

D6.1: Dissemination and Exploitation Plan and Annual Dissemination Report 1

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R	Document, report	x
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patent fillings, videos, etc.	
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Dissemination Level		
PU	Public	x
CO	Confidential, only for members of the consortium (including the Commission Services)	

Related Deliverables / Project-related Documents

Abbreviation	Title	Status
GA	Grant Agreement	Finalized
CA	Consortium Agreement	Finalized
D6.6	Website and Project Logo	Finalized
D6.2	Dissemination Plan and Annual Dissemination Report 2	M24
D6.3	Dissemination Plan and Annual Dissemination Report 3	M36
D6.4	Impact Areas and Exploitation Plan	M36
AD	Additional Deliverable: Needs and Requirements Aerospace – Year 1	tbd

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Glossary

Acronym	Meaning
ACARE	Advisory Council for Aviation Research and Innovation in Europe
AD	Additional Deliverable: Needs and Requirements Aerospace – Year 1
BIC	Business Incubation Centre
CA	Consortium Agreement
EBN	European Business and Innovation Centre Network
GA	Grant Agreement
PEDR	Plan for the Exploitation and Dissemination of project Results
TRL	Technology Readiness Level
TBD	To be Defined

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Table of Contents

List of Figures	8
List of Tables	8
Abstract	9
1. Introduction	10
1.1. Objectives and Scope of this Deliverable	11
1.2. Importance of Dissemination and Exploitation Activities	13
1.3. Principles and Key Objectives of the ICARUS Plan for the Exploitation and Dissemination of the Project Results.....	13
2. ICARUS Dissemination Plan.....	15
2.1. Methodology	15
2.2. Building the ICARUS Community	16
2.3. Identifying the Target Audience.....	17
2.4. Defining the Message	18
2.5. Using the appropriate tools	21
2.6. Evaluating the Impact.....	28
3. Summary and Evaluation of the impact achieved from the performed dissemination activities	30
3.1. Performed Dissemination Activities	30
3.1.1 Participation in conferences	30
3.1.2 Presentations in other types of activities	30
3.1.3 Non-scientific and non-peer reviewed publications (popularised publications)	31
3.1.4 Press Releases.....	32
3.1.5 Films, Videos, TV	32
3.2. Analysis of the types of the performed activities	32
3.3. Analysis of the target groups addressed	33
3.4. Geographic Coverage of the performed dissemination activities	34
3.5. Public Website	36
4. ICARUS Exploitation Plan.....	38
4.1. Objectives of Exploitation	39
4.2. Methodology	39
4.3. Tools for and Approaches to Exploitation	41
4.3.1. The ICARUS (Target) Outcome Table	41
4.3.2. Application Fields	42
4.3.3. Stakeholders	43
4.3.4. Needs analysis	46

4.4. Plan for the exploitation after ICARUS (Future Roadmap).....	50
4.5. Exploitation Activities	51
5. KNOWLEDGE MANAGEMENT AND PROTECTION OF IPR	55
6. Conclusion	58
7. List of References	59
Appendix.....	60

LIST OF FIGURES

Figure 1: Framework for the definition of the ICARUS Dissemination and Exploitation plan	12
Figure 2: ESA Broker Network	17
Figure 3: ICARUS Leaflet presenting an overview of the project	21
Figure 4: ICARUS Poster presenting an overview of the project.....	22
Figure 5: ICARUS official logo	22
Figure 6: ICARUS public website	23
Figure 7: ICARUS LinkedIn group	26
Figure 8: ICARUS Twitter group.....	27
Figure 9: Images from the International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions.....	28
Figure 10: Distribution of ICARUS dissemination activities per type (M1-M12)	33
Figure 11: Target groups reached through the dissemination activities realized (M1-M12).....	34
Figure 12: Geographic Coverage of the performed dissemination activities	35
Figure 13: Top ten countries – origins of ICARUS website visitors (M2 – M12)	35
Figure 14: ICARUS public website users' overview per month (total number of users 936).....	36
Figure 15: Exploitation Options (European IPR Helpdesk, 2015b).....	51

LIST OF TABLES

Table 1: ICARUS Target groups and key messages to be delivered	20
Table 2: List of scientific journals and portals where project's research results are considered to be published.....	24
Table 3: List of conferences/workshops/exhibitions which are planned to be attended by ICARUS partners.....	25
Table 4: Target Outcomes Table	42
Table 5: ICARUS exploitation target groups	46
Table 6: Properties of materials currently used in aerospace	49
Table 7: Nanocrystalline aluminum-based alloys.....	49
Table 8: Nanocrystalline Magnesium-based alloys.....	49
Table 9: Nanocrystalline Titanium-based alloys.....	50
Table 10: Nanocrystalline Nickel-based alloys.....	50
Table 11: Summary of exploitation activities (performed and planned)	54

ABSTRACT

The efficient dissemination and exploitation of important research results produced within the project is one of the key objectives of the ICARUS Consortium. The aim of this deliverable is to report on the envisaged dissemination and exploitation activities of the project results. The Plan for the Exploitation and Dissemination of Results (PEDR) summarises the consortium's strategy and concrete actions to disseminate, exploit and protect the foreground generated within the project and could serve as a guideline to the Consortium for the dissemination and exploitation (D&E) activities to be carried out in the context of the ICARUS project.

The Plan for the Exploitation and Dissemination of Results is one of the compulsory reports required to be submitted to the EC by all H2020 projects. The current document presents the ICARUS Dissemination and Exploitation Plan (PEDR), as this is defined up to the end of the project's first year. The two key areas addressed by this deliverable are the dissemination and the exploitation actions which are separately reported in Section A and Section B of the PEDR (Appendix – ICARUS Plan for the Exploitation and Dissemination of Results). Section A of the PEDR (see Annex) describes the dissemination activities which demonstrate the added-value and positive impact of the project on the European Union. Dissemination activities will be performed during the three years of the project (September 2016 – August 2019) and after the end of the project. Across this first year, activities were focused on amplifying the public awareness about the project's concept, objectives and expected impact through popularised publications, press releases, videos, participations at conferences and various events. It is worth mentioning that as the resources dedicated to dissemination are restricted, cost-effective ways have been chosen to achieve the maximum of publicity for the project and its results. This initial deliverable aims at the presentation of a suitable dissemination plan for making the project and its results known all over Europe. Section B of the PEDR (see Annex) provides the strategic exploitation plan to be carried out jointly from Consortium partners or by individual partners. This initial deliverable aims at presenting the exploitation scenarios, the plans of industrial partners in the Consortium, and the IPR regulating issues.

The deliverable is structured in the following six chapters. The first section includes introductory information about the scope and objectives of the dissemination and exploitation activities within the ICARUS project. The second section presents the conceptual framework adopted for the development of the ICARUS Dissemination Plan, while the third section focuses on the performance assessment of the performed dissemination activities. The fourth section presents the performed exploitation strategy and activities of the project. Finally, the last chapter includes the concluding remarks of the deliverable.

1. INTRODUCTION

Research innovation is a driving force for economic growth, the creation of new job opportunities and the enhancement of the standard of living. It is therefore important to ensure that the knowledge generated within research and innovation projects is properly diffused and that the means through which such knowledge can be delivered to the society are being effectively explored. This is realized through the commercial exploitation of products and services, which is the primary way of delivering research results to the citizens (end-users).

In addition, communicating research results can effectively accelerate research and technical development (RTD) towards increasing the technology readiness level (TRL), going beyond the current state of the art, and even creating new research horizon lines on future and emerging trends. Furthermore, dissemination activities, such as participation in workshops or publication of information in websites, enable participants “to get feedback on the economic potential and recommended market-oriented exploitation pathways”.

All the above significantly contribute to the sculpture of a European 'Innovation Union' profile, while they also account for public spending and provide tangible proof that collaborative research adds value by:

- Showing how European collaboration has achieved more than would have otherwise been possible; notably in achieving scientific excellence, contributing to competitiveness and solving societal challenges;
- Showing how the outcomes are relevant to our everyday lives; by creating jobs, introducing novel technologies, or making our lives safer;
- Making better use of the results; by ensuring that these are taken up by industry representatives and the scientific community.

Dissemination and Exploitation therefore include the entire set of activities aiming to present and discuss the project outside the consortium members so as to enhance its scientific impact and the potential of market uptake of its results. Thus, a commonly agreed Plan for the Exploitation and Dissemination of project results (PEDR) is necessary in order to ensure the effective communication of knowledge by all partners, and also the establishment of a common strategy, that is supported and amplified by the entire consortium (see [Chapter 2. ICARUS Dissemination Plan](#) and [Chapter 4. ICARUS Exploitation Plan](#)). This presents the strategic vision of the ICARUS partners towards the diffusion of the project's results during its implementation, as well as after its end, predominantly aiming at:

- The effective and sustainable dissemination of ICARUS generated knowledge and technologies within the entire European Aerospace Community through the implementation of suitable and specialised dissemination and communication activities for each of the project's identified target groups and end users.
- The exploitation of the project's results by the European Aeronautics and Space Industry so as to maintain and reinforce technological advantage over the competition from outside Europe.



- The interconnection with other industrial sectors with the potential to exploit the findings and outcomes of the project.
- The conveyance of new knowledge into the engineering education base provided by the European Aeronautics and Space Universities, so as to meet the evolving skill needs of the sector.

During the first months of the ICARUS project, WP6 activities focused on the creation of effective public communication channels and tools towards raising public awareness for the project objectives and important results within the European aerospace industry, SMEs, research community, academia and the general public ([see Chapter 2.5. Using the appropriate tools](#)). Towards the realization of this objective, the ICARUS Consortium identified dissemination activities which could be performed in order to disseminate the project results to more specific channels, related scientific and industrial groups, transferring knowledge and fostering new collaborations (see [Chapter 2.3. Identifying the Target Audience](#) and [2.4. Defining the message](#)).

All ICARUS partners have realized the importance of disseminating the significant research results to be produced within the ICARUS project and planned specific dissemination activities, either at individual level or as a joint effort of two or more ICARUS partners (see [Chapter 3.1. Performed Dissemination Activities](#)). Since the ICARUS project focuses on developing a new thermodynamic approach to materials design that promises the discovery of entirely new classes of multi-component nc metal alloys resistant to coarsening, with properties specifically tailored to application, IPR conflicts may arise and it is the consortium's concern to ensure a fair and respectful collaboration.

In the following paragraphs of this Chapter the objectives and scope of this deliverable, the importance of the dissemination and exploitation activities and the principles and key objectives of the ICARUS Plan for the Exploitation and Dissemination of the project results are briefly presented.

1.1.OBJECTIVES AND SCOPE OF THIS DELIVERABLE

The present deliverable contains an overview of the dissemination and exploitation strategy applied by the ICARUS consortium to effectively distribute the results generated within the project to the relevant target audiences based on their interests and via a comprehensible manner. In particular, it indicates the guiding principles and tools for the dissemination and exploitation activities, reports on the envisaged relate activities of the project and on the identified processes for the efficient monitoring and safeguarding of the IPR of the involved partners.

The dissemination and exploitation plan has been developed towards addressing the following questions [European Commission, 2014 "Communicating EU research and innovation guidance for project participants", September 2014¹]:

¹http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-guide-comm_en.pdf





Figure 1: Framework for the definition of the ICARUS Dissemination and Exploitation plan

1.2.IMPORTANCE OF DISSEMINATION AND EXPLOITATION ACTIVITIES

Dissemination is a significant tool that is used to connect the consortium members, the stakeholders of the related scientific fields, and the general public to the achievements and activities performed within the project. Consequently, by effectively and strategically disseminating the project's results, greater public awareness is created as well as knowledge sharing, transparency and education are promoted. Also, the potential of market uptake and commercial exploitation of the project results is considerably increased.

The European Commission has made communication one of its strategic objectives, fully recognising it as a policy in its own right. Research is an excellent subject for communicating the benefits and added value of European cooperation due to:

- The important role of R&D in building Europe's future as a competitive and sustainable society.
- The fact that public support for scientific research remains high while support for the EU generally has been declining (Eurobarometer, 2016²).

Considering the above, EU-funded activities and projects distinctly contribute to the creation of new jobs, novel technologies and improve the citizens' quality of life. Public interest for research findings and achievements is increasingly growing over time. Moreover, since one of the main financers of such projects is the European taxpayer, a major objective of dissemination and exploitation activities is transparency in terms of the financial resources spent. Thus, it is an obligation to ensure: i) maximum return on the investment, and ii) full openness about actions financed.

Disseminating results and products means looking for maximum exploitation, so that as many potential users as possible can/could benefit from the results of the ICARUS project. For the ICARUS Consortium, proper dissemination of the important research results provides the maximum chance of success and impact. For the target groups, it enables them to be aware and benefit from innovation developed elsewhere, rather than investing a great deal of time and effort in their own innovation projects.

1.3.PRINCIPLES AND KEY OBJECTIVES OF THE ICARUS PLAN FOR THE EXPLOITATION AND DISSEMINATION OF THE PROJECT RESULTS

The core principle in the ICARUS dissemination and communication strategy is to disseminate ICARUS related information in networks of people who are connected through shared objectives and activities. The ICARUS related dissemination activities will aim at four different levels of involvement:

- *Dissemination for awareness* (for the audiences who do not need a detailed knowledge of the work and results, but outcomes of ICARUS could be useful to them): general information about the project.

² http://data.europa.eu/euodp/en/data/dataset/S2130_85_2_STD85_ENG

- *Dissemination for understanding* (directly targeting groups who would benefit from the outcomes of the project and the project itself would benefit from their support and favorability): detailed information about the project.
- *Dissemination for action* ('action' refers to a change of practice resulting from the adoption of results offered by the project. Targeted audiences for this type of dissemination are groups/audiences that are in a position to 'influence' and 'bring about change' within their organisations. These are the groups/audiences that will need to be equipped with the right skills, knowledge and understanding of the work in order to achieve real change): detailed technical information about the project.
- *Dissemination for exploitation*: in an effective, timely and constant manner to: i) the relevant scientific community (e.g. Academic Institutions, Research agencies/establishments), ii) aircrafts' and space industry, iii) policy makers, iv) investors, as well as v) the wider public. Exploitation does not only refer to commercial exploitation but to all types of exploitation that the project's foregrounds may have (e.g. the knowledge advancement incorporated into a university lecture, i.e., this is the way that an academic institution may exploit this foreground).

The following section presents the methodology used for the development of the ICARUS Dissemination Action Plan.

2. ICARUS DISSEMINATION PLAN

2.1.METHODOLOGY

Following are presented the methodological steps followed for the development of the ICARUS Plan for the Exploitation and Dissemination of Results according to the guidelines provided by the EC [[“Guidance Notes on Project Reporting” p. 25](#)].

Step 1 - Conceptual Design of the Plan: The first step towards the development of the ICARUS Plan for the Exploitation and Dissemination of Results involved the identification of the goals and objectives of the ICARUS dissemination and exploitation activities (see [Chapter “1.1.Objectives and Scope of this Deliverable”](#) and [Chapter “1.2.Importance of Dissemination and Exploitation Activities”](#)).

Step 2 - Design of the instrument to be used for the collection of the dissemination and exploitation activities: Following the identification of the objectives of the ICARUS dissemination and exploitation activities, the instrument used for the collection of the dissemination and exploitation activities from the partners was designed. In particular, this step involved the development of the templates to be used for the collection of the input from the partners. The completed templates are presented in the Appendix of this deliverable [[“Guidance Notes on Project Reporting” p. 25](#)].

Step 3 - Detailed Plan Development: After the development of the dissemination and exploitation templates, these were circulated to the ICARUS Consortium for completion with their intended dissemination and exploitation activities. The completion of these templates with the dissemination and exploitation activities is followed by the analysis of the received input and the development of the ICARUS Plan for the Exploitation and Dissemination of Results (see [Chapter 2. ICARUS Dissemination Plan](#) and [Chapter 4. ICARUS Exploitation Plan](#)).

Through the analysis of the received input from the partners, the ICARUS target audiences were identified, which enabled the dissemination manager, the exploitation manager and the ICARUS partners to select the most cost-effective ways to communicate with them. Within the target audience, there are groups of interest which are groups of individuals that have an interest or are going to be affected by the significant research results produced within the ICARUS project. These groups of interest may be within the Scientific Community (higher education, Research), Industry, Civil Society, Policy Makers, Medias, General public, etc. (see [Chapter “2.3.Identifying the Target Audience”](#) and [Chapter “2.4.Defining the Message”](#)).

In addition, through the input received by the partners, the communication measures used for transferring the messages to the target audiences were revealed. The communication measures take many forms and there is an infinite list of possibilities. There exist three main categories of communication measures:

- **Interpersonal communication: Workshops, presentations, demos, etc.**
- **Written communication: Newsletters, bulletins, posters, etc.**

- **Technology-based: Internet, e-mail, voicemail, video conferences, etc.**

All measures have inherent strengths and weaknesses, so it is essential to adopt a combination of all of them in our dissemination strategy in order to take advantage of their strengths and minimize the impact of their weaknesses (see [Chapter “2.5.Using the appropriate tools”](#)).

Step 4: Plan Execution of activities: The phase of execution of activities puts in practice all actions described in the Plan for the Exploitation and Dissemination of Results. The objectives of this phase are:

- **To implement communication activities as defined in the Plan for the Exploitation and Dissemination of Results.**
- **To enable bi-directional communication paths for the channels selected.**
- **To increase visibility about the ICARUS project, its objectives and significant expected results.**

From the beginning of the dissemination phase and with the objective of promoting future exploitation opportunities, all members of the consortium have realized that their role is significant towards contributing to the implementation of activities depending upon their field of expertise and area of influence.

Step 5: Plan Evaluation: This step includes the monitoring, update and evaluation processes of the Dissemination and Exploitation activities throughout the project lifecycle. In particular, the ICARUS Plan for the Exploitation and Dissemination of Results will be constantly monitored in order to ensure that the dissemination and exploitation activities are performed according to the plan. In addition, if deviations occur, the constant monitoring of the plan will enable the dissemination and the exploitation manager to intervene and keep the plan on track (see [Chapter 3. “Summary and Evaluation of the impact achieved from the performed dissemination activities”](#)).

2.2.BUILDING THE ICARUS COMMUNITY

The great strength of the ICARUS Consortium is that its members not only represent their own organization, but the European aerospace community as a whole. In particular, the ICARUS consortium is a fully multidisciplinary team with long experience in materials science, integrating 2 industries specialized in alloys production and 2 industrial end users working for the aerospace value chain (ESA, NASA) interested by the materials technology proposed in ICARUS. Thanks to this empowerment, the ICARUS Consortium is to a wide extent representative of the European Aerospace community as it includes actors from industry, academic research, research establishments, and SMEs. It is worth noting that all ICARUS partners will contribute in populating and maintaining the community thanks to their own established contacts and respective databases and also will further develop and update strategies if necessary in order to support and boost this task. In addition, members of the ICARUS Community are the members of the ICARUS Advisory Board, which is managed in WP 2. Apart from the scientific advice, it will support dissemination and exploitation activities.

In addition, to maximize the reach of the project's results and achievements to the wider European Community, a dedicated network, namely EASN, will be exploited. EASN (European Aeronautics Science Network) is the European Association of academics dealing with Aeronautics-related research. Its main goal is to support the development and dissemination of new knowledge, innovation and breakthrough technologies through fundamental research in Aeronautics. EASN will make available on a royalty-free basis its tools and network peers towards the effective dissemination of the project's results. The network will act as dissemination multiplier for the ICARUS project, diffusing project-related information and knowledge, influencing the aeronautics community, and at the same time attracting new users.

BRIMATECH provides the link to the network of 14 ESA brokers by subcontracting the ESA Broker Network Coordinator Verhaert, who is in close contact not only to the European space industry but also to other important industries in their countries. The ESA Broker Network and its large reach are illustrated in the following figure:



Figure 2: ESA Broker Network

The Management Team of ICARUS has created an international Advisory Board in order to involve directly worldwide experts into the scientific core activity (the theoretical model and discovery approach). Apart from the scientific advice, it will support dissemination and exploitation activities.

2.3. IDENTIFYING THE TARGET AUDIENCE

A crucial challenge was the identification of the preconditions that ensure augmented exploitation, high impact and increased likelihood of uptake of the project's results. The key aspect answering to these needs is to prudently and effectually disseminate and

communicate the appropriate information to the relevant and interested audiences in a concise, well-articulated, understandable and attractively packaged manner. Consequently, the first step towards developing a successful dissemination action plan relies on the identification and classification of the groups which need to be targeted. Based on the concept, objectives and expected impact of the ICARUS project, the following groups of interest have been identified:

- **Scientific community** (e.g. Academic Institutions, Research agencies/establishments): the novelty results of the ICARUS project will open a new horizon in materials design and bring a radically new concept beyond the current state of the art. Dissemination of foreground across the related scientific community will in this sense constitute the basis for further future scientific work, applications and achievement of higher TRL. Also, spreading this knowledge to young scientists will contribute to the preparation of tomorrow's engineers and increase their competence in state-of-the-art research areas and applications;
- **Industrial stakeholders**: this group mainly includes the European aviation and Space industry, i.e., aircraft manufacturers. The efficient communication of the project results to this group will significantly contribute to the future exploitation of the current research, and the advancement and competitiveness of European SMEs and large enterprises;
- **Investors**: an important target group both for the commercialization and/or for the implementation of further research on the project outcomes (e.g. Angel Investors, Peer-To-Peer Lending, Venture Capitalists, Banks, Personal Investors).
- **Technology Transfer organizations** (e.g. ESA Technology Transfer Office, ESA brokers): these types of organizations are very important target audiences towards ensuring the exploitation of the cutting-edge technologies expected to be generated within the project.
- **General public**: it is an obligation to ensure that the European tax payers are informed of the technical and societal impacts of the project's outcomes (i.e. ambitious environmental goals, etc.).

2.4. DEFINING THE MESSAGE

It is worth noting that the dissemination activities planned to take place during the lifetime of the ICARUS project, focus and address the full range of potential end- users and higher-goals, including research, commercial, investment, social, environmental, policy making, setting standards, skills and educational training.

One of the main objectives of the planned dissemination and communication strategy is to communicate the **right information** to the **right people** at the **right time** using the **right language**. In order to approach the ICARUS target groups, it is required to clearly communicate the unsolved scientific problems ICARUS is trying to address and the technological achievements incubated at each stage of the project and how each of the target groups can benefit from those in their current practices. This information is the key message ensuring focused and effective dissemination, which can be seen as an

essential success factor. The key message is of paramount importance to be clear, correct, complete, self-contained and leaves no open questions.

An important aspect is the adaptation of the message to each target group. By recognizing these differences in the early definition of the message phase, a more effective dissemination strategy is applied. The project partners peer-review and check texts for leaflets, press releases and brochures before printing in order to combine the required level of quality and non-specialized technical language where possible.

Based on the concept, objectives and expected impact of the ICARUS project, the following table presents the groups of interest, which have been identified to be addressed as well as the key ICARUS messages that will be delivered to each identified target group.

TARGET AUDIENCE	KEY MESSAGE	COMMUNICATION MEASURES
Scientific community (e.g. Academic Institutions, Research Agencies / establishments)	Dissemination of scientific results and expected benefits on materials design and processing technology of the project foregrounds through publications in highly ranked journals, presentations in conference proceedings, educational material, etc.	Scientific publications in highly ranked journals and conference proceedings, presentations in conferences and workshops, educational material, etc.
Industry (European aviation and space industry)	Dissemination of scientific results and expected benefits on materials design and processing technology of the project foregrounds through publications in highly ranked journals, presentations in conference proceedings, exhibitions, etc.	Scientific publications in highly ranked journals and conference proceedings, presentations in conferences and workshops, attendance in major aeronautics events, trade fairs, etc. Targeted communication to industrial groups and associations and presentation of results in relative industrial fora
Investors	Information related to the innovation focused on : i. the business opportunity, ii. the competing solutions and iii. the core competences of the ICARUS foregrounds compared to competition.	Electronic and web-based outreach tools (project web-site, social media, etc.), newsletters, etc.
Technology Transfer organizations (e.g., ESA Technology Transfer Office, ESA brokers)	Information related to the innovation focused on : i. the business opportunity, ii. the competing solutions and iii. the core competences of the ICARUS foregrounds compared to competition.	Meetings
General public	Information related to the social impact of the project such as the new ambitious environmental goals, job opportunities, etc.	Newspaper, radio, TV, press releases, electronic and web-based outreach tools (project website, social media, etc) interviews, documentary, etc.

Table 1: ICARUS Target groups and key messages to be delivered

2.5. USING THE APPROPRIATE TOOLS

The dissemination strategy increases the likelihood of success when exploring, evaluating and developing a framework of the most appropriate channels and tools of dissemination which are tailored to the different needs of all target audiences. In this context, the dissemination plan includes an efficient and effective mix of both interpersonal and mass communication tools which are briefly presented below.

Electronic and printed dissemination material: the visual identity of the ICARUS project was structured with the aim not only to boost ICARUS recognition but also to develop “eye-catching” and attractive dissemination material for the information presented either internally or externally by the consortium. Within the frame of the project’s dissemination materials the project logo, posters, banners, leaflets, newsletters, deliverable and presentations templates were developed. Printable material with information for different target groups have been provided to all partners to distribute at conference venues, while electronic copies are used in online publications, articles and other references such as local and international press. Additionally, a dedicated dissemination pack will be created at the end of the project in order to be used by all partners in events as an advertising tool for the project’s results. Detailed information regarding the project’s initial communication pack is provided in D6.6 (Project Website and Logo).



Figure 3: ICARUS Leaflet presenting an overview of the project

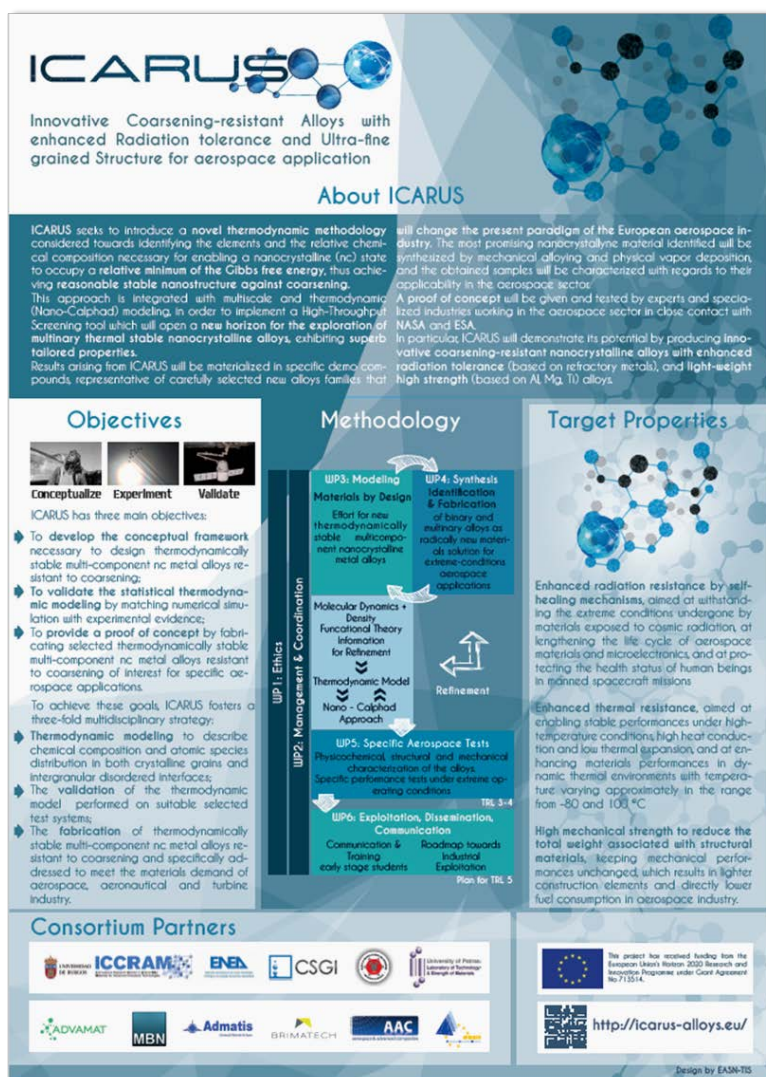


Figure 4: ICARUS Poster presenting an overview of the project



Figure 5: ICARUS official logo

Project website: a dedicated public website has been established since the second month of the ICARUS lifetime operating as the supporting pillar of the project's online image. The visitor is enabled to get informed about the project's objectives, progress and results for different target groups and levels of dissemination (from members-only to public). Special care was taken to present information in a comprehensible way, thus allowing grand access to the general public. The website is an effective way to

continuously disseminate and promote the project's progress, list of publications and publishable reports. The project website also serves as a gateway to a private (password protected) collaboration platform for the consortium partners. The website will be continuously updated during the project lifetime providing a permanent online reference for the project. Also it follows best practices for a search engine optimized website, like the use of the "description" and "title" meta tag, improved URLs structure, easy navigation, images with caption text, etc. In this manner, the website will be easily indexed by search engines (i.e. google) and as a result it will be reachable by a wider audience. EASN-TIS will provide connection between the project website and the EASN portal, the Transport Research and Innovation Portal and the EC communication channels (e.g. CORDIS, Horizon the EU Research and Innovation Magazine, etc.).

The ICARUS website can be accessed through <http://icarus-alloys.eu/>

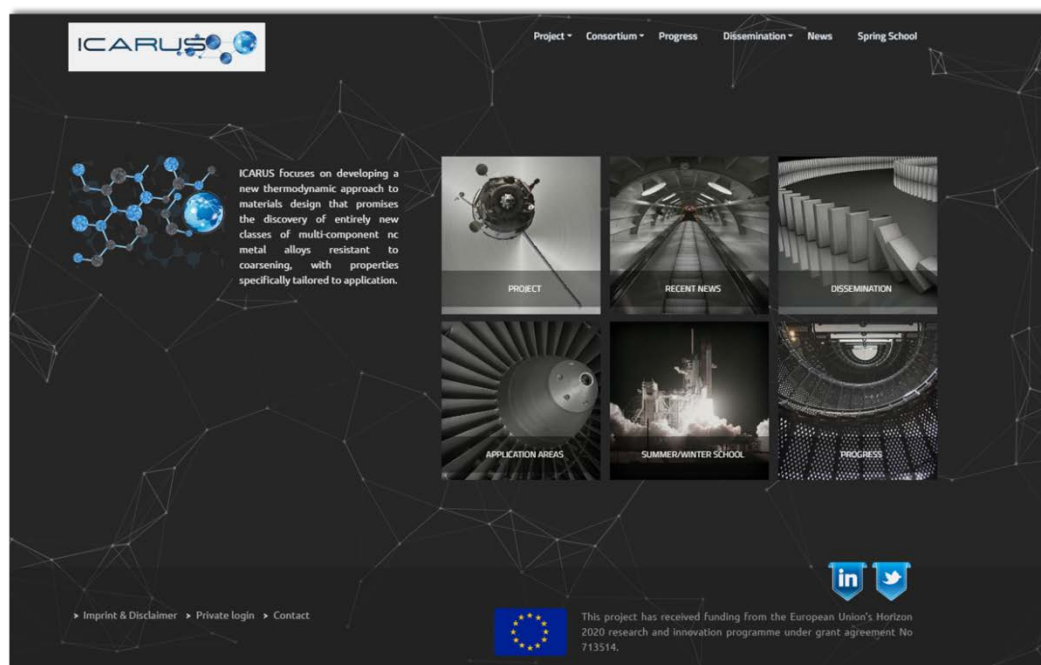


Figure 6: ICARUS public website

Scientific Publications, Regular Press Releases, Newsletters and Other Publications: All partners are responsible for publishing project results in local and international press (press releases in magazines and newspapers, newsletters, etc.) and in EC communication channels (e.g. Horizon the EU Research and Innovation Magazine, research*eu results magazine, research*eu focus, etc.). These publications could also be in the form of papers in scientific journals and conferences, press releases or newsletters in magazines and newspapers, etc. It is worth mentioning that special emphasis will be placed on publishing project-related information in Open Access journals which provide access to scientific information, free of charge. The dissemination manager is responsible for maintaining an overview of all published results. In cooperation with the project

coordinator he will intervene in case of results which have been classified as publishable but do not receive the necessary diffusion. The following table presents a preliminary list of the scientific journals and portals where project's research results are considered to be published.

Scientific journals, magazines and newsletters	Year
Horizon the EU Research and Innovation Magazine	TBD
Research*eu results magazine	TBD
Materials Research Society Publications Journal	TBD
Nature Materials Journal	TBD
Nanoletters Journal	TBD
EASN Newsletter	TBD

Table 2: List of scientific journals and portals where project's research results are considered to be published

Participation in conferences, workshops and events related to materials design, Nanocrystalline, Supermaterials, Nanocrystalline Alloys, Multinary Alloys, Superalloys, Materials Genome is considered essential for obtaining "feedback" on the acceptance of the project results by both academic and industrial communities, and on the economic potential and recommended market-oriented exploitation pathways, the identification of which is considerably important for the ICARUS project. All partners will be responsible for publishing project results in conferences and workshops. In addition, understanding the importance of face-to-face communication and physical trials, EASN will arrange at least one major International Workshop of relevance. Further to that, and if project timing permits, a joint broader International Aeronautical Conference shall be also organized, in order to exploit mass dissemination and outreach for amplifying the consortium's performed work.

The following table presents a list of conferences/workshops which are planned to be attended by the partners for disseminating project related information. Detailed information about these foreseen dissemination activities are included in the PEDR available at the Annex of this deliverable.

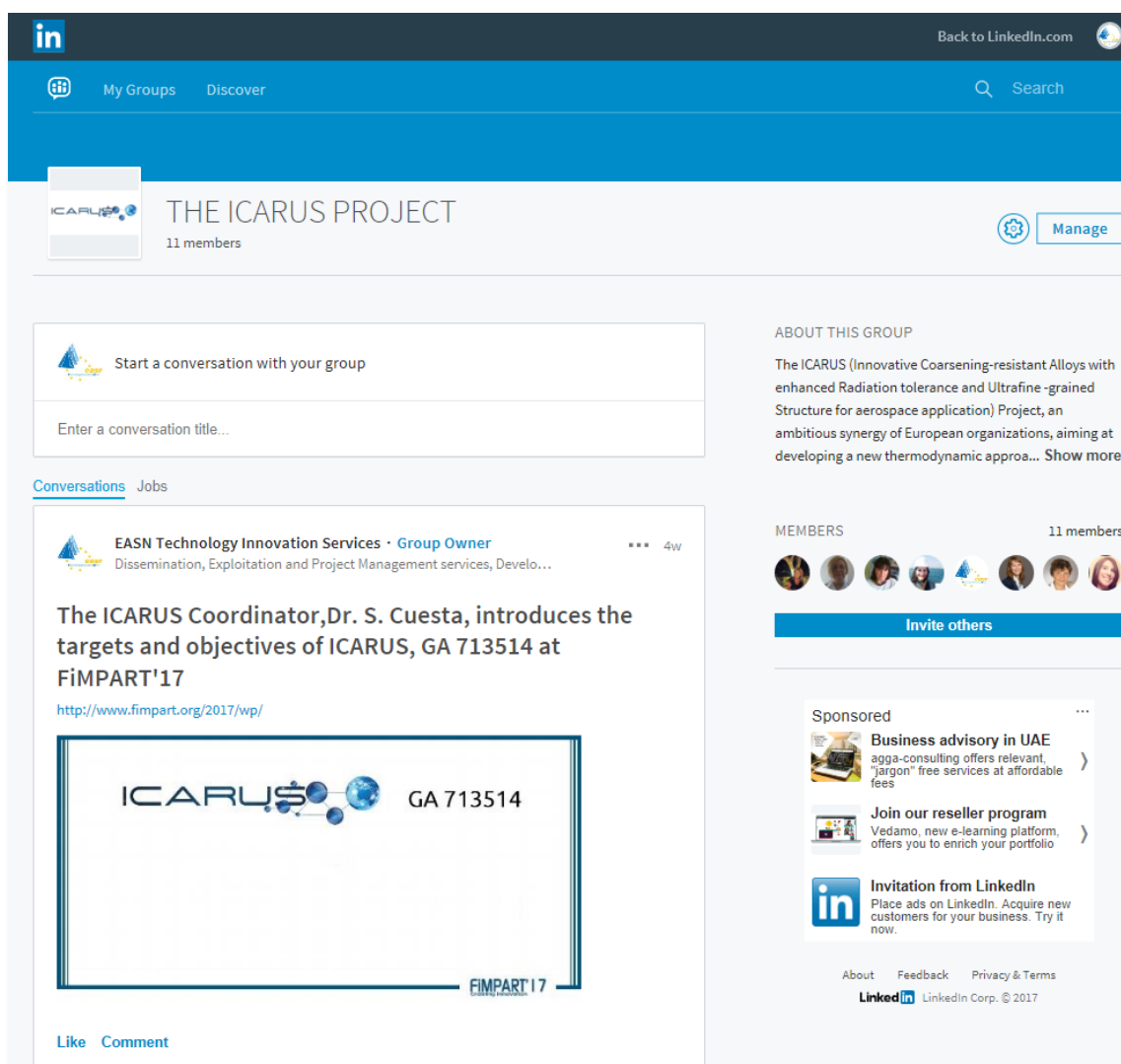
CONFERENCE/WORKSHOP/EXHIBITION	YEAR
ETN European Turbine Network Conference	2017
9th International Conference on Mechanochemistry and Mechanical Alloying (INCOME)	2017
Intelligent Transportation Systems Conference	2017
Euro PM2017 Congress & Exhibition	2017
Euronanoforum, Valetta, Malta	June 2017
EASN International Conference	2017, 2018, 2019
2nd Global Congress & Expo on Materials Science and Nanoscience, Valencia, Spain	25-27 Sept 2017
EUROMAT2017, Thessaloniki, Greece	17-22 Sept 2017
EUROMAT2019, Stockholm, Sweden	2019
LightMAT 2017, Bremen, Germany	8 -10 Nov 2017
Space Engineering and Technology Final Presentation Days, ESA-ESTEC, The Netherlands	21-22 Nov 2017, 2018
ILA Berlin Air Show	2018
European Energy Research Alliance Workshop	2018
Aerodays	To be defined
ESA Industry Space Days	2018
EUCASS, European Conference on Aeronautics and Space Science	2019 (abstracts Nov 2018)

Table 3: List of conferences/workshops/exhibitions which are planned to be attended by ICARUS partners

Social Media: A project-related group has been created in LinkedIn to which the project partners as well as individuals from the targeted audiences have been invited. Project related information is frequently published and the project outcomes will be discussed and promoted. Furthermore, a project-related Twitter account has been created through which 45 “tweets” related to the project progress and news have been posted. At each stage of the project, achieved results will be also published to widen the project’s diffusion. The social media pages can be accessed through the following links:

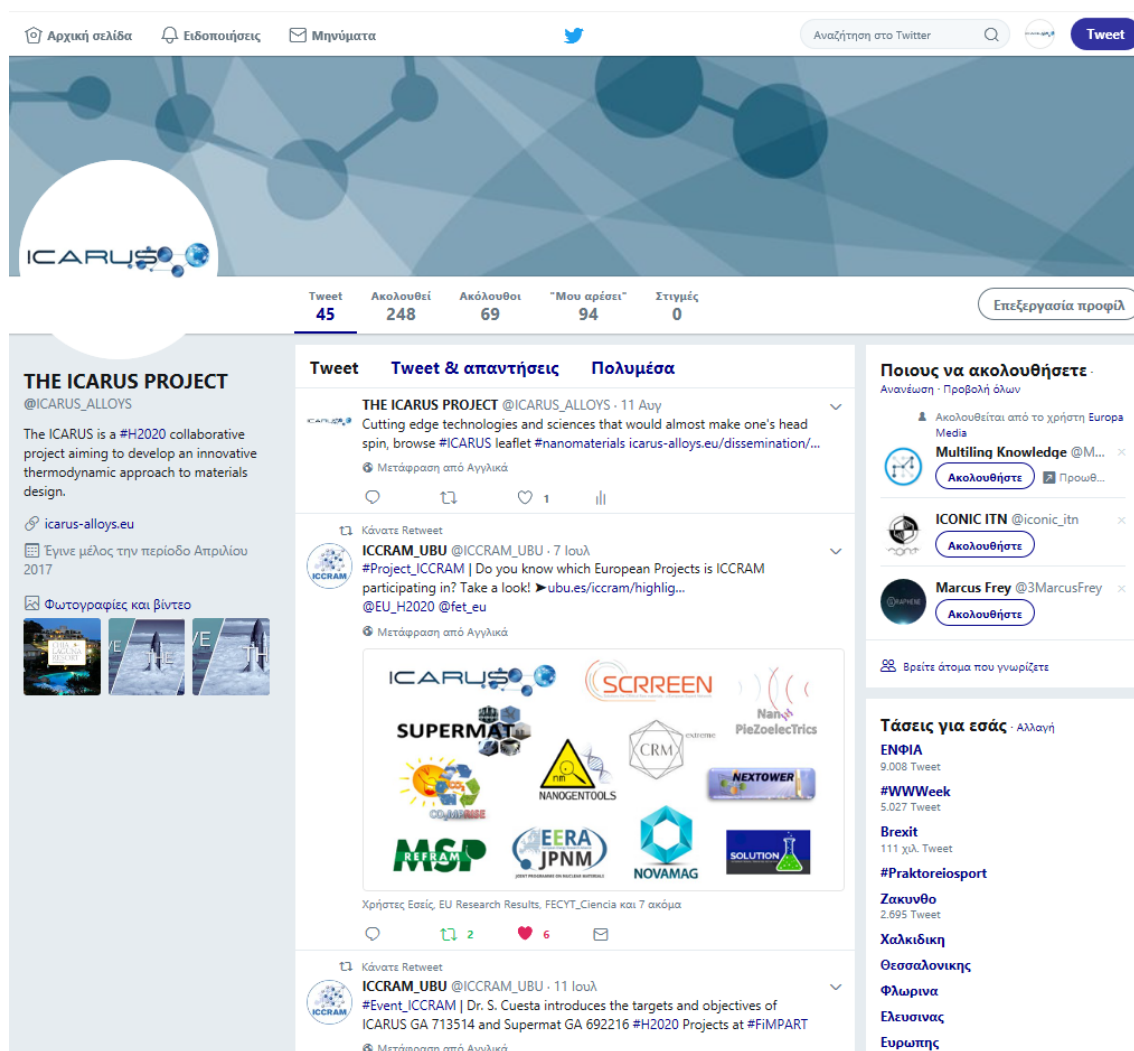
LinkedIn: <https://www.linkedin.com/groups/13523454>

Twitter: https://twitter.com/ICARUS_ALLOYS



The screenshot shows the LinkedIn group page for 'THE ICARUS PROJECT'. The group has 11 members. The page features a header with the LinkedIn logo, navigation links for 'My Groups' and 'Discover', and a search bar. Below the header, the group name 'THE ICARUS PROJECT' is displayed with a 'Manage' button. A section titled 'ABOUT THIS GROUP' describes the project as 'The ICARUS (Innovative Coarsening-resistant Alloys with enhanced Radiation tolerance and Ultrafine-grained Structure for aerospace application) Project, an ambitious synergy of European organizations, aiming at developing a new thermodynamic approach...'. A post by 'EASN Technology Innovation Services · Group Owner' is visible, titled 'The ICARUS Coordinator, Dr. S. Cuesta, introduces the targets and objectives of ICARUS, GA 713514 at FiMPART'17'. The post includes a link to a website and a large image of the ICARUS logo and project number. The right sidebar shows a list of members and sponsored content.

Figure 7: ICARUS LinkedIn group



THE ICARUS PROJECT
@ICARUS_ALLOYS

The ICARUS is a #H2020 collaborative project aiming to develop an innovative thermodynamic approach to materials design.

icar-us-alloys.eu

Εγινε μέλος την περίοδο Απριλίου 2017

Φωτογραφίες και βίντεο

Tweet & απαντήσεις

THE ICARUS PROJECT @ICARUS_ALLOYS · 11 Αυγ
Cutting edge technologies and sciences that would almost make one's head spin, browse #ICARUS leaflet #nanomaterials icarus-alloys.eu/dissemination/...
Μετάφραση από Αγγλικά

Κάνετε Retweet

ICCRAM_UBU @ICCRAM_UBU · 7 Ιουλ
#Project_ICCRAM | Do you know which European Projects is ICCRAM participating in? Take a look! >ubu.es/iccrum/highlig...
@EU_H2020 @fet_eu
Μετάφραση από Αγγλικά

Χρήστες Εοίς, EU Research Results, FECYT_Ciencia και 7 ακόμα

Κάνετε Retweet

ICCRAM_UBU @ICCRAM_UBU · 11 Ιουλ
#Event_ICCRAM | Dr. S. Cuesta introduces the targets and objectives of ICARUS GA 713514 and Supermat GA 692216 #H2020 Projects at #FIMPART
Μετάφραση από Αγγλικά

Ποιους να ακολουθήσετε
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Τάσεις για εσάς · Αλλαγή

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9.008 Tweet

#WWWeek
5.027 Tweet

Brexit
111 χιλ. Tweet

#Praktoreiosport

Ζακυνθο
2.695 Tweet

Χαλκιδική

Θεσσαλονίκης

Φλωρινα

Ελευσινας

Ευρωπης

Figure 8: ICARUS Twitter group

Clustering Activities: synergies with related and parallel projects contributes in dissemination and exploitation opportunities, while at the same time supports exchanging technology novelty and ensuring maximum complementarity.

Within these clustering activities, the ICARUS and the SUPERMAT Consortiums jointly organized the **International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions**. The major event took place at Chia Laguna Resort, in Sardinia, Italy on 15 to 17 May. The main aim of this important experience was to increase awareness with regards to the projects' concept and objectives and to provide students the opportunity to be specifically trained on the cutting edge science and technology intrinsic to the ICARUS and SUPERMAT projects.



Figure 9: Images from the International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions

2.6.EVALUATING THE IMPACT

All project related activities are subject to monitoring and evaluation as part of an on-going quality control process (see [Appendix – ICARUS Plan for the Exploitation and Dissemination of Results](#)). The principal purpose of this process in the case of dissemination activities is to evaluate the success of the dissemination strategy towards achieving the expected impact and maximizing the potential of market uptake and exploitation of the project results and foregrounds. The objective of the performance monitoring of dissemination is to ensure that the project achieves the goals defined in the dissemination action plan.

The performance of the dissemination strategy will be evaluated in terms of the following pre-defined Key Performance Indicators (KPIs), which will be used throughout the project lifetime:

- Number of papers published in international refereed journals.
- Number of papers presented in international conferences/ workshops/ forums (see [Chapter “3.1.1 Participation in conferences”](#)).
- Number of publicity material (articles in press, newsletters, web-based articles, articles in newspapers and magazines) (see [Chapter “3.1.3 Non-scientific and non-peer reviewed publications \(popularised publications\)”](#) and [Chapter “3.1.4 Press Releases”](#)).
- Number of participations in exhibitions and major aeronautics events.
- Type and size of the target audiences addressed through the performed dissemination activities (see [Chapter “3.3. Analysis of the target groups addressed”](#)).
- Geographic coverage of the performed dissemination activities (see [Chapter “3.4. Geographic Coverage of the performed dissemination activities”](#)).
- Record of contacts: The consortium will keep track of contacts at the events and number of people asking for feedback or more information, record the website access and people subscribed to the mailing list, will collect the contacts on the social network and the people involved in the project discussions.
- Website statistics & Search Engine performance: The website will use Google Analytics to monitor the website number of visitors and visitor’s engagement. Other data collected on the project website will be: duration of visits, most visited pages, traffic sources, time spent on the website, referral traffic and geographical distribution of the visits (see [Chapter “3.5 Public Website”](#)).

The analysis and evaluation of the impact achieved are summarized in the following chapter.

3. SUMMARY AND EVALUATION OF THE IMPACT ACHIEVED FROM THE PERFORMED DISSEMINATION ACTIVITIES

3.1. PERFORMED DISSEMINATION ACTIVITIES

A series of activities were already performed while others are planned to be realized at various scientific events across Europe. They aim to present both is to provide an overview of the ICARUS concept and objectives, as well as to emphasize specific processes and achievements realized at this early stage of the project. In the Appendix of this deliverable, an extended list with all the performed and future dissemination activities is included.

3.1.1 Participation in conferences

1. **Gácsi, Z., Kaptay, G., Bárczy, P., Bárczy T. (2017).** Novel materials for aerospace hardware. H-SPACE 2017 Conference, Budapest, Hungary, 9-10 February 2017.
2. **Cuesta López S. (2017).** Innovative Coarsening-resistant Alloys with enhanced Radiation tolerance and Ultrafine –grained Structure for aerospace application, Excellence Square of Nanotechnologies and new materials, Mecspe Exhibition, Parma, Italy, 17-19 March 2017.
3. **Cuesta López S. (2017).** Innovative coarsening-resistant alloys with enhanced radiation tolerance and ultra-fine –grained structure for aerospace application. EuroNanoForum 2017, Valletta, Malta, 21 -23 June 2017.
4. **Jung-Waclik S. (2017).** Flyers training, stakeholder contacts. EuroNanoForum 2017, Valletta, Malta, 21 -23 June 2017.
5. **Cuesta López S. (2017).** On the discovery of new alloys for operation under extreme conditions like severe damage resistance. FiMPART International Conference 2017, Bordeaux, France, 9-12 July 2017.

3.1.2 Presentations in other types of activities

1. Scheerer, M. (2017). "Introduction of new material in space - qualification testing needs". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 15 May 2017.
2. Pantelakis, S. (2017). "Current advances and emerging needs in aeronautical materials: could nanocrystalline alloys offer the desired breakthrough?" International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 15 May 2017.
3. Barczy, T. (2017). "Space engineering – process of satellite hardware development". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 15 May 2017.
4. Barczy, P. (2017). "Material developments for space applications". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 15 May 2017.
5. Polcar, T. (2017). "Toward frictionless engineering surface". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.

6. Rinaldi A. (2017). "Advanced Ceramics for Energy and Nanomechanical Methods for in-situ characterization and residual stress estimate". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
7. Cabbibo M. (2017). "Potentials and limits of novel severe plastic deformation techniques applied to metallic materials". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
8. Mascia, M., Vacca, A. (2017). "Corrosion tests for metals and alloys". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
9. Garroni S. (2017). "High-Energy Ball Milling: a powerful technique for the synthesis of new alloys and nanostructured materials". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
10. Cuesta-López, S. (2017). "General introduction to circular economy, efficiency of resources and sustainability of Advanced Materials". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
11. Romero, L. (2017). "Methods and importance of assessing the safety and environmental compatibility of new materials. International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
12. Kurz, A. (2017). "From Impact to Business: Fundamentals of understanding 'Impact' in the H2020 context". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 16 May 2017.
13. Tserpes, K. (2017). "Multiscale modelling of multifunctional nanocomposites: Identification of parameters influencing the mechanical, electrical and thermal properties". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 17 May 2017.
14. Kaptay, G. (2017). "Application of the nano-Calphad method to select stable binary nano-grained alloys". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 17 May 2017.
15. Cuesta-López, S. (2017). "Multiscale modelling as a successful tool for exploring forefront materials under extreme conditions". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 17 May 2017.
16. Locci, A. (2017). "Thermodynamical model for the discovery of stable nc alloys". International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions, Sardinia, Italy, 17 May 2017.

3.1.3 Non-scientific and non-peer reviewed publications (popularised publications)

1. Chamos, A., Drimala, C. (EASN-TIS), 2017. The ICARUS Project (Newsletter),



EASN Newsletter, January 2017¹.

2. **Jung-Waclik S. (BRIMATECH), 2017.** ICARUS Project presentation and overview in ESA SPACE SOLUTION Facebook Page and Linkedin Group, Social Media Campaign, February 2017. <https://www.linkedin.com/company/esa-technology-transfer-programme-office>, <https://www.facebook.com/ESAspacesolutions/>

3. **Polcar, T. (ADVAMAT), 2017.** ICARUS Project overview. MM Průmyslové spektrum Journal, 12 April 2017 <http://www.mmspektrum.com/clanek/material-sveti-prostredky.html>

4. **Chamos, A., Drimala, C. (EASN-TIS), 2017.** The ICARUS Project (Newsletter), EASN Newsletter, April 2017².

¹ <http://www.easn.net/newsletters/issues/easn-newsletter-january-2017>

² <http://www.easn.net/newsletters/issues/easn-newsletter-april-2017>

3.1.4 Press Releases

1. **ICCRAM-UBU.** Premio de innovación en materiales y a la mejor divulgación científica. El Correo de Burgos (local newspaper), 3 April 2017.

2. **Polcar, T. (2017)** ICARUS Project overview: New Alloys. March 2017, <https://www.novinky.cz/veda-skoly/430917-vedci-z-cvut-budou-vyvijet-slitiny-pro-letectvi-kosmonautiku-i-jaderny-prumysl.html>

3.1.5 Films, Videos, TV

1. **ICCRAM-UBU.** ICCRAM will coordinate the FET-OPEN project ICARUS. 28 July 2016 (Spanish Version) and 18 December 2016 (English Version). <https://www.youtube.com/watch?v=WxowJ7vKjzY>, <https://www.youtube.com/watch?v=oFDVnyoN5aM>

2. **ICCRAM-UBU.** H2020 - FETOPEN - 2014-2015 - ICARUS - GA – 713514. 10 March 2017. <https://www.youtube.com/watch?v=FcpdVZHuoAY>

3. **ICCRAM-UBU.** Presentation of EU-H2020-FET-OPEN ICARUS GA713514 - Onda Cero Burgos. 22 March 2017. https://www.youtube.com/watch?v=tvpcIf8TOP4&index=1&list=PLc88uGJ1RIFWkual7Ndd_EroNtBhJm_5b

4. **ICCRAM-UBU.** ICARUS & SUPERMAT Spring School Highlights. 30 May 2017, <http://icarus-alloys.eu/spring-school/video-material>

3.2. ANALYSIS OF THE TYPES OF THE PERFORMED ACTIVITIES

A graphical illustration of the project's dissemination and communication activities



realized during the past twelve months (M1-M12) is presented in **Figure 10**. The classification of these activities implies the consortium's focus and target audiences, while it also reflects the actions taken towards the realization of the objectives of this period.

As we can observe during this first phase the successful participation in the ICARUS and SUPERMAT Spring School of the ICARUS partners was the major dissemination event of the project accounting to 45.94% of the performed dissemination activities. Also a campaign (public website, communication campaign in radio, TV) was executed in order to create and increase public awareness of the ICARUS concept, objectives and expected impact accounting in total 13.50 % for the of the overall actions realized. Additionally, a series of presentations of the ICARUS project took place at conferences (H-SPACE, EuroNanoForum, Mecspe) resulting in total for the 13.51% of the project's actions. While newsletter entries (10.81%) and press releases (5.40%) have been pursued with the aim to reach industrial stakeholders and end users. Finally, several ICARUS' related videos have been published including interviews from the partners (10.81%).

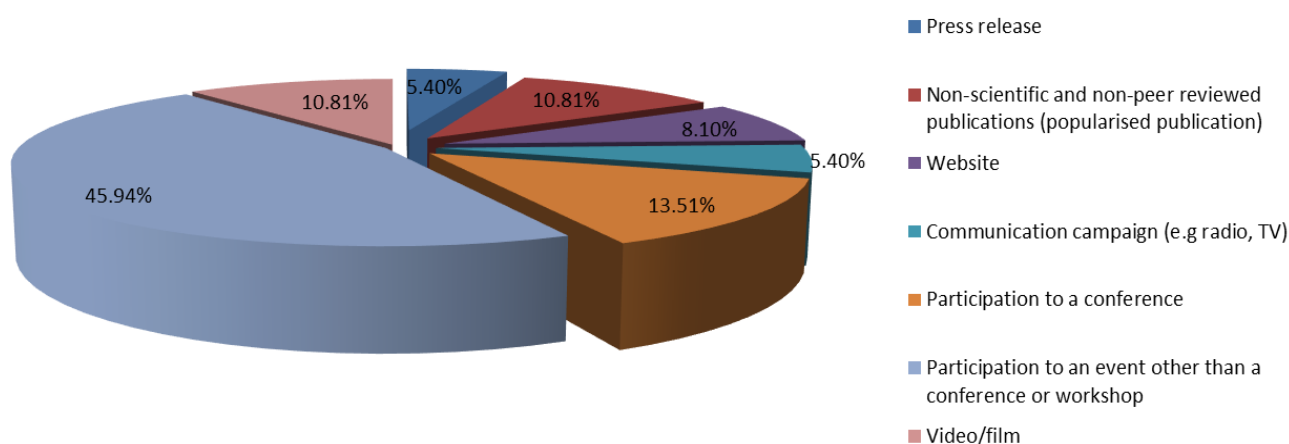


Figure 10: Distribution of ICARUS dissemination activities per type (M1-M12)

3.3.ANALYSIS OF THE TARGET GROUPS ADDRESSED

During the first year of the ICARUS lifetime, the following target groups were addressed and reached:

1. Scientific and technical presentations took place at events mainly addressing researchers, industry representatives and academics.
2. Project updates at the EASN newsletter addressed researchers, industry representatives, academics, policy makers, etc.
3. Exhibitions were mainly addressed to industrial representatives and researchers
4. The public website, social media, communication campaigns, press releases and popularized publications formed a communication passage to the general public.

An estimation of the target groups approached is illustrated in the **Figure 11**. The majority of the actions were targeted towards the scientific community (91.4%). This enhances the dissemination of the project's scientific impact, contributes to the knowledge sharing and innovation acceleration, and marks the lines for further research activities. The engagement of the industry (45.71%) and policy makers (22.86%) is also of high importance to the project partners, as the interaction with policy makers, investors (22.86%) and customers (20%) can provide valuable feedback, as well as exploitation opportunities. Increased public awareness (82.86%)³ about the project promotes knowledge sharing, transparency and education.

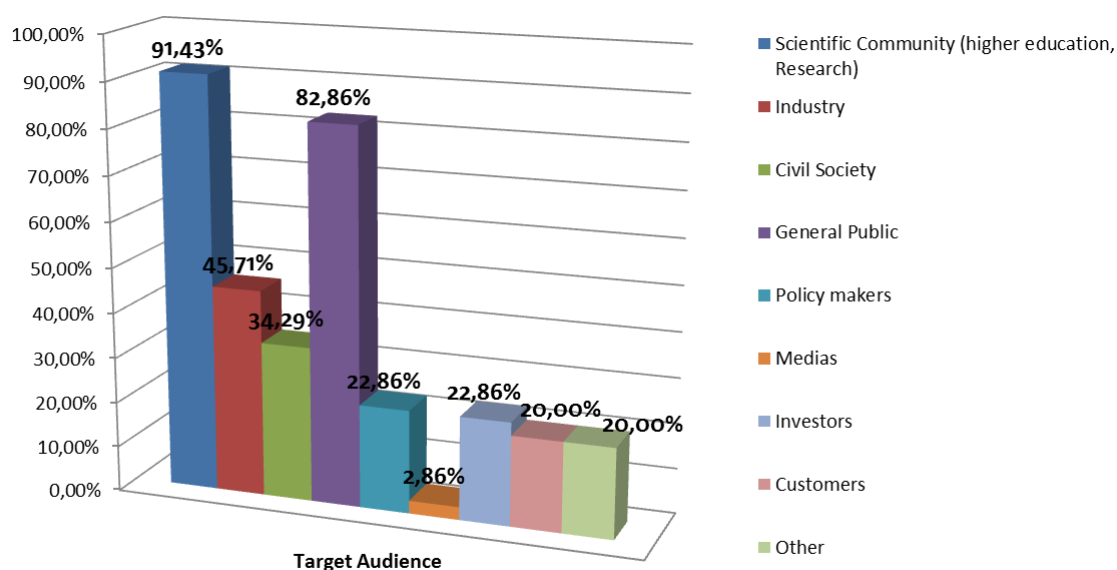


Figure 11: Target groups reached through the dissemination activities realized (M1-M12)

3.4.GEOGRAPHIC COVERAGE OF THE PERFORMED DISSEMINATION ACTIVITIES

A wide geographical impact maximizes the opportunities for new collaborations and exploitation of the project results, while it also enhances the profile of each partner individually, of the consortium as a whole, and of the European scientific profile.

Figure 12 below depicts in detail the places where ICARUS has been disseminated during its first year of development.

³ Based on the input received from the partners regarding the type of target audience addressed through each performed dissemination activity, the percentage of the performed dissemination activities that addressed a specific target audience was estimated. For example, if all performed dissemination activities were targeting the scientific community, then the outcome would be that 100% of the performed dissemination activities targeted the scientific community.



Figure 12: Geographic Coverage of the performed dissemination activities

As seen in the **Figure 13** below, ICARUS has managed to generate a strong international impact with followers in Europe and the USA. More specifically, the majority of the ICARUS website visitors currently appear to come from the following countries:










Country	Sessions	% Sessions
1.  Greece	828	32.37%
2.  Spain	375	14.66%
3.  Italy	281	10.99%
4.  Russia	176	6.88%
5.  United States	134	5.24%
6.  Austria	101	3.95%
7.  United Kingdom	100	3.91%
8.  Hungary	98	3.83%
9.  France	71	2.78%
10.  Czechia	64	2.50%

Figure 13: Top ten countries – origins of ICARUS website visitors (M2 – M12)

3.5.PUBLIC WEBSITE

Google Analytics (<https://www.google.com/analytics/>) is a tool allowing us to monitor and study the popularity of the project website, in order to evaluate how effectively the website works towards the dissemination of the project. However, Google Analytics also provides an insight on other activities realized, and how these may have contributed at shaping users' behavior.

The figure below presents an overview of the ICARUS website users across the period November 2016 - August 2017 (the ICARUS website was launched in the end of October 2016). Following the overview of the activities realized during these months, as this was provided in the previous section, we could use the following figure towards comprehending the impact achieved. According to the data acquired for the first months of the project, we observe that the number of website visitors from M6 to M9 was constantly increasing due to the increased outreach activities that took place during that period for raising awareness about the project and its expected results.

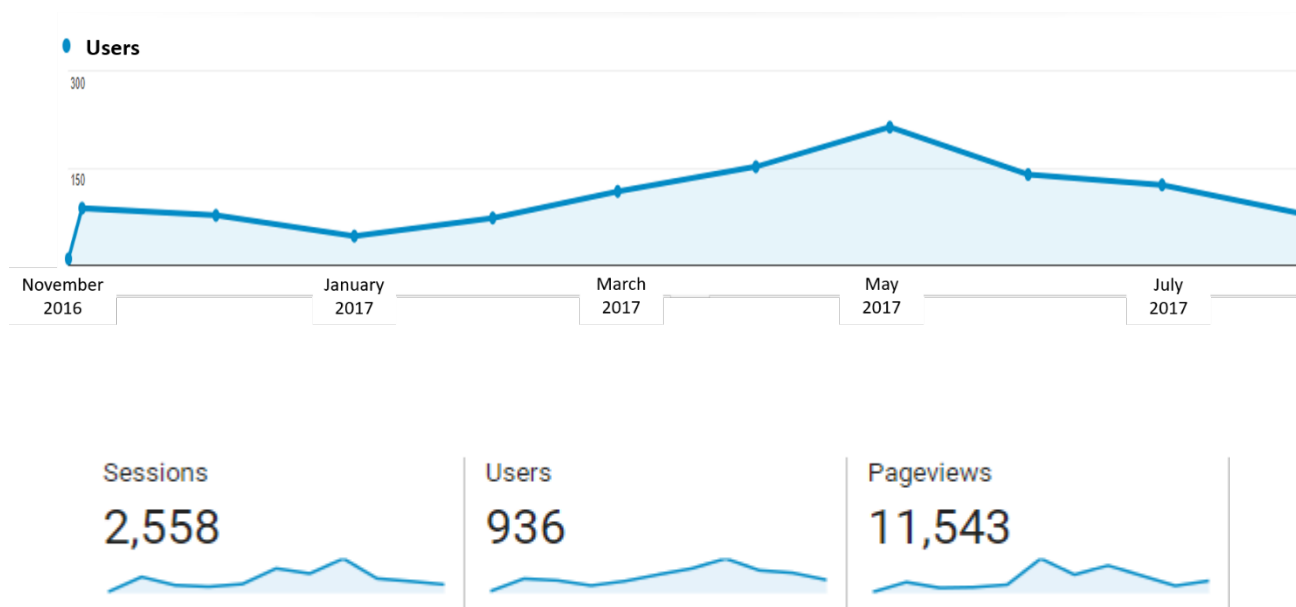


Figure 14: ICARUS public website users' overview per month (total number of users 936)

These are rather positive indications of the impact achieved through the project's outreach activities, as the website visitors reflect the behaviour of multiple audiences such as recipients of newsletters, attendants of scientific fora, readers of scientific publications and press releases, social media users, website users performing organic search upon specific criteria (keywords), etc. By taking into account the dissemination activities realized during this period, we may have a rough interpretation of the website traffic which does not confidently points to the reason why the website users are increasing / decreasing, however, we could consider some significant findings or repeated patterns towards drawing conclusions. For example, we can easily observe that after the presentation of the ICARUS concept, objectives and expected results at

the winter issue of the EASN newsletter (January), the ESA social media campaign by Brimatech (January, February), EASN Association Portal (February), Mecspe Exhibition (March) and spring issue of the EASN newsletter (April) the numbers of visitors have an upward course. Additionally we should highlight that the month that coincided with the organization of the *International Spring School on Forefront Alloys and Advanced Materials for Extreme Conditions* by the ICARUS and SUPERMAT projects on 15 to 17 May, in Sardinia (Italy) presented peaks in the overall traffic.

It is therefore recommended that these are effective dissemination activities which target users relevant to ICARUS and manage to engage them towards visiting the project website for more information. It appears that face-to-face presentations at events significantly contribute to the engagement of users, which are then prompted to seek for more information on the project through its website. This reasonably suggests that: i) the selection of the targeted audience is a very important phase of the dissemination lifecycle of the project, ii) high-impact events extend their high impact on the project and iii) multiple presentations provide a very strong overall appearance. Furthermore, the referencing of the ICARUS website at the partners' organizational websites directly increases the visibility of the project by introducing it to potential customers with pre-defined needs.

4. ICARUS EXPLOITATION PLAN

Research and innovation have been placed at the centre of the Europe 2020 strategy to promote smart, sustainable and inclusive growth. While one can debate what constitutes a healthy relation of industry and basic research, there is no doubt that a knowledge based society prospers with the innovativeness of its engineers and the skills of its scientists. It is emphasized that “research is an investment in our future and so put it at the heart of the EU’s blueprint for smart, sustainable and inclusive growth and jobs” (EC, 2011). In the Horizon 2020 funding program, EC puts a focus on closely linking basic research and application, and applied research with industry, SMEs and start-ups. Various funding schemes are offered and competition in these calls is ever increasing. Thus it is pivotal for consortia to clearly describe the impact of their research and to plan activities fostering the further use of project results (Kurz & Jung-Waclik, 2017).

Impact in this context is the extent of the benefits derived from the innovation (Scherer, 2014). A distinction is made between economic impact, academic impact, societal impact and the impact on environment (Alho & Haataja, 2015). While academic impact can be addressed by suitable dissemination and communication activities, economic impact requires exploitation measures. All exploitation-related approaches and activities need to be described in a **Plan for the Exploitation and Dissemination of Results**. It is a document which “**summarises the beneficiaries’ strategy and concrete actions related to the protection, dissemination and exploitation of the project results**” (European IPR Helpdesk, 2015/1). Initially part of the proposal, it must be refined and compared to actual activities throughout the project.

The **exploitation strategy** defines application segments of the innovation, economic size of the target markets and their geographic coverage. It identifies potential users and stakeholders and sets objectives for addressing and involving them in the project. It compares their needs to the kind of problem the proposed solution solves and outlines why this solution is better than existing ones in terms of benefits to users and the society at large. It talks about the knowledge (IPR) the project will generate compared to the state of the art or what is commercially available today. Finally, at the end of the project, it shall be clear which further actions shall be taken both in terms of scientific and commercial follow up. Options range from further internal research, collaborative research, internal product development, internal service creation, licensing, assignment, joint venture, to creating a spin-off, or supporting standardization activities (European IPR Helpdesk, 2015/2).

The exploitation strategy will be mainly addressed in Deliverable 6.4, “Impact areas and Exploitation Plan”. The following subchapters address the exploitation plan (summary of the strategy and concrete actions related to the exploitation of the project results).

4.1. OBJECTIVES OF EXPLOITATION

Overall objectives of the exploitation task are fostering exploitation by ensuring contacts to stakeholders, collecting needs & requirements, identifying challenges for implementation, summarizing impact, and to developing the exploitation plan and the exploitation strategy.

The objective of this deliverable is to provide an overview of the methodological approach for the development of the exploitation strategy throughout the project and to summarize the first exploitation activities that have taken place so far.

4.2. METHODOLOGY

Important exploitation approaches and tools typically evolve from proposal to the end of the project and often comprise (Kurz & Jung-Waclik, 2017):

- A **target outcomes table** describes the features of the method / material / product / service that are the outcome of the project. Performance indicators can be physical values, chemical/mechanical properties, efficiency measures, environmental savings and the like. Throughout the project the comparison to the state of the art or to commercial solutions shall be further refined and target values can be compared to validated results (see chapter 4.3.1 “The ICARUS (Target) Outcome Table”).
- **Application Fields** shall be selected based on the above performance indicators. Selection criteria need to be disclosed and discussed. It may be recommendable to focus on two or three application areas and do a rather detailed analysis there (see chapter 4.3.2 “Application Fields”).
- A **Stakeholder Matrix** has become the standard tool for giving a comprehensive picture of the community of researchers, potential users, buyers and influencers in an application field. On top, this information is the basis for defining target groups in dissemination and communication planning (see chapter 4.3.3 “Stakeholders”).
- A **Needs and Requirements Table** is considered useful for linking stakeholders, use cases, and benefits. Often use cases are an adequate starting point for interaction with potential users. For the project it is often critical to get this information early to fine-tune development goals, performance and validation activities, as well as to base project communication on real life scenarios and benefits (see chapter 4.3.4 “Needs analysis”).
- Depending on the TRL of the project outcome and the exploitation strategy chosen, further concepts may seem appropriate, in particular when establishing a start-up is an option. Positioning the organization in the **Value Chain**, critically reviewing resources and outlook in a **SWOT analysis** and first **Business Model** considerations will serve as a basis for taking informed decisions. This will be part of the deliverable [D 6.4].

The **ICARUS strategic exploitation plan and strategy** continuously evolves throughout the project, based on the following selected steps:

1. Identification of the ICARUS exploitation target groups (from among the dissemination target groups) (see chapter 4.3.3 “Stakeholders”).
2. Needs analysis per target sector (see chapter 4.3.4 “Needs analysis”).
3. Summary of project outcomes / IP generated (see chapter 4.3.1 “The ICARUS (Target) Outcome Table”).
4. Task technology fit: needs covered / gaps remaining (ICARUS perspective), (tbd in [D 6.4]).
5. Validation and feedback by target groups (outside perspective, incl. IAB), (tbd in [D 6.4]).
6. Plan for the exploitation after ICARUS: funding schemes, other application areas, collaboration with other projects, joint commercialization in a start-up, (see chapter 4.4 “Plan for the exploitation after ICARUS (Future Roadmap)”) and tbd in [D 6.4].

In order to gather content for the ICARUS exploitation strategy and the related exploitation tools, information needs to be collected from various stakeholder groups and via different methodological approaches. The main activities for the development of the exploitation strategy comprise:

- Interviews with different stakeholder groups in person or via phone/internet.
- Organization of and participation in exploitation-related workshops.
- Organization of and participation in exploitation-related trainings.
- Attending conferences.
- Supporting activities related to the further Use of IP generated in ICARUS.
- Identification of further research areas and promising industry sectors.

The International Project Advisory Board, ESA TTPO, brokers and project partners help establish contacts to experts and stakeholders.

The annual exploitation plan is the summary of the exploitation activities undertaken each year to finally result in the future roadmap for the exploitable ICARUS results. The annual exploitation plan is part of the “Plan for Exploitation and Dissemination of Results” (PEDR), which is displayed in the Annex (based on EC, 2012 p.25ff). Exploitation-related aspects are collected in section B of the PEDR and comprise the following:

- Patents, Trademarks, etc.: applications for patents, trademarks, registered designs, etc. on behalf of the project partners.
- Exploitable Foreground: results created within the project.
- Exploitation Activities: see main exploitation activities above (interviews, workshops, trainings, conferences, etc.).

Due to the low TRL of the ICARUS project and the early phase of the project at the moment of the production of this deliverable, exploitation-related information collected is not sufficient to provide a detailed view on target outcome, stakeholders, application fields and user needs. Nevertheless, the following chapters summarize first results and activities related to exploitation.

4.3. TOOLS FOR AND APPROACHES TO EXPLOITATION

4.3.1. THE ICARUS (TARGET) OUTCOME TABLE

The (target) outcome table describes the features of the method / model / simulation software / material / coating / process / product / service that are the (intended) outcome of ICARUS. Characteristics can be for instance for tangible results (material, coating): Technology Readiness Level (TRL), composition of alloy, grain size, stability measures, amount available.

Key Performance Indicators (KPI) can be e.g. (target) mechanical properties, thermodynamic properties, processing requirements, efficiency measures, environmental benefits and other benefits as compared to the state of the art. Wherever possible, quantifiable targets shall be given. It shall be indicated which material the outcome is comparable to / superior to. Throughout the project this comparison to existing scientific findings or to commercial solutions shall be further refined and target values can be compared to validated results, thus turning the target outcomes table into an outcomes table.

	Outcome 1: nc Material	Outcome 2: nc Coating	Outcome n: nc Processing Technology
TRL			
Characteristics (examples)	<ul style="list-style-type: none"> • composition of alloy • grain size • stability measure <ul style="list-style-type: none"> • amount available 	<ul style="list-style-type: none"> • composition of alloy • grain size • stability measure • thickness of coating • material(s) coated 	<ul style="list-style-type: none"> • confidential? IP!
KPI (examples)	<ul style="list-style-type: none"> • mechanical properties, • thermodynamic properties, • processing requirements, • efficiency measures, • environmental benefits 	<ul style="list-style-type: none"> • mechanical properties, • thermodynamic properties, • processing requirements, • efficiency measures, • environmental benefits 	<ul style="list-style-type: none"> • processing requirements, • efficiency measures, • environmental benefits
Comparison	<ul style="list-style-type: none"> • comparable material and KPI 	comparable coating and KPI	comparable process and KPI
Application domain /	<ul style="list-style-type: none"> • Aeronautics / engine • Aeronautics / structural part 		

application (examples)	<ul style="list-style-type: none"> • Space / launcher • Space / satellite • Energy / nuclear • Medical / prothesis 		
Comments			
Demonstration (further tests planned)			

Table 4: Target Outcomes Table

Primarily the content of the (target) outcomes table will come from the ICARUS partners and shall be compared to needs and requirements of potential users and stakeholders. Adaptations of what is considered a KPI will be made according to stakeholder expectations.

4.3.2. APPLICATION FIELDS

The main application fields for ICARUS are defined in the proposal [GA]: “While the alloys developed in ICARUS and the method to design them will have a broad application spectrum, the project team decided to concentrate on the needs and requirements in two areas, namely aeronautics and space:

- In the space exploration and satellite sector ICARUS will address space materials and processes qualifications driven by high reliability, performance and harsh space environment (radiation, temperature etc.). This is combined with limited availability of raw materials and low volumes in terms of units, yet with sometimes very complex manufacturing processes. ICARUS has the potential to contribute solutions to the present challenges of space industry translated in needs of materials as summarized in Figure 15: Space Challenges and related Needs (see [GA]).
- In the Aeronautics sector, the high level drivers set out by the Advisory Council for Aviation Research and Innovation in Europe (ACARE) lead to materials technology requirements related to reduction in mass, increased temperature capabilities, and reduced cost through the use of new materials with low density, mechanical properties unaffected by high temperatures and simpler production and maintenance processes, so as to be used in primary and secondary structures, cabin elements and engine structures.

ICARUS will strongly impact the aerospace sector providing a new methodology for exploring and tailoring properties “a la carte” for new families of super alloys.

Additional potential application fields largely depend on project outcomes and may include:

- Bionanomaterials for Medical Applications.
- Materials for Nuclear Energy Generation.

4.3.3. STAKEHOLDERS

The ICARUS dissemination target groups are described in chapter 2.3 “Identifying the Target Audience” (see *Table 1: **ICARUS Target groups and key messages to be delivered***). Within both application fields (space and aviation), the exploitation target groups, a subset of the dissemination target groups, will be continuously specified in greater detail during the project, with the following table as a guiding framework for the identification process:

TARGET GROUP	KEY QUESTIONS	EXPLOITATION MEASURES
<p>Scientific community (e.g. Academic Institutions, Research Agencies / establishments)</p>	<p>Who might be interested in the ICARUS outcomes?</p> <ul style="list-style-type: none"> Which academic or applied research centers should one cooperate with? Interest in industry: e.g. Suppliers of special metals? Special processing shops for part manufacturing and coatings? How can engineering companies be involved? Are there any special tools or equipment required for processing? <p>Space:</p> <ul style="list-style-type: none"> Who defines missions? Who selects processing technologies and materials in the missions? Who conducts research on new materials for space? Who does the testing? <p>Aeronautics:</p> <ul style="list-style-type: none"> Which parts should be the first that could use the new material? Which aircraft type? What are the testing and certification requirements? Which airframe manufacturer, which Tier 1 Supplier, Tier 2 Supplier, Tier 3 Supplier? <p>Raw material suppliers / stockists</p> <ul style="list-style-type: none"> Is the material readily available? Is it a critical material? Is it affected by restrictions? 	<p>Interviews, workshops, IAB</p>
<p>Industry (European aviation and space industry)</p>	<p>Who invests in space and aviation surface materials design, coatings and processing technology?</p> <p>Who are the main industry players in the selected industries?</p> <p>What are the challenges needs & requirements from an investment perspective for the ICARUS target outcomes?</p>	<p>Interviews, workshops</p>
<p>Investors</p>	<p>Who invests in space and aviation surface materials design, coatings and processing technology?</p> <p>Who are the main industry players in the selected industries?</p> <p>What are the challenges needs & requirements from an investment perspective for the ICARUS target outcomes?</p>	<p>Interviews, workshops</p>

Technology Transfer organizations, Clusters, Associations	<ul style="list-style-type: none"> • What are potential business opportunities? • What are competing solutions? • What are the core competences of the ICARUS foregrounds compared to competition? 	IAB
Certification Bodies, Standardisation Bodies, International and National Authorities	<ul style="list-style-type: none"> • Is the material affected by trade restrictions? • Dual Use legislation? • REACH directive? 	IAB, interviews

Geographical focus lies on Europe. Nevertheless, important international players are considered as well.

The following table provides a first overview of relevant stakeholders in the space sector, taking Austria as an example:

EXPLOITATION TARGET GROUP	DESCRIPTION	NAME OF THE ORGANISATION	GEOGRAPHICAL AREA
Scientific community (Research)	Academic Institutions, Research Agencies / establishments	Material & Processes Research (spacetechnology.at): Carinthian Tech Research CTR, Graz University of Technology, Montanuniversität Leoben, ofi, ÖGI, Seibresdorf Laboratories, University of Applied Sciences Wr. Neustadt, University of Innsbruck, Vienna University of Technology	Austria
Industry: European aviation and space industry, SMEs & Startups	Industrial Materials producer	Material & Processes Production (spacetechnology.at): Alpex Technologies, Andritz, Böhler Edelstahl, Böhler Schmiedetechnik, Electrovac, eoVision, Fuchshofer, HES, Langzauner, LuftBlick, Magna Steyr, MSW, Orlik, Pichler & Strobl, Rejlek Metal & Plastics Group, RHP, RUAG Space, Rübig)	Austria
Investors	VC, Business Angels, Incubators, Accelerators	ESA Business Incubation Centers (ESA BICs)	Europe, Austria,...
		Frequentis Startup Center	Austria

EXPLOITATION TARGET GROUP	DESCRIPTION	NAME OF THE ORGANISATION	GEOGRAPHICAL AREA
Technology Transfer organizations, Clusters, Associations	Technology Transfer	ESA Technology Transfer Office	Europe
	Technology Transfer	ESA broker network (14 national broker)	Europe, Austria,...
	Clusters	Austrospace	Austria
	Associations	Materials Genome Initiative	US
Certification Bodies, Standardisation Bodies, International and National Authorities	EC, NCP, ESA	ESA Materials Department, European Space Policy Institute (ESPI), Austria NCP: Austrian Research Promotion Agency	Europe, Austria,...
Other Governmental / Public Institutions		International Astronautical Federation (IAF), Committee on Space Research (COSPAR)	Europe
		Office for Outer Space Affairs of the United Nations in Vienna, International Space Science Institute (ISSI)	International

Table 5: ICARUS exploitation target groups

This table is to be extended to other European countries. The further the project evolves and results become more explicit, stakeholders and potential users will be described in more detail and tailored to the ICARUS project results.

4.3.4. NEEDS ANALYSIS

In order to foster exploitation, BRIMATECH and EASN TIS collect input on needs and requirements of aeronautics and space industry that might be covered by the groups of alloys developed. Focus is not only on the material but also on processing technology. Furthermore, the applicability of new production and design concepts is addressed in the analysis.

This chapter describes in greater detail the methodology applied to analyse challenges, needs and requirements faced by the ICARUS target groups in the aviation and space sector.

The “Needs analysis” for the ICARUS materials and processing technology focuses on the following aspects:

- Situation:
 - What are the specific characteristics of the ICARUS alloys?
 - What are relevant characteristics of comparable alloys?

- What are the needs and requirements from a user / different stakeholders' perspective?
- **Problems:**
 - What are problems and potential barriers for implementing new groups of alloys?
 - What are the limitations of the ICARUS alloys?
 - What are the limitations of other competitive solutions?
- **Implications:**
 - What are the main implications?
 - What is the remaining gap between the characteristics of the ICARUS results, the needs of potential users (technology fit: needs covered / gaps remaining)?
- **Needs:**
 - What needs to be done in order to overcome the limitations identified?
 - What is the economic, social, environmental and legal impact of the ICARUS solution?
 - What are important follow-up research projects and exploitation paths for the IP generated in ICARUS?
 - What are potential further exploitation options (depending on the material specifications) in other sectors (e.g. medicine, oil and gas, (petro)chemical, processing industry, etc.)?

The methodological approach for the “Needs analysis” includes the summary of the assumptions made in the proposal and the analysis of roadmaps (SRIA, ESA). Furthermore, input is collected in expert interviews and small workshops:

- **For aeronautics**, EASN TIS follows a top-down approach: activities are based on the ACARE SRIA (Strategic Research and Innovation Agenda). Additional information exchange routes are activated (e.g. with European SME cluster organisations).
- **For space**, BRIMATECH involves the ESA broker network coordinator Verhaert via subcontract. The network coordinator is in close contact not only with the European space industry but also to other important industries in their countries. The network of Brokers helps to identify industry sectors interested in technology transfer and establishes contacts and meetings. Furthermore, the European Space Agency Technology Transfer Programme Office is involved in the ICARUS Advisory Board ensuring the information transfer throughout the project. Project outcomes may feed into ESA's Technology Readiness Programme TRP or directly into ESA programmes addressing higher TRLs.

First results of the Needs Analysis

Due to the early stage of the project, first results mainly come from the assumptions made in the proposal, internet research, first interviews with project partners and documents they wrote to inform the ICARUS team about industry needs and requirements and the state of the art.

General needs:

- Widen the stability limit of existing (comparable) materials, i.e. keeping the structure and main properties or at least the body integrity against external influence that can be thermal, mechanical, electric, chemical or irradiative.
- Be in line with sustainability goals and bear in mind environment, health and safety issues (clean sky, clean space, REACH directive, etc.).
- Contribute to European political goals (no dual use issues, non-dependence from critical raw materials, etc.).

For aviation ICARUS aims at providing an answer to the high temperature present challenges: improved materials for engines, and lightweight temperature resistant materials for supersonic flight regimes.

The new generations of alloys deriving from ICARUS target to have the following impacts on the aviation industry (adapted from [GA]):

- Improved stability to weight ratio to meet ACARE fuel efficiency and environmental goals.
- Reductions in aviation's negative environmental impact through the use of lighter and recycle structures in aviation.
- Reduction in manufacturing and maintenance costs and lead time.
- Reduction in the certification/standardisation costs.

For Space [Barczy, 2017]

- Thermal stability is the most relevant stability factor.
- Irradiative stability against proton bombardment is needed for long term spaceflight.
- Improved stability to weight ratio in launchers will allow more payload.
- Target application field for nc W alloys could be light combustion chambers with regenerative cooling.
- Multi-alloyed stable nc Nickel alloys seem interesting for high temperature applications.
- Materials development for combustion chambers will require significant technology development.
- Developing structural materials for room temperature space application is not recommended.
- CVD coating methods seem particularly interesting.

Properties of materials currently used in aerospace were collected in a database for comparison. They include the following parameters:

Properties (general)	Properties relevant to Space Use	Mechanical behavior (tension / compression / fatigue) of nanocrystalline alloys (base: aeronautical materials)
Specific gravity	Corrosion	Vickers' (micro)hardness / maximum hardness
Ultimate tensile strength	Stress Corrosion	Elastic modulus
Proof Stress (0,2%)	EMK	Compressive tests
Elongation at Break		(Maximum compressive) Yield strength/maximum strength
Thermal Expansion Coefficient		
Thermal Conductivity		
Electrical resistivity		

Table 6: Properties of materials currently used in aerospace

The following base materials and alloys are frequently used in aerospace [Pantelakis, 2017]:

Base material (% wt)	Alloying elements (% wt)	Grain size	Ultimate Strength (MPa)	Young Modulus (GPa)	Density (g/cm ³)	Elongation at fracture (%)
90% Al	10% Zr	58nm	766	-	-	-
93% Al	3%Fe – 2%Ti – 2%Cr	50nm	690	97	-	0.02
90% Al	10% Fe	30nm	683	44.3	-	-
92.5% Al	7.5% MWCNT	34.2 nm	450	-	-	-
84.2% Al	11.9%Cu-3.5%Ce-0.3%Zr-0.1%Mn	70.3nm	523	-	-	-
92.5% Al	7.5% Mg	30nm	1166	-	-	-

Table 7: Nanocrystalline aluminum-based alloys

Base material (% wt)	Alloying elements (% wt)	Grain size	Ultimate Strength (MPa)	Young Modulus (GPa)	Density (g/cm ³)	Elongation at fracture (%)
73% Mg	27% Ti	66 nm	480	-	-	-
85% Mg	15% Ti	76 nm	-	-	-	-

Table 8: Nanocrystalline Magnesium-based alloys

Base material (% wt)	Alloying elements (% wt)	Grain size	Ultimate Strength (MPa)	Young Modulus (GPa)	Density (g/cm ³)	Elongation at fracture (%)
59%Ti	49%Ni	64nm	-	-	-	-
91%Ti	9%Mg	15nm	-	-	-	-
88.5%Ti	6.3%Al – 3.5%Mo – 1.7%Zr	30nm	1900	-	--	-

Table 9: Nanocrystalline Titanium-based alloys

Base material (% wt)	Alloying elements (% wt)	Grain size	Ultimate Strength (MPa)	Young Modulus (GPa)	Density (g/cm ³)	Elongation at fracture (%)
86%Ni	14%W	10nm	2600	-	-	-
60%Ni	40%Mo	5nm	2288	-	-	-
98%Ni	2%P	-	1550	-	-	9.5
56%Ni	44%Cu	20nm	1889	-	-	-

Table 10: Nanocrystalline Nickel-based alloys

In order to update, analyse and identify challenges, needs and requirements from potential users of the new materials (super alloys), a number of interviews and workshops with relevant stakeholders in aviation and space, including the IAB and project partners, will be conducted by the project partners involved in this task.

4.4. PLAN FOR THE EXPLOITATION AFTER ICARUS (FUTURE ROADMAP)

In the follow-up Deliverable 6.4 (due at the end of the project) this chapter will outline a strategic plan for the further use of IP generated in the project and for liaising with other initiatives to maximize impact. This will include suggested further research areas, other promising industry sectors, and making use of the extensive network of partners for contributing to strategic initiatives

The plan summarizes all contents collected in the exploitation activities described in the previous chapter. It includes recommendations for the further use of IP generated in ICARUS and for liaising with other initiatives and addresses the following overarching question:

- How to make R&I results beneficial – for research, for companies, for new enterprises, for a sector?

The following figure provides main strategies for exploiting ICARUS results after the project end:

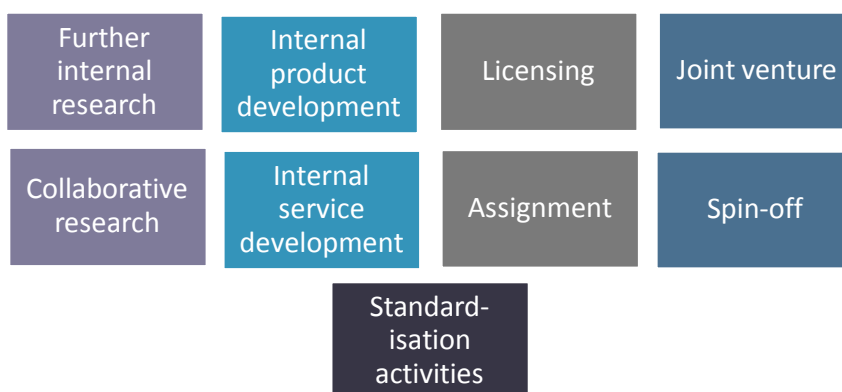


Figure 15: Exploitation Options (European IPR Helpdesk, 2015b)

Further internal research activities must be beyond the project and are relevant for research organisations and research intensive companies. The results can be used as background of future **collaborative research** projects and are relevant for research organisations and research intensive companies. Results can also be used for **internal product development** in developing, creating and marketing a product/process, which is relevant for companies. Using results for **internal service creation** (creating and providing a service) is an exploitation option for companies. To exploit results by other organisations throughout **licensing** is an exploitation option which is relevant for all participants, but care should be taken to comply with Horizon 2020 rules. The same is true for results exploited by other organisations by the transfer of ownership (**assignment**), the usage of results as background of a **joint venture** or the established of a separate company in order to bring results from the project to the market (**Spin-off**). Finally, results can be used either to develop new **standardisation activities**, or to contribute to on-going standardisation work which is also relevant for all participants (European IPR Helpdesk 2015b, p.11).

4.5. EXPLOITATION ACTIVITIES

The exploitation activities documented in section B in the PEDR by August 2017 (see [Appendix](#)), are summarized in this chapter. They aim at gaining content for the exploitation strategy and the related chapters (4.3.1 - 4.3.4) throughout the project.

- Patents, Trademarks, etc.:

There have been no applications for patents, trademarks, registered designs, etc. within the first year of the project.

- Exploitable Foreground:

So far, only 1 partner (LTSM) described exploitable foreground (see PEDR in Annex).

- Exploitation Activities:

Exploitation activities performed by August 2017 comprise the organization of a training (Spring School) and interviews with project partners conducted by Brimatech:

- ICARUS/SUPERMAT Spring School in Cagliari, Sardinia (15th-17th May 2017): 8 lectures from project partners addressed exploitation-related contents. In total, 48 participants from different European countries attended the lectures (see attendance list). The following lectures were giving general insights into the aerospace sector and were particularly relevant to the exploitation of ICARUS results:
 - “You need more space” (ESA).
 - “Current advances and emerging needs in aeronautical materials: could nanocrystalline alloys offer the desired breakthrough” (LTSM).
 - “Material developments for space applications” (ADMATIS).
 - “Space engineering – process of satellite hardware development” (ADMATIS).
 - “Introduction of new material in space - Qualification testing needs” (AAC).
 - “General introduction to circular economy, efficiency of resources and sustainability of Advanced Materials” (UBU-ICCRAM).
 - “Methods and importance of assessing the safety and environmental compatibility of new materials” (UBU-ICCRAM).
 - “From impact to business” (BRIMATECH).
- Two interviews related to exploitation were conducted by BRIMATECH with project partners (AAC and ADMATIS) by June 2017. Main topics addressed comprised relevant stakeholders & their roles, application fields of potential ICARUS results in space, value chains in space industry.
- Findings regarding industry needs, requirements and other factors influencing the choice of ICARUS alloys were summarised in a separate document [AD] not foreseen in the [GA].

Exploitation Activities planned:

- EBN conference in Paris:
 - Speed dating and match making among FETs and BICs
 - Participants and Date (planned):
 - BRIMATECH.
 - 5-7 July 2017.
- Common Exploitation Booster (CEB)⁴:
 - The CEB is a support service from the European Commission which aims to bridge the gap between research results and exploitation by:
 - Raising awareness on exploitation possibilities; recognizing valuable and exploitable results; providing an opportunity to clarify issues, propose solutions and actions, anticipate possible conflicts for a successful exploitation;

⁴ <http://exploitation.meta-group.com/Pagine/About-Us.aspx>

- Helping to set-up roadmaps for the long-term sustainability of the project results and facilitating open innovation and (re)use of project results.
 - Creating value out of novel knowledge (creating revenues, improving skill set, preparing for standardization of patenting, finding optional pathways for future work).
- The services offered:
 - Analysis of Exploitation Risks, to scout the route towards the market and better tackle risks.
 - Exploitation Strategy Seminar a joint working session to streamline the exploitation strategy and go to market action plan;
 - Business Plan Development to design a convincing and actionable plan for exploitation.
 - Brokerage and Pitching Event where partners present their results to peers, potential users and investors, in order to pave the way to follow-ups.
- Due to the low TRL of the ICARUS project at the time of the application, the only suitable (and selected) service is the “Analysis of Exploitation Risks” (identification of risks and potential obstacles to the future exploitation of the project’s results).
- Participants and Date (planned):
 - All project partners.
 - March 2018 (before/after ICARUS 18 month meeting).
- FET2RIN⁵:
 - FET2RIN is a training funded by the EU for all FET projects. It supports FET projects to reach out investors and make a larger impact on society.
 - The program aims at facilitating collaborations to set the ground for the take up of Future and Emerging Technologies and FET projects by overcoming obstacles related to market acceptance and accessing business leaders including entrepreneurs, early stage investors and crowdfunding communities.
 - The online and in person training for 3 representatives from the consortium to teaches how to:
 - rapidly develop and test novel solutions,
 - apply the lean start-up approach,
 - get “out of the lab”,
 - search for unmet needs & validate their impact related assumptions
 - Participants and Date (planned)
 - UBU-ICCRAM, BRIMATECH, EASN-TIS.
 - Application in Autumn 2017, Training in 2018.
- Stakeholder Interviews and Workshops YEAR2:
 - e.g. with ESA Materials Department CSL, QINETIQ, LAMBDA-X, SAS

⁵ <http://www.fet2rin.com/>

Plan for the exploitation after ICARUS

At this early project phase, the activity planned related to the plan for the exploitation after ICARUS in order to use the IP generated in ICARUS, is the application to the **FET Innovation Launchpad in 2018⁶**:

- The FET Innovation Launchpad is a Coordination & Support Action (CSA) which aims at funding further innovation related work, i.e. activities which were not scheduled to be funded by the original projects.
- It aims at short and focused individual or collaborative actions to take out of the lab a promising result or proof-of-concept that originated from a FET project and to get it on the way to social or economic innovation.
- The action will support the transformation of that specific research result into a credible offering for economic or social impact, by exploring the feasibility of an exploitation path and by coordinating and supporting the assembling of the right knowledge, skills and resources and thus serves as a launch pad for exploitation.

Summary

The following table summarizes the exploitation activities performed and planned:

EXPLOITATION ACTIVITY		DESCRIPTION
Company Visits	Interviews	With project partners and project external stakeholders
	Workshops	
Events	EBN Conference July 5th-7th, 2017	Matchmaking among FETs and BICs
	Common Exploitation Booster, Mar 2018 (tbd)	Analysis of Exploitation Risks
	FET2Rin, 2018 (tbd)	Training to reach out to investors and make a larger impact on society
Further Use of IP generated in ICARUS	FET Innovation Launchpad, 2018 (tbd)	Coordination & Support Action (CSA) for further innovation related work

Table 11: Summary of exploitation activities (performed and planned)

⁶ <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/fetopen-04-2016-2017.html>

5. KNOWLEDGE MANAGEMENT AND PROTECTION OF IPR

Effectively exploiting research results depends on the proper management of intellectual property, which will be part of the overall management of knowledge in the project. Due to the novelty research aimed to be realized within the ICARUS project, the necessary measures are required to be applied towards protecting the legitimate interests of the involved parties with respect to the background introduced to the project and the foreground developed. To this end, special focus will be placed on ensuring appropriate knowledge management and protection.

Before the project start, in order to properly manage the intellectual property and results generated in the course of the project as well as pre-existing IP, a Consortium Agreement was signed by all partners. This is an essential action in order to guarantee an efficient and protected sharing of information, as well as to ensure the smooth running of the project. The general principles that were stated in the definitive Consortium Agreement cared to appropriately distinguish and manage background and foreground knowledge, ownership and access, dissemination and sharing of the results. The main issues addressed are the following:

- **Confidentiality among institutions involved in the project, as well as confidentiality policy towards external institutions;**
- **Ownership of future results, taking into account pre-existing IP and each partner's contribution to the production of new or emergent IP;**
- **The possibility of joint ownership of resources for future exploitation;**
- **Transfer of knowledge and results to those industrial partners interested in exploiting ICARUS results as well as to third parties.**

To ensure a smooth implementation of ICARUS, partners have agreed to grant royalty-free access to Background and Foreground IP for the implementation of the project. Therefore, all project partners have already determined any Background IP they will submit to the project within the Consortium Agreement. Any details concerning the access rights to Background and Foreground IP for the duration of the project have also been defined in the Consortium Agreement.

Foreground IP shall be owned by the project partner carrying out the work leading to such Foreground IP. If any Foreground IP is created jointly by at least two project partners and it is not possible to distinguish between the contributions of each of the project partners, such work will be jointly owned by the contributing project partners. The same shall apply if, in the course of carrying out work on the project, an invention is made having two or more contributing parties, and it is not possible to separate the individual contributions. Any such joint inventions and all related patent applications and patents shall be jointly owned by the contributing parties. Any details concerning the exposure to jointly owned Foreground IP, joint inventions and joint patent applications have been described in the [CA].

Furthermore, a process has been established and defined ensuring that prior notice of any planned publication is given to the other project partners before the publication. Specifically, according to Annex II of the Grant Agreement "at least 20 days prior notice

of any dissemination activity shall be given to the other beneficiaries concerned. (...) Any of those beneficiaries may object within 15 days of the notification. (...) In such cases the dissemination activity may not take place unless appropriate steps are taken to safeguard these legitimate interests.” EASN-TIS is responsible for monitoring all planned dissemination and exploitation activities, so as to ensure that the consortium agreement and grant agreement requirements are respected and that the involved parties’ IPRs are properly protected from unauthorized use or any other kind of misuse. Any objection to the planned publication shall be made in accordance with the Consortium Agreement in writing to the Coordinator and to the Party or Parties proposing the dissemination after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted. It is worth noting that at all times, care will be taken in order to ensure that knowledge protection rules and requirements stated within the [CA] and [GA] are fully respected.

To this end, a dedicated on-line tool (namely the ICARUS e-approval tool) was set-up during the first months of the project. The aim of the ICARUS e-approval tool was to:

- **Keep partners up-to-date with all project-related dissemination activities**
- **Provide partners the ability to raise a comment (with regards to the validity of the results, missing or incorrect information, etc.) or objection (when they feel that their legitimate interests in relation to their foreground or background could suffer disproportionately great harm)**
- **In-time inform the respective author of the consortium’s feedback**
- **Enable all the aforementioned activities in an automatic, effective and timely manner**

The ICARUS e-approval tool is being monitored on a daily basis and includes the following tasks:

- **EASN TIS receives the intended dissemination material in order to be circulated to the consortium for approval, i.e. a new poll is being created; according to the project’s Grant Agreement this needs to be realized at least 20 days prior to the intended publication date.**
- **A daily verification on whether all partners have received automatic e-mail notifications is sent by the ICARUS e-approval tool. If a partner has not acknowledged the receipt of the aforementioned notifications, he/she will be contacted directly via e-mail or by telephone, in order to confirm the receipt of the respective notifications.**
- **If a partner requests major modifications (such as adding or removing information) upon the dissemination material under approval, then the dissemination material will be re-circulated to the consortium for approval.**
- **If a partner rejects a planned dissemination activity, then in cooperation with the Project Coordinator the respective partners will be contacted in order to mutually resolve the issue. Once resolved, the said partner will be allowed to re-cast his/her vote in order for the approval process to be finalized.**
- **An activity is considered as “Approved “when all partners have agreed on its contents, or when a period of fifteen (15) days has passed from the**

initial notification, whichever comes first.

Foreseen exploitation activities will be at all times communicated internally with the use of the ICARUS PEDR, although these are managed in greater detail by the corresponding departments of each partner organization,. This ensures that the consortium will be aware of the commercial interests of each partner and to any sensitive information related to the research activities.

6. CONCLUSION

The current document presents and analyses the ICARUS Plan for the exploitation and dissemination of project results of all ICARUS partners. An overview of the activities realized so far was thoroughly presented and an assessment of their impact was discussed. As the planned activities of each individual partner are shared within the consortium, the task of protecting IPR and planning communication strategies becomes more effective and close monitoring of the implementation of the plan is made possible.

In that sense, the current document is expected to act as a point of reference for current and foreseen dissemination activities. Even though the official delivery of the document is on M12 of the project lifetime, the ICARUS Dissemination and Exploitation Plan will be continuously monitored and updated throughout the project lifetime. In particular, it will be circulated to the consortium for updates, corrections and/or amendments on a semi-annual basis. Moreover, information will be also added continuously according to the performed and planned dissemination activities during the entire project lifetime.

This report is the first PEDR release and describes the preliminary stage of the dissemination and exploitation plan. It outlines the intended actions as to disseminating the results of the project as well as the structure of the final plan. Based on this dissemination action plan the dissemination target groups have been identified and the planned activities are presented. As the resources dedicated to dissemination are restricted, cost-effective ways will be chosen to achieve the maximum of publicity for the project and its results.

The two key areas addressed by this deliverable are the dissemination and the exploitation activities. The information presented in this deliverable was based on the input collected from all ICARUS partners by August 2017. As far as the dissemination activities are concerned, this initial deliverable aims at the presentation of the dissemination plan, planned to be followed by the ICARUS partners, for making the project and its results known all over the world. For exploitation first input regarding user needs in aerospace was collected, both in interviews, online research, by dedicated documents written by partners and presentations given at the Spring School.

Based on the input received from the partners, the number and type of dissemination activities performed and/or intended to be performed by the ICARUS partners is considered to be sufficient by taking into account the nature of the project. In addition, the time distribution of the performed and planned activities is considered to be satisfying by taking into account that the project started its activities in September 2016, and usually the highest amount of activities is expected to be performed after the end of the first half of the project (M18) as at that time results will become available for presentation. Finally, the involvement of all partners in the implementation of the dissemination activities is considered to be adequate since all partners have reported their participation in several dissemination activities. .

The first year's ICARUS PEDR including the full list of performed and planned dissemination and exploitation activities is included in the Appendix of this deliverable.

7. LIST OF REFERENCES

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APPENDIX



Table A1: List of Current and Foreseen scientific (peer reviewed) publications:

NO.	Type of Scientific Publication ⁷	Title of the publication	DOI or Repository Link	ISSN or ESSN	Main author		Title of the Journal/Proceedings/Book Series or equivalent	Number, Date or frequency of the Journal/Proceedings/Book or equivalent ⁸	Publisher	Place of publication	Year of Publication	Relevant pages ⁹	Is this a joint public/private publication? ¹⁰	Is this a peer reviewed publication? ¹¹	Is this publication available in Open Access (OA) or will it be made available? ¹²	
					Organization(s)	Authors' Names										
1.	Article in journal	Mechanical behaviour of nanocrystal line aluminum alloys (to be updated)	TBD ¹³	TBD	LTSM	Spiros Pantelakis (LTSM), Konstantinos Tserpes, Panagiotis Bazios	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	

⁷ Possible options: Article in journal; Publication in conference proceedings/workshop; Book/Monograph; Chapter in a book; Thesis/dissertation; Other

⁸ Please insert: i) the number of the journal, and/or ii) the month of the publication, and/or iii) the year of the publication

⁹ [Please insert the first page of the publication] - [Please insert the last page of the publication]

¹⁰ Please confirm or not that this is a joint publication coming from public and private project participants (Yes/No).

¹¹ Please indicate whether this is a peer review publication or not (Yes/No).

¹² Possible options: "Yes - Green OA", "Yes - Gold OA", No. If you select "Yes - Green OA", then please insert the length of embargo (if any). If you select "Yes - Gold OA", then please insert the amount of processing charges in EUR (if any).

Green Open Access: Beneficiaries can deposit the final peer reviewed manuscript in a repository of their choice. A repository for scientific publications is an online archive. Institutional, subject-based and centralised repositories are all acceptable choices; repositories that claim rights over deposited publications and preclude access are not. Beneficiaries must ensure open access to the publication within at most 6 months.

Gold Open Access: Researchers can also publish in open access journals, or in hybrid journals that both sell subscriptions and offer the option of making individual articles openly accessible. Monographs can also be published either on a purely open access basis or using a hybrid business model. Article processing charges (APCs) for gold open access are eligible for reimbursement during the duration of the project. As stated, the article must also be made accessible through a repository upon publication.

¹³ TBD: To be defined



Table A1: List of Current and Foreseen scientific (peer reviewed) publications:

NO.	Type of Scientific Publication ⁷	Title of the publication	DOI or Repository Link	ISSN or ESN	Main author		Title of the Journal/Proceedings/Book Series or equivalent	Number, Date or frequency of the Journal/Proceedings/Book or equivalent ⁸	Publisher	Place of publication	Year of Publication	Relevant pages ⁹	Is this a joint public/private publication? ¹⁰	Is this a peer reviewed publication? ¹¹	Is this publication available in Open Access (OA) or will it be made available? ¹²	
					Organization(s)	Authors' Names										
2.	Article in journal	Multi-scale modelling of nanocrystalline materials (to be updated)	TBD	TBD	LTSM	Spiros Pantelakis (LTSM), Konstantinos Tserpes, Panagiotis Bazios	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
3.	Article in journal	Diffusion mechanisms of nanostructured materials (to be updated)	TBD	TBD	LTSM	Spiros Pantelakis (LTSM), Konstantinos Tserpes, Panagiotis Bazios	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
4.	Publication in conference proceeding/workshop	Fatigue behaviour of nanocrystalline aluminium alloys (to be updated)	TBD	TBD	LTSM	Spiros Pantelakis (LTSM), Konstantinos Tserpes, Panagiotis Bazios	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	

Table A1: List of Current and Foreseen scientific (peer reviewed) publications:

NO.	Type of Scientific Publication ⁷	Title of the publication	DOI or Repository Link	ISSN or ESN	Main author		Title of the Journal/Proceedings/Book Series or equivalent	Number, Date or frequency of the Journal/Proceedings/Book or equivalent ⁸	Publisher	Place of publication	Year of Publication	Relevant pages ⁹	Is this a joint public/private publication? ¹⁰	Is this a peer reviewed publication? ¹¹	Is this publication available in Open Access (OA) or will it be made available? ¹²	
					Organization(s)	Authors' Names										
5.	Thesis/dissertation	Mechanical behaviour of nanocrystalline aluminium alloys	TBD	TBD	LTSM	Panagiotis Bazios	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
6.	Publication in conference proceeding/workshop, Publication in conference proceeding/workshop	Space qualification testing of new nanocrystalline alloys to be used in space applications	TBD	TBD	AAC	Michael Scheerer, Christian Jogl, Grazyna Mozdzen	Proc. Of ECSSMET	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD
7.	Article in journal	TBD	TBD	TBD	UBU-ICCRAM	Santiago Cuesta, Gloria Rodríguez, Rocío Barros	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	



Table A1: List of Current and Foreseen scientific (peer reviewed) publications:

NO.	Type of Scientific Publication ⁷	Title of the publication	DOI or Repository Link	ISSN or ESN	Main author		Title of the Journal/Proceedings/Book Series or equivalent	Number, Date or frequency of the Journal/Proceedings/Book or equivalent ⁸	Publisher	Place of publication	Year of Publication	Relevant pages ⁹	Is this a joint public/private publication? ¹⁰	Is this a peer reviewed publication? ¹¹	Is this publication available in Open Access (OA) or will it be made available? ¹²	
					Organization(s)	Authors' Names										
8.	Publication in conference proceeding/workshop	TBD	TBD	TBD	UBU-ICCRAM	Santiago Cuesta, Gloria Rodríguez, Rocío Barros	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
9.	Books/Monographs	International Spring School Abstracts Book	TBD	TBD	UBU-ICCRAM	ICARUS&SU PERMAT Consortiums, UBU	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
10.	Article in journal	Mechanism of mechanical alloying in binary metal systems (to be updated)	TBD	TBD	CSGI	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Yes	Yes	TBD	



Table A1: List of Current and Foreseen scientific (peer reviewed) publications:

NO.	Type of Scientific Publication ⁷	Title of the publication	DOI or Repository Link	ISSN or ESN	Main author		Title of the Journal/Proceedings/Book Series or equivalent	Number, Date or frequency of the Journal/Proceedings/Book or equivalent ⁸	Publisher	Place of publication	Year of Publication	Relevant pages ⁹	Is this a joint public/private publication? ¹⁰	Is this a peer reviewed publication? ¹¹	Is this publication available in Open Access (OA) or will it be made available? ¹²	
					Organization(s)	Authors' Names										
11.	Article in journal	Nanomechanical characterization of nanocrystalline stable materials (tentative)	TBD	TBD	ENEA	Antonio Rinaldi, Francesco Delogu, Santiago Cuesta (other to be determined)	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	
12.	Publication in conference proceeding/workshop	Mechanical Stability of nanocrystalline stable materials resistant to Damage Irradiation (tentative)	TBD	TBD	ENEA	Antonio Rinaldi, Francesco Delogu, Santiago Cuesta (other to be determined)	TBD	TBD	TBD	TBD	TBD	TBD	No	Yes	TBD	



Table A2: List of Performed & Planned dissemination activities

NO.	Type of activities ¹⁴	Main leader		Title of the disseminated material	Title of the dissemination activity	Place of the Dissemination Activity	Date	Type of audience ¹⁵	Size of audience	Geographic coverage
		Organization	Authors' Name(s)							
1.	Video/film	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	El ICCRAM de Burgos desarrollará el Proyecto aeroespacial 'ICARUS' de la Comisión Europea	Radio Televisión de Castilla y León Youtube Channel	https://www.youtube.com/watch?v=WxowJ7vKjzY	28-Jul-16	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other	~100	Castilla y León, Spain, Europe, International
2.	Video/film	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	ICCRAM will coordinate the FET-OPEN project ICARUS	UBU-ICCRAM Youtube Channel	https://www.youtube.com/watch?v=oFDVnyoN5aM	18-Dec-16	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other	~100	Europe, International
3.	Participation to a conference	ADMATIS, UniMi	Z.Gácsi, G.Kaptay, P.B. árczy, T.Bárczy	Novel materials for aerospace hardware	H-SPACE 2017 Conference	Budapest, Hungary	9-10-Feb-17	Scientific Community (higher education, Research)	~100	Hungary, Europe
4.	Web-site	EASN-TIS	EASN TIS	ICARUS Project	ICARUS Public Website	http://icarus-alloys.eu/	1-Oct-16	General Public, Industry, Policy makers, Scientific Community (higher education, Research), Investors, Customers	> 57 monthly visitors > 600 monthly pageviews (Source: Google Analytics)	Europe, International

¹⁴ Possible options: Organisation of a Conference, Organisation of a workshop, Press release, Non-scientific and non-peer reviewed publication (popularised publication), Exhibition, Flyers, Training, Social media, Website, Communication campaign (e.g radio, TV), Participation to a conference, Participation to a workshop, Participation to an event other than a conference or workshop, Video/film, Brokerage event, Pitch event, Trade fair, Participation in activities organised jointly with other H2020 project(s), Other

¹⁵ Possible options: Scientific Community (higher education, Research), Industry, Civil Society, General Public, Policy makers, Medias, Investors, Customers, Other



5.	Web-site	EASN-TIS	EASN TIS	ICARUS Project	EASN-TIS Company Website	https://easn-tis.com/projects	17-Feb-17	General Public, Industry, Policy makers, Scientific Community (higher education, Research), Investors, Customers	20 (15 news/5 returning visitors) average daily pageviews according to www.googleanalytics.com	Europe, International
6.	Web-site	EASN-TIS	EASN TIS	ICARUS Project	EASN Association Portal	https://easn.net/research-projects/	February 2017	General Public, Industry, Policy makers, Scientific Community (higher education, Research), Investors, Customers	98 (65 news/33 returning visitors) average daily pageviews according to www.googleanalytics.com	Europe, International
7.	Non-scientific and non-peer reviewed publications (popularised publications)	EASN-TIS	EASN TIS	ICARUS project presentation and overview	Periodic EASN Association Newsletter	https://easn.net/news/17/289/ , https://www.easn.net/newsletters/issues/easn-newsletter-april-2017	January 2017, April 2017	General Public, Industry, Policy makers, Scientific Community (higher education, Research), Investors, Customers	>10,000	Europe, International
8.	Video/film	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	H2020 - FETOPEN - 2014-2015 - ICARUS - GA - 713514	UBU-ICCRAM Youtube Channel	https://www.youtube.com/watch?v=FcpdVZHuoAY	10-Mar-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other	~100	Europe, International
9.	Communication campaign (e.g radio, TV)	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	Presentation of EU-H2020-FET-OPEN ICARUS GA-713514 - ONDA CERO Burgos	UBU-ICCRAM Youtube Channel	https://www.youtube.com/watch?v=tvpClf8TOP4&index=1&list=PLC88uGJ1RIFWkuaI7Ndd_EroNtBhJm_5b	22-Mar-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other	~100	Castilla y León, Spain, Europe, International

10.	Press release	UBU-ICCRAM	UBU-ICCRAM	Premio de innovación en materiales y a la mejor divulgación científica	El Correo de Burgos (local newspaper)	http://www.elcorreoburgos.com/noticias/burgos/previo-innovacion-materiales-mejor-divulgacion-cientifica_149088.html	3-Apr-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other		Burgos, Castilla y León, Spain, Europe, International
11.	Participation in activities organised jointly with other H2020 project(s)	All partners, UBU-ICCRAM	Gloria Rodríguez (UBU-ICCRAM), Santiago Cuesta López (UBU-ICCRAM), Iris García Iglesias (UBU-ICCRAM)	Several technical and scientific lectures	ICARUS-SUPERMAT Spring School	Sardinia, Italy	15-17-May-17	Scientific Community (higher education, Research), Other	48	European
12.	Participation to a conference	LTSM	Spiros Pantelakis (LTSM)	Innovative nanocrystalline materials for aeronautical applications (to be confirmed)	7th EASN International Conference on "Innovation in European Aeronautics Research"	Warsaw, Poland	26 -29-Sep-17	Scientific Community (higher education, Research), Civil Society, Industry	400	International

13.	Social media	BRIMATECH	Sabine Jung-Waclik (BRIMATECH)	ICARUS project presentation and overview	BRIMATECH-ESA Social Media Campaign	https://www.linkedin.com/company/esa-technology-transfer-programme-office https://www.facebook.com/ESAspacesolutions/	1-Feb-17	General Public, Industry, Policy makers, Scientific Community (higher education, Research), Investors, Customers	>600	European, International
14.	Participation to a conference	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	Conference Poster-Innovative coarsening-resistant alloys with enhanced radiation tolerance and ultra-fine –grained structure for aerospace application	EuroNanoForum 2017	Valletta, Malta	21-23-Jun-17	Scientific Community (higher education, Research), Civil Society, Industry	>1000	European
15.	Participation to a conference	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	Poster of ICARUS, project presentation and overview	Excellence Square of Nanotechnologies and new materials, Mecspe Exhibition	Parma, Italy	17-19-Mar-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Policy makers, Medias, Investors	<30000	Italy, European
16.	Flyers training	EASN-TIS	Apostolos Chamos (EASN-TIS)	Leaflets distribution	7th EASN International Conference on “Innovation in European Aeronautics Research”	Warsaw, Poland	26-29-Sep-17	Scientific Community (higher education, Research), Civil Society, Industry	400	International
17.	Participation to a conference	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	ICARUS project overview presentation	7th EASN International Conference on “Innovation in European Aeronautics Research”	Warsaw, Poland	26-29-Sep-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Policy makers, Medias, Investors	400	International



18.	Participation to a conference	CSGI	Francesco Torre	Thermodynamically stable nanostructured metal alloys by mechanical alloying: The ICARUS project	9th International Conference on Mechanochemistry and Mechanical Alloying (INCOME)	Košice , Slovakia	3-7-Sep -17	Scientific Community (higher education, Research), Industry, Policy makers, Investors, Customers, Other	TBD	International
19.	Non-scientific and non-peer reviewed publications (popularised publications)	EASN-TIS	TBD	TBD	Horizon the EU Research and Innovation Magazine	https://horizon-magazine.eu/	TBD	TBD	TBD	European
20.	Non-scientific and non-peer reviewed publications (popularised publications)	EASN-TIS	TBD	TBD	Research*eu results magazine	TBD	TBD	TBD	TBD	European
21.	Social media	EASN-TIS	Clio Drimala (EASN-TIS)	ICARUS Project Presentation and Overview	EASN TIS Social Media Campaign	https://twitter.com/ICARUS_ALL_OYS , https://www.linkedin.com/groups/13523454	April-August 2017	Scientific Community (higher education, Research), Industry, Civil Society, General Public	>100	European
22.	Participation to a conference	AAC	Michael Scheerer (ACC)	Space qualification testing of new nan-crystalline alloys to be used in space applications	ECSSMET	TBD	TBD	Scientific Community (higher education, Research)	> 200	European
23.	Video/film	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	ICARUS & SUPERMAT International Spring School (May 2017)	UBU-ICCRAM Youtube Channel	https://www.youtube.com/watch?v=9qytXCWZ73w&t	30-May-17	Scientific Community (higher education, Research), Industry, Civil Society, General Public, Other	~100	Europe, International



24.	Participation to a conference	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	TBD	ILA Berlin Air Show	Berlin, Germany	25-29-Apr-18	Scientific Community (higher education, Research), Industry, Policy makers, Investors, Customers, Other, Scientific Community (higher education, Research), Industry, Policy makers, Investors, Customers, Other	TBD	International
25.	Exhibition	ADMATIS	Tamas Barczy (ADMATIS)	ICARUS New materials	5th Workshop on Advanced RF Sensors and Remote Sensing Instruments, ARSI'17 & 3rd Ka-band Earth Observation Radar Missions Workshop, KEO'17	ESTEC, Noordwijk, The Netherlands	12-14-Sep-17	Industry, Scientific Community (higher education, Research)	200	European
26.	Exhibition	ADMATIS	Pál Bárczy (ADMATIS)	ICARUS New materials	TBD	ESTEC, Noordwijk, The Netherlands	1-Sep-18	Industry	200	European
27.	Press release	UniMi	Gréta Gergely (UniMi)	ICARUS Science for UniMi	Magazine of Univeristy of Miskolc	Hungary, Miskolc	2017	Civil Society	TBD	Hungary, Europe
28.	Exhibition	BRIMATECH	Sabine Jung Waclik	Distribution ICARUS flyer, poster	EBN Congress	Enghien-les-Bains, France	5 -6 -Jul-17	Scientific Community (higher education, Research), Industry, Policy makers, Investors, Customers, Other	TBD	European
29.	Communication campaign (e.g radio, TV)	ADVAMAT	Tomas Polcar (ADVAMAT)	ICARUS project overview	Interview - Czech radio	http://m.rozhlas.cz/meteor/prispevky/zprava/novy-material-pro-letadla-i-do-kosmu--1711260	1-Mar-17	General Public	>5000	Czech republic
30.	Non-scientific and non-peer reviewed publications (popularised publications)	ADVAMAT	Tomas Polcar (ADVAMAT)	ICARUS project overview	Editorial feature, MM Průmyslové spektrum Journal	http://www.mmspektrum.com/clanek/material-sveti-prostredky.html	12-Apr-17	Industry	9000	Czech republic



31.	Press release	ADVAMAT	Tomas Polcar (ADVAMAT)	ICARUS project overview	New alloys	https://www.novinky.cz/veda-skoly/430917-vedci-z-cvut-budou-vyvijet-slitiny-pro-letectvi-kosmonautiku-i-jaderny-prumysl.html	2-Mar-17	General Public	>1000	Czech republic
32.	Participation to a conference	ENEA	Antonio Rinaldi (ENEA)	ICARUS Project	ETN European Turbine Network Conference	Genoa, Italy	4-5-Oct-17	Industry	>50	European
33.	Participation in activities organised jointly with other H2020 project(s)	ENEA	Antonio Rinaldi (ENEA)	ICARUS Project	Nexttower and cross cutting opportunity in concentrated solar power	Nexttower Workshop	2018	General Public	>100	European
34.	Participation to a conference	ENEA	Antonio Rinaldi (ENEA)	ICARUS Project	EERA-JPNM	EERA workshop (TBD)	2018	Scientific Community (higher education, Research)	>50	European
35.	Exhibition	MBN	Alberto Colella (MBN)	ICARUS Project	ITSC2017	Yokohama, Japan	16-19-Oct-17	Industry, Scientific Community (higher education, Research)	>1000	World
36.	Exhibition	MBN	Alberto Colella (MBN)	ICARUS Project	EPMA 2017	Milan, Italy	1-5 -Oct-17	Industry, Scientific Community (higher education, Research)	>1000	European
37.	Participation to a conference	TBD	TBD	TBD	2nd Global Congress & Expo on Materials Science and Nanoscience,	Valencia, Spain	25-27-Sep-17	TBD	TBD	International
38.	Participation to a conference	TBD	TBD	TBD	EUROMAT 2017, European Congress and Exhibition on Advanced Materials and Processes	Thessaloniki, Greece	17-22-Sep-17	TBD	TBD	European



39.	Participation to a conference	TBD	TBD	TBD	EUROMAT2019,	Stockholm	2019	TBD	TBD	European
40.	Participation to a conference	TBD	TBD	TBD	LightMAT2017, 2nd International Conference on Light Materials – Science and Technology	Bremen, Germany	8-10-Nov-17	TBD	TBD	European, International
41.	Participation to a conference	TBD	TBD	TBD	EUCASS, European Conference on Aeronautics and Space Science	TBD	2019	TBD	TBD	TBD
42.	Participation to a conference	TBD	TBD	TBD	Space Engineering and Technology Final Presentation Days	ESA-ESTEC, The Netherlands	21-22-Nov-17	TBD	TBD	TBD
43.	Flyers	BRIMATECH	Sabine Jung Waclik	ICARUS Leaflets Distribution	EuroNanoForum 2017	Valletta, Malta	21-23 Jun-17	Scientific Community (higher education, Research), Civil Society, Industry	>1000	European
44.	Participation to a conference	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	“On the discovery of new alloys for operation under extreme conditions like severe damage resistance”	FiMPART International Conference 2017, Frontiers in Materials Processing Applications, Research and Technology	Bordeaux, France	9-12-Jul-17	Scientific Community (higher education, Research), Civil Society, Industry	TBD	International



TABLE B2: List of exploitable foreground

NO.	Type of Exploitable Foreground ¹⁶	Title of Exploitable Foreground	Description of exploitable foreground	Current TRL ¹⁷	Expected TRL ¹⁴	Is the Exploitable Foreground Confidential? ¹⁸	Exploitation Channel ¹⁹	Sector(s) of application ²⁰	Knowledge Transfer ²¹	Owner & Other Beneficiary(s) involved
1.	General advancement of knowledge	Mechanical behaviour of nanocrystalline alloys (to be updated)	Experience on nanocrystalline alloys material testing including static, dynamic, fatigue and creep tests	To be completed	To be completed	No	Creating and providing a service	Education, Aeronautic industries, Mechanical engineering	Scientific Publications	LTSM
2.	General advancement of knowledge	Multi-scale modelling of nanocrystalline materials (to be)	Development of simulation concept for modeling	TRL2	TRL4	No	Further internal research; Further collaborative	Education, Aeronautic industries, Mechanical	Scientific Publications	LTSM

¹⁶ Possible options: General advancement of knowledge; Commercial exploitation of R&D results; Exploitation of R&D results via standards; Exploitation of results through EU policies; Exploitation of results through (social) innovation

¹⁷ Possible options: TRL1, TRL2, TRL3, TRL4, TRL5, TRL6, TRL7, TRL8, TRL9

¹⁸ Possible options: Yes, No

¹⁹ Possible options: Developing and marketing a product/process; Spin-off; Licence; Joint Venture; Further internal research; Further collaborative research; Creating and providing a service; Standardisation activities; Assignment; Consultancy

²⁰ Possible options: Aeronautic industries, Agriculture, Audiovisual and media, Automotive industry, Automotive industry: competition aspects, Biotechnology, Business-related services, Chemicals, Communications, Construction, Cosmetics, Culture, Defence industries, Education, Electrical engineering, Energy, Financial services, Fisheries, Fishing, Food, Food safety, Footwear, Furniture, Gas appliances, Information society sectors, Leather, Manufacturing, Maritime industries, Measuring instruments, Mechanical engineering, Media in the Single Market, Medical devices, Mining, metals and minerals, Pharmaceuticals, Pharmaceuticals & SMEs: European Medicines Agency SME Office, Pre-packed products, Pressure equipment, Radio and telecommunications terminal equipment, Raw materials, Retail services, Rural activities, Security, Services, Social economy, Space, Textiles and clothing, Tourism, Toys, Transport, Wood, paper and printing: forest-based industries, Other

²¹ Possible options: Scientific Publications, Other publications, including professional publications and reports, Participation in conferences and workshops, Networking (personal contacts (informal, via membership of professional organisations, via alumni organisations), Cooperation in R&D projects (Joint R&D projects, Presentation of research, Supervision of a trainee or Ph.D. student, Financing of Ph.D. research, Sponsoring of research), Contract research, Personnel mobility (Graduates, Mobility from public knowledge institutes to industry, Mobility from industry to public knowledge institutes, Mobility of people Trainees, Double appointments, Temporarily exchange of personnel), Sharing of facilities (Shared laboratories, Common use of machines, Common location or building (Science parks), Purchase of prototypes), Cooperation in education, IPR (Patent texts, Co-patenting, Licenses of university-held patents, Copyright and other forms of intellectual property), Spin-offs and entrepreneurship (Spin-offs, Start-ups, Incubators at universities, Stimulating entrepreneurship)



TABLE B2: List of exploitable foreground

NO.	Type of Exploitable Foreground ¹⁶	Title of Exploitable Foreground	Description of exploitable foreground	Current TRL ¹⁷	Expected TRL ¹⁴	Is the Exploitable Foreground Confidential? ¹⁸	Exploitation Channel ¹⁹	Sector(s) of application ²⁰	Knowledge Transfer ²¹	Owner & Other Beneficiary(s) involved
		updated)	nanocrystalline materials mechanical behaviour				research	engineering		
3.	Commercial exploitation of R&D results	Production of nanocrystalline alloys and composite powders by High Energy Ball Milling	Production of binary alloy (i.e W-Ti, Nb-Fe) by proprietary Mechanomade® technology based on high capacity high energy ball milling technique	TRL3	TRL5	Yes	Supply of pilot scale batch of powder for users in powder metallurgy, coating application, laser based processes applications	Aeronautic industries, Manufacturing, Raw materials	Cooperation in R&D projects (Joint R&D projects, Participation in conferences and workshops	MBN

Table B3: list of Performed & Planned exploitation activities

NO.	Type of activities ²²	Main organizer		Participants		Title of the exploitation activity	Content of the exploitation activity ²³	Place of the exploitation activity	Date ²⁴	Type of audience ²⁵	Size of audience	Geographic coverage	Status ²⁶
		Organization	Main Organizer's Name(s)	Organization	Participants' Name(s) ²⁷								
1.	Organization of a training	UBU-ICCRAM	Santiago Cuesta López (UBU-ICCRAM)	Students (university tbd)	TBD	General introduction to circular economy, efficiency of resources and sustainability of Advanced Materials , Multiscale modelling as a successful tool for exploring forefront materials under extreme conditions	Spring School Lecture	Cagliari, Sardinia	15-17-May-17	Scientific Community (higher education, Research)	~20	Europe	Planned
2.	Organization of a training	BRIMATECH	Andrea Kurz (BRIMATECH)	Students (university tbd)	TBD	"From impact to business"	Spring School Lecture	Cagliari, Sardinia	15-17-May-17	Scientific Community (higher education, Research)	48	Europe	Planned

²² Possible Options: Organization of a workshop, Participation in a workshop, Attending a conference, Interview, Participation in a training, Organization of a training, Other

²³ Please further specify the content/goal of the exploitation activity

²⁴ Please type the date (dd/mm/yyyy) that the dissemination activity took / will take place.

²⁵ Possible Options: Scientific Community (higher education, Research), Industry, Civil Society, General Public, Policy makers, Medias, Investors, Customers, Project Partners, Other

²⁶ Possible Options: Performed, Planned, Cancelled

²⁷ Please insert the names of all participants or refer to the attendance list.


Table B3: list of Performed & Planned exploitation activities

NO.	Type of activities	Main organizer		Participants		Title of the exploitation activity	Content of the exploitation activity	Place of the exploitation activity	Date	Type of audience	Size of audience	Geographic coverage	Status
		Organization	Main Organizer's Name(s)	Organization	Participants' Name(s)								
3.	Participation in a training	Other: H2020 Common Support Center of the European Commission	TBD	TBD (all project partners are invited)	TBD	Common Exploitation Booster	Analysis of Exploitation Risks	TBD	TBD	Project Partners	~20	Europe	Planned
4.	Participation in a training	Other: Meta Group, EBN, The European Crowdfunding Network AISBL	TBD	TBD (3 representatives from project partners)	UBU-ICCRAM, BRIMATECH, EASN	FET2RIN training	Empowerment of participants on how to better validate research results and how to connect with early stage investors and crowdfunding sources	3 workshops in Brussels & online course	TBD	Project Partners	2-3 persons per consortium	Europe	Planned

Table B3: list of Performed & Planned exploitation activities

NO.	Type of activities	Main organizer		Participants		Title of the exploitation activity	Content of the exploitation activity	Place of the exploitation activity	Date	Type of audience	Size of audience	Geographic coverage	Status
5.	Interview	BRIMATECH	Sabine Jung-Waclik (BRIMATECH)	AAC	Sabine Jung-Waclik, Andrea Kurz (BRIMATECH), Michael Scheerer (AAC)	Interview with project partners	Relevant stakeholders & roles, application fields in space, value chains in space industry	Wr. Neustadt, Austria	12-Dec-16	Project Partners	3	Europe, Austria	Performed
6.	Participation in a training	LTSM	Spiros Pantelakis (LTSM)	LTSM	Spiros Pantelakis (LTSM)	Current advances and emerging needs in aeronautical materials: could nanocrystalline alloys offer the desired breakthrough	Spring School Lecture	Cagliari, Sardinia	15-17-May-17	Scientific Community (higher education, Research)	48	Europe	Performed
7.	Participation in a training	LTSM	Konstantinos Tserpes	LTSM	Konstantinos Tserpes	Multi-scale modeling of multifunctional nanocomposites: Identification of parameters influencing the mechanical, electrical and thermal properties	Spring School Lecture	Cagliari, Sardinia	15-17-May-17	Scientific Community (higher education, Research)	48	Europe	Performed



Table B3: list of Performed & Planned exploitation activities

NO.	Type of activities	Main organizer		Participants		Title of the exploitation activity	Content of the exploitation activity	Place of the exploitation activity	Date	Type of audience	Size of audience	Geographic coverage	Status
		Organization	Main Organizer's Name(s)	Organization	Participants' Name(s)								
8.	Participation in a training	AAC	Michael Scheerer	AAC	Michael Scheerer	Introduction of new material in space - Qualifaction testing needs	Spring School Lecture	Cagliari, Sardinia	15-17-May-17	Scientific Community (higher education, Research)	48	Europe	Performed
9.	Interview	BRIMATECH	Sabine Jung-Waclik (BRIMATECH)	Project Partner: Admatis	Sabine Jung-Waclik, Andrea Kurz (BRIMATECH), Tamás BÁRCZY (Admatis)	Interview with project partner	Relevant stakeholders & roles, application fields in space, value chains in space industry	Miskolc, Hungary	28-Mar-17	Project Partners	3	Europe, Hungary	Performed