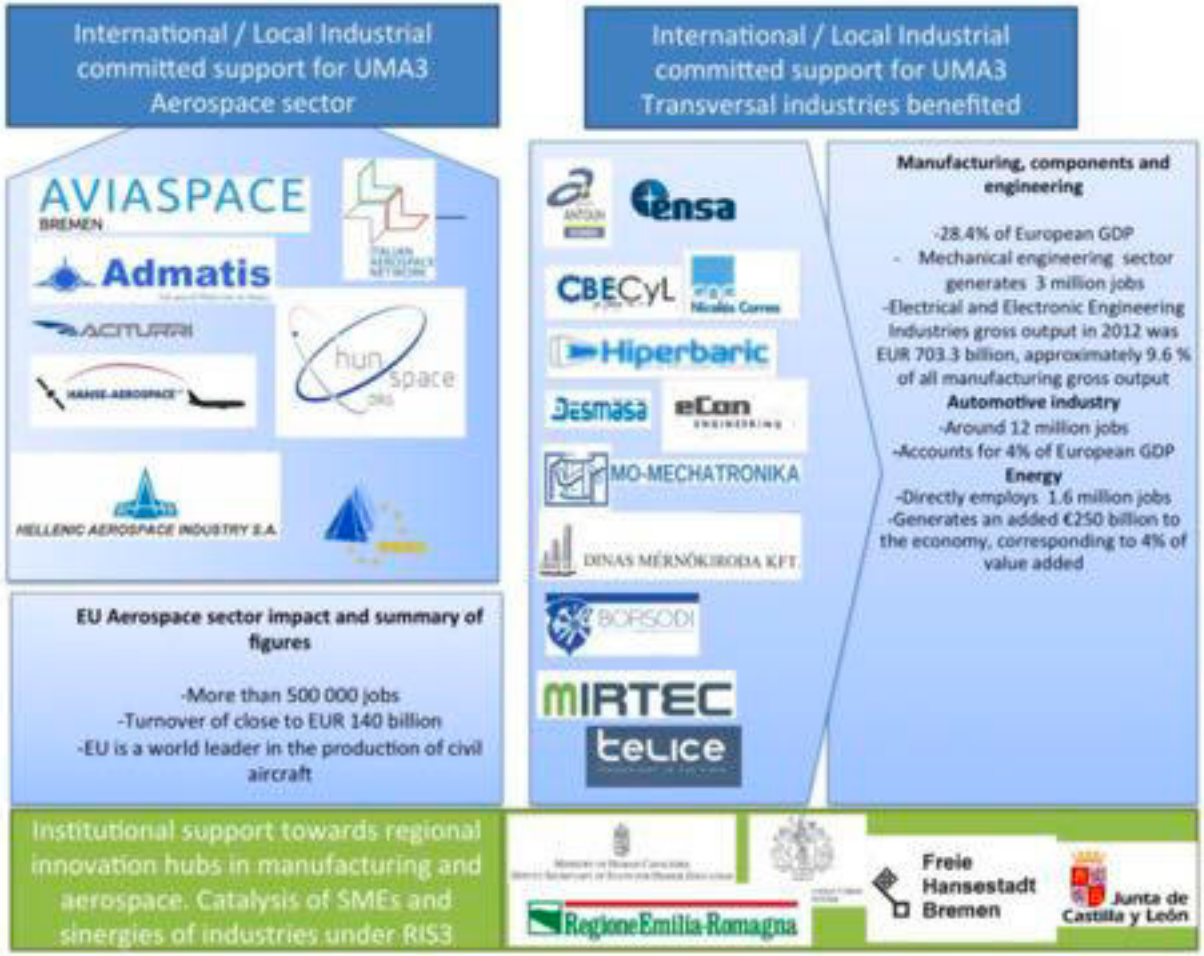

ICAMCYL
Centro internacional de materiales avanzados y materias primas
International center for advanced materials and raw materials

IBERIAN SUSTAINABLE MINING CLUSTER

Thank you for your attention

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