HECARRUS Project

Hybrid **E**lectri**C** sm**A**ll commute**R** ai**R**craft concept**U**al de**S**ign

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D5.3: "Dissemination, Communication and Exploitation Plan"

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Record of revisions

Revision	Date	Description
2.0	27/03/2020	First integrated version revised by AUTH
3.0	30/03/2020	Final changes provided by MDH and LSC

List of Abbreviations and Acronyms

Abbreviations and acronyms

CS2JU	Clean Sky 2 Joint Undertaking
DMP	Data Management Plan
D_x	Deliverable number x
EC	European Commission
EU	European Union
KER	Key Exploitable Result
MRO	Maintenance, Repair and Overhaul
M_x	Month number x
NDA	Non-Disclosure Agreement
IADP	Innovative Aircraft Demonstration Platforms
IP	Intellectual Property
ITD	Integrated Technology Demonstrators
OA	Open Access
OEM	Original Equipment Manufacturer
PEB	Project Executive Board
RIA	Research and Innovation Actions
R&D	Research & Development
SAT	Small Air Transport
SME	Small and Medium-sized Enterprise
TA	Transverse Activities
TAB	Technical Advisory Board
TRL	Technology Readiness Level
WP	Work Package

Partner acronyms

AUTH	Aristotle University of Thessaloniki [GRE]
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Executive Summary

The deliverable (D5.3) entitled "Dissemination, Communication and Exploitation Plan", is a public document of the HECARRUS project, produced in the context of Work Package 5 (WP5). It is in line with Horizon's 2020 'Open Research Data Pilot (ORDP)' strategy [1] and is an additional objective that aims to improve and maximize access to, and re-use of research data generated by this Clean Sky 2 Joint Undertaking (CS2JU) project. Moreover, it is in line with the project's Data Management Plan that has been developed in M3. The widespread dissemination and visibility of the HECARRUS objectives, capabilities, activities and results are important for its overall success, as they will prepare the future development and potential commercial deployment of the new hybrid-electric aircraft technologies. At the same time, it will consolidate strategic partnerships among the participants and general targeted audience. The aim of this document is to present the dissemination, communication and exploitation strategy that will be followed within the project. To this end, the present deliverable aims to achieve the following goals:

- describe the general objectives of dissemination strategy;
- define target audience, dissemination channels and outputs;
- define communication activities;
- present the means that will be used to attract stakeholders potentially interested in building-up strategic partnerships;
- evaluate the dissemination strategy through metrics;
- identify key exploitable results;
- identify potential exploitation routes;
- preliminarily identify the IPR protection plan.

Keywords: dissemination, communication, exploitation, IPR management, open-access, target audience, key messages, dissemination channels.

1. Introduction

The present document is a comprehensive outcome of Tasks 5.2 – "Dissemination Activities" and 5.3 – "Exploitation and IPR management" that are included in Work Package 5 (WP5) of HECARRUS project. Its main goal is to outline the dissemination and communication activities that will be carried out, in order to ensure the effective dissemination of project results. The preparation of an effective dissemination and communication plan will pave the way for a coordinated exploitation plan, that will be engaged throughout the various actions that are foreseen in the corresponding tasks of the project. Moreover, the role of this work is to serve as a blueprint as well as an internal practical guide for the consortium partners for engaging with dissemination and communication activities throughout the project life cycle, as well as after its completion.

The overall guidelines for dissemination and exploitation activities are provided by European Commission (EC) in [2]. Dissemination activities are undertaken from the beginning of the project and aim, in a first instance, at informing and raising interest in the proposed technologies, of potential parties across relevant stakeholders. In a second instance, exploitation-oriented dissemination activities aim at promoting the novel technologies concerning aircraft electrification that are developed throughout the project, along with the benefits they can provide, towards potential target end-users/adopters, to speed up the adoption and take-up.

The wide promotion and dissemination of project results will ensure that the hybrid-electric aircraft concept becomes a consolidated and widespread scenario within the 5-10 years timeframe of development, according to the corresponding aircraft architectures that will be provided by this project. **Additionally, it will be necessary to disseminate the need for electrified air transport to fulfill Clean Sky 2 Programme High-level objectives, namely, reduce CO_2, NO_x and noise emissions and, improve EU competitiveness and mobility**. Hence, the project partners need to create an efficient strategy that will promote HECARRUS aircraft as a unique, environmentally friendly technology solution, that will include innovative concepts based on hybrid-electric propulsion.

Finally, the presence of the **'Technical Advisory Board' (TAB)** consisting of experts in the field of aeronautics will increase the project's impact and ensure a proper intellectual property management. More specifically, experts of leading global Original Equipment Manufacturers (OEMs) of propulsion systems (Rolls-Royce, HONDA, Safran Helicopter Engines), integrated aircraft systems in commercial aeronautics (SAAB Aeronautics), passenger and cargo transport and aeronautical maintenance (Air France-KLM Group), aerospace manufacturing (Piaggio Aero Industries S.P.A) and of academic institutions with vast experience in aircraft propulsion systems (ÉCOLE de TECHNOLOGIE SUPÉRIEURE), guarantee a successful dissemination-oriented exploitation to a wide range of stakeholders.

In consideration of the foregoing, this document constitutes of three core sections. Initially, the dissemination plan describing the objectives of dissemination activities, the overall dissemination management and target audience followed by the means and outputs of dissemination. The following section describes the communication activities that are undertaken to ensure the successful project impact and communicate its benefits to the general, as well as to the topic related community. Lastly, an initial exploitation strategy is described, defining the key exploitable results, the exploitation routes and also an approach to intellectual property (IP) upon which the overall IP management and exploitation plan will be prepared, by the end of the project.

2. Dissemination Plan

2.1 Objectives of the dissemination activities

In order to ensure maximum visibility, accessibility and impact of the project, the dissemination activities will support all Work Packages (WPs). Hence, the whole dissemination plan is designed to provide easy access of the project outcomes, to the different targeted stakeholders.

The purpose of defining the dissemination and communication plan is to answer **Who** (target audience) will receive **What** (key messages), **How** (communication channels) and **When** (implementation and time planner), in order to convey key messages that must moreover be sound, clear, comprehensive, didactic and relevant to the target audience. This deliverable is thus created in such a way, so that it thoroughly presents the abovementioned details. Additionally, the dissemination plan outlines the roles and responsibilities of the partners and the conditions ensuring proper dissemination of the generated knowledge, related to confidentiality, publication and use of the knowledge. Conditions ensuring a proper dissemination of the project's results, not endangering any IPR of relevant partners, are also considered.

The plan will be constantly updated, based on the advances of the project. All updates and final evaluation of the project dissemination and exploitation activities will be included in the last, confidential deliverable, namely D5.4 – "Final plan for use and dissemination of results, including business models and IPR management plan" that is foreseen for M30.

The concrete **objectives** of the overall HECARRUS dissemination strategy are identified hereinafter:

- Raise public awareness and identify targets, messages, tools, and channels. Promote the HECARRUS project to relevant stakeholders (industrial, governmental and commercial communities and individuals) in order to pave the way for effective exploitation of its results. As a result, the HECARRUS hybrid-electric, 19-passenger aircraft will be promoted as an ideal, environmentally friendly technology solution that will be based on electrification, aiming towards a more efficient and greener European aviation scenario.
- Build an adequate and effective dissemination and communication plan to ensure the highest impact of project results. Consequently, effective design of dissemination tools must be ensured.
- Distribute and represent the generated knowledge, the methodologies and technologies developed during the project, by using the dissemination channels (both internal and external). These also include the planned coordination of project events and participation in workshops, conferences, and international meetings.
- Sustain the project ensuring a persistent and long-lasting visibility of the project activities and outcomes.

HECARRUS dissemination and communication actions are intrinsically linked to the exploitation of the project's activities and results. For this reason, they are presented in separate sections of this deliverable. **Efficient publicity and wide exposure of the project and its achievements will increase stakeholders' engagement with the HECARRUS initiative, and the use of its results beyond the project's lifetime.** It should be noted that both dissemination and exploitation of projects of Clean Sky 2 Joint Undertaking are obliged to keep exploiting results 4 years after the end of the action. Ultimately, communication and dissemination activities will maximize its impact on prompting dialogues, cooperation, coordination and establishing connections between all participants. Before moving on to the analysis of the project's strategy, it should be underlined that

all of the following dissemination and communication activities (either printed or web-based activities and potentially videos), will properly include the use of Clean Sky 2 Joint Undertaking (CS2JU) logo, the European Union (EU) emblem and the message "**This Project has received funding from the Clean Sky 2 Joint Undertaking (JU) under grant agreement No 865089. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Clean Sky 2 JU members other than the Union**".

2.2 HECARRUS Consortium and Technical Advisory Board in dissemination

HECARRUS is a small collaborative project of three partners and hence, all partners are committed to actively contribute to the most efficient dissemination and communication of the research done. The consortium consists of two universities (AUTH – Greece, MDH – Sweden) and a spin-off company (LSc – Switzerland) that complement each other. The presence of participants within the consortium, having proper links to the industry and the academia ensure that the project outcome will be successfully disseminated to the targeted audience, described below. Moreover, the presence of the HECARRUS consortium in global committees of propulsion and aircraft innovation along with the prior experience in various research projects, guarantee a dissemination to a wide range of stakeholders.

To further enhance the quality of the project findings and its impact, a Technical Advisory Board (TAB) is set up consisting of experts in different segments of the aerospace engineering field. Moreover, the board will enhance the project's links to the industry and pave the way for efficient dissemination and communication of the project's findings. The TAB will screen the results obtained in the project and the planned publications for market-relevant solutions. As the latter should sometimes be protected, in terms of Intellectual Property, the TAB will also play a significant role to the project's proper exploitation. More details are provided in the corresponding section, of the exploitation plan.

2.3 Dissemination management

In order for the abovementioned objectives to be satisfied, each consortium member is fully committed to the targeted dissemination of results across the wide range of stakeholders. Dissemination will take place at multiple levels and all partners will contribute via the routes that are most appropriate to their operational model and expertise. The overall dissemination management strategy upon which the following sections are based, comprises of three main phases:

Phase (I) focusing on raising interest among stakeholders and general public [M1-M24]: The aim of this phase will be to create visibility and raise interest about the project and its expected outcomes, both within the project external community of stakeholders as well as beyond, to the wider stakeholder audiences. This phase consists mainly of interest raising activities making use of a common project identity (project logo and visual identity), promoting the project website among stakeholders and distributing the communication material (i.e. project leaflet and poster). The project and its preliminary results (assessments and configurations specification) will be shared during international conferences and workshops of the first year. More mature results will emerge from the following phases of the project.

Phase (II) focusing on the exploitation-oriented dissemination of results [M24-M36]: This phase will have a strong focus on disseminating the project's results once they will be mature enough to clearly show the benefits that the evolutionary technologies of HECARRUS can provide to potential adopters. Activities within this phase include the publication of papers and articles in journals, the

participation at relevant conferences and exhibitions and the organization of workshops at which targeted stakeholders will be invited.

Phase (III) focusing on the promotion of the overall results beyond the project [M36+]: This phase has a strong focus on disseminating the complete project results' stimulating the need to cooperate with partners from the industry for the future demonstration of the concept. Overall contribution in the future roadmap for the electrification of the commuter aircraft of the future will be also demonstrated.

2.4 Target audience

Dissemination activities will aim at raising interest among the wider community including the relevant stakeholders and the general public, by demonstrating the benefits provided by the evolutionary configurations proposed in the project towards their future implementation to the higher levels of design such as detailed component analysis and iron-bird/flight demonstration. There are different types of identified target audience for HECARRUS, including industry in the targeted sectors, professional representatives and related associations, relevant public authorities, the civil society, and, last but not least, research as well as educational institutions. The main list of targeted audience that has so far been identified, is summarized in Table 1. It should be noted that a project milestone is to generate a 'Stakeholders contact list' within the consortium. The data will not be openly available according to General Data Protection Regulation (GDRP) principles and in order to avoid the misuse issues occurring from spamming programs.

Table 1. Target audience.

External Dissemination	**Research and Industrial community**	• Overall aerospace industry • SME's • Propulsion system OEMs • Airframe manufacturers • Integrated aircraft systems • MRO • Relevant authorities and policy makers (ICAO, FAA, EASA and National Bodies, DG Research) • Relevant European communities (Clean Sky 2 community, INEA etc.)
	Research and education community	• Scientific/technical community with expertise in the field of aeronautics and aerospace, turbomachinery and general propulsion systems, hybrid-electric propulsion, electrical machines, energy storage and energy conversion and distribution systems. • National and International scientific/research centers and communities.
Internal Dissemination	**Relevant consortium members**	• Technical partners of the HECARRUS project including the members of the Technical Advisory Board, representing a wide variety of fields, are expected to have an interest in the technical and scientific outcome of the entire project. • Students and future engineers of the involved Universities who may be linked with the HECARRUS project consortium through internships, theses elaboration and exhibitions/workshops preparation.

Key Messages	
	The Challenges
	International Level
	Number of commercial aircraft and number of people flying is expected to double by 2030+.
	Fuel consumed by global aviation fleet will rise.
	ACARE Flightpath 2050 goals: CO_2: -75%, NO_x: -90%, Noise: -65%
	National Level
	In need of a cost-friendly air-transport to serve point-to-point transport of 100-600 km where car and rail solutions are infeasible (islands, mountains, places with poor road infrastructure).
	Aircraft level
	Old fleet and lack of new aircraft alternatives in the commuter aircraft segment.
	The solution
	HECARRUS proposes a novel, community-friendly aircraft solution, based on hybrid-electric propulsion architectures, in order to reduce the overall environmental footprint, improve mobility and achieve sustainable growth in aviation.
	The impact
	ΔCO_2: 40-50%, ΔNO_x: 40-50%, ΔNoise: 40-50% compared to a state-of-the-art aircraft with Entry-Into-Service as of 2014.

2.5 Dissemination means/channels

In order to successfully convey the dissemination output of the project to the respective target audience and reach the highest impact possible, the HECARRUS dissemination strategy involves a broad spectrum of channels. On one hand, the online and interactive tools and channels and on the other hand, the non-electronic and physical means of interaction. The means of dissemination refer to all the material which will be used to present HECARRUS project to the external audience, while dissemination channels represent the media through which the project results will be conveyed and distributed to the target audience. All the means and channels of the project are thoroughly explained throughout the following sections. These include:

- Scientific/technical publications and oral/poster presentations at conferences, symposia, seminars, exhibitions and workshops;
- Project technical e-publications and newsletters;
- Educational sessions;
- Project dedicated workshops;
- Workshops organized by CS2JU, Innovation and Research Executive Agency (INEA) and EU in general;
- Liaison/collaboration with relevant European communities;
- Liaison/collaboration with relevant projects considering aircraft electrification and 'sister' projects focusing on Small Air Transport (SAT) activities;
- HECARRUS website[1];
- HECARRUS social media and research platforms.

Considering the last two means of dissemination (project website and social media), these will be thoroughly described in the 'Communication Activities' section, due to the inherent interconnection of the two parts.

2.5.1 Scientific publications and presentations in journals, conferences and other events

A major means of reaching the targeted scientific audience of the HECARRUS project is to publish the project results in the international scientific/technical literature. Additionally, results will be presented at relevant conferences, symposia, seminars, workshops and other events either through

[1] www.hecarrus.eu

oral or poster presentations. Several publications are expected to occur by the end of the first year of the project, when the first key findings become available through the assessments that will be performed at components' and integrated systems' level. Additionally, the second half of the project (M18-M36) life cycle will be characterized by the most mature results and relevant publications. The publications that will be delivered throughout the entire duration of the project, will be also made available online through the project's website, whilst safeguarding at the same time the rights of the consortium partners to protect their IP. The **open-access strategy** pursued [1], is thoroughly described in the 'Data Management Plan' which is also publicly available through the project website. The project will furthermore promote its results at the National level in the various Member States of the partners and the members of TAB.

Regarding the **relevant presentations in Conferences/Symposia/Seminars/Workshops**, Table 2 below provides the list of upcoming events where the HECARRUS consortium aims to present its findings. The list will be regularly updated throughout the project based on its progress and relevance of events. Moreover, all completed actions and updates will be included in the final deliverable of WP5, D5.4 "Final plan for use and dissemination of results, including business models and IPR management plan".

In addition to conferences, all relevant scientific results not protected by any IP, may be disseminated through invited talks and lectures in related events like seminars and workshops. Workshops may either be organized by the consortium of HECARRUS or jointly by other organizations/projects. The overall exploitation of workshops will be another route of boosting dissemination and will enhance the successful outcome of the project. It should be noted that the total number of workshops hosted or participated by the consortium members, will also work as a key performance indicator (KPI) for the project's progress and credibility. Moreover, workshops can work as joint actions between the HECARRUS project and several other communities. Table 2 includes some planned and possible events where the HECARRUS project will host or contribute. The presented dates may be modified according to the organizers' decision, in the occurrence of global crises as the recent coronavirus pandemic which may force postponements or rescheduling of the planned events.

Table 2. Targeted Conferences/Symposia/Seminars/Workshops for the HECARRUS project.

Title	Details	Location and date(s)
ASME Turbo Expo - Turbomachinery Technical Conference and Exposition	Turbo Expo is one of the largest international conferences that encompasses topics spanning the entire turbomachinery industry. Yearly Turbo Expo attracts over 2,800 attendees from 50+ countries with varying degrees of expertise related to turbomachinery, plus access to over 100 exhibiting companies from all over the world that provide technology solutions for turbines.	Turbo Expo London, UK, June 2020 Turbo Expo Pittsburgh, Pennsylvania, USA, June 2021
Global Power and Propulsion Society (GPPS)	The Global Power and Propulsion Society (GPPS) is a volunteer-led international community and forum for rotating machinery professionals in industry and academia. The society aims to provide an environment for professionals to meet and exchange results and ideas, with a specific focus on power generation and propulsion systems.	GPPS Chania, Greece, September 2020 GPPS Forum, Switzerland, January 2021
International Council of the Aeronautical Sciences (ICAS)	ICAS is an international, non-government, non-profit scientific organization with the mission to advance knowledge and facilitate collaboration in aeronautics. ICAS is the only international support organization to representative aeronautical engineering professional societies and their	ICAS Congress, Shanghai, China, September 2020 ICAS Forum, Kyoto, Japan, September 2021

	members in 30 countries. ICAS organizes every two years an International Congress covering all aspects of aeronautical science and technology and their application to both military and civil aviation.	
AIAA/IEEE Electric Aircraft Technologies Symposium (EATS)	Electric Aircraft Technologies Symposium looks at progress over the past years and promotes discussion about the aerospace industry goals for future aircraft. To accommodate rapid growth in emerging markets and ensure sustainability of air travel, the symposium explores concepts of electric, turboelectric, and hybrid/electric powertrains.	AIAA Propulsion and Energy Forum and Exposition, New Orleans, Louisiana, USA, August 2021 EATS Symposium New Orleans, LA, USA, August 2020
American Institute of Aeronautics and Astronautics (AIAA)	The American Institute of Aeronautics and Astronautics (AIAA) is a professional society for the field of aerospace engineering. The AIAA is the U.S. representative on the International Astronautical Federation and the International Council of the Aeronautical Sciences.	AIAA SciTech Forum and Exposition Nashville, USA, January 2021
Aerospace Europe Conference (AEC)	This conference offers scientists and engineers from industry, government, and academia the opportunity to exchange knowledge and results of current studies and to discuss directions for future research in the fields of aeronautics and space. This is a recently established, joint event featuring the 3AF Greener Aviation, CEAS Air & Space Conference and Aircraft Noise and Emissions Reduction Symposium.	-
International Society for Air Breathing Engines (ISABE)	The International Society for Air Breathing Engines (ISABE) is an organization that was formed to further the free exchange, on an international level, of knowledge in the field of airbreathing propulsion for flight vehicles. ISABE has national representatives from more than 25 nations and holds events on six continents.	ISABE Ottawa, Canada, 2021
Electric & Hybrid Aerospace Technology Symposium	Electric & Hybrid Aerospace Technology Symposium is one of the world's leading international conferences dedicated to ultra-low-emission aircraft technology and full-electric flight possibilities. The event covers all aspects of aerospace activity, from general aviation and smaller regional aircraft, to larger commercial airliners. Its purpose is to highlight the fast-paced development of hybrid propulsion and electrical subsystem architecture or MEA and to discuss the vast research into increased electrification of aircraft and the possibilities and challenges that brings.	Köln Messe, Cologne, Germany, November 2020
Project dedicated workshops	Workshops organized by the Consortium itself where it will invite people from its targeted audience. Workshops participation, organized by CS2JU, Innovation and Research Executive Agency (INEA) and EU in general	EU-funded Aviation Research on Hybrid-Electric Aircraft Brussels, Belgium, January 2020

HECARRUS consortium is planning to hold dedicated sessions on hybrid-electric aircraft technologies as project specific dissemination events, in one or more of the abovementioned events.

Regarding the **publications in international Journals**, the list below (Table 3) indicates some of the major targets of the HECARRUS consortium. It should be highlighted that publications in high quality journals and conferences will also act as means of verification for the several milestones that will be achieved throughout the project. It should be noted that the impact factor appearing in the corresponding table is indicative of the month and year that this document was written (March, 2020).

The consortium has already planned for the publications of the first year and also some of the publications that will emerge in the following years. It should be highlighted that all published work of the project will become publicly available in an open access manner through its website.

Table 3. Scientific Journals' list.

Title	Aims & Scope	Impact Factor
Applied Energy	This journal provides a forum for information on innovation, research, development and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, analysis and optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.	8.426
Energy	An international, multi-disciplinary journal in energy engineering and research, which covers research in mechanical engineering and thermal sciences, with a strong focus on energy analysis, energy modelling and prediction, integrated energy systems, energy planning and energy management.	4.159
Applied Thermal Engineering	This journal disseminates applied novel research about the development and demonstration of components, equipment, technologies and systems involving thermal processes for the production, storage, utilization, and conservation of energy.	4.026
IEEE Transactions on Aerospace and Electronic Systems	IEEE Transactions on Aerospace and Electronic Systems focuses on the organization, design, development, integration, and operation of complex systems for space, air, ocean, or ground environment	2.797
ASME Journal of Turbomachinery	Its scope includes the fluid dynamics, heat transfer, and aeromechanics technology associated with the design, analysis, modeling, testing, and performance of turbomachinery. Emphasis is placed on gas-path technologies associated with axial compressors, centrifugal compressors, and turbines.	2.592
IEEE Aerospace and Electronic Systems Magazine	IEEE Aerospace and Electronic Systems Magazine is a monthly magazine that publishes articles concerned with the various aspects of systems for space, air, ocean, or ground environments as well as news and information of interest to IEEE Aerospace and Electronic Systems Society members.	2.113
AIAA Journal of Propulsion and Power	This journal is a bimonthly peer-reviewed scientific journal covering research on aerospace propulsion and power.	1.885
Journal of Engineering for Gas Turbines and Power	Its scope includes aircraft ranging from engine configurations, design concepts, component and systems interactions, to operability, stall and surge, life cycle and component life management, inlets and exhaust nozzles as well as rotating detonation engines.	1.653
Aerospace - MDPI	Aerospace is a peer-reviewed open access journal of aeronautics and astronautics published monthly online by MDPI. The Aerospace journal provides an open access publication.	1.63
Aeronautical Journal	The Aeronautical Journal contains original papers on all aspects of research, design and development, construction and operation of aircraft and space vehicles.	0.976
Journal of Aerospace Engineering	The journal is dedicated to the publication of high quality, peer-reviewed research in all branches of applied sciences and technology dealing with aircraft and spacecraft, and their support systems.	0.454
Global Power and Propulsion Society (GPPS) Journal	The GPPS is an international community and forum for rotating machinery professionals in industry and academia. The society's aim is to provide an environment for professionals to meet and exchange results and ideas, with specific focus on power generation and propulsion systems. The GPPS journal is an online open access publication.	-

The final dissemination tool regarding the publications section is the **project e-publication and e-newsletter**. At least 2 e-newsletters will be created annually to provide relevant the relevant audience with up-to-date information about the project. These constitute of periodically published material that will be uploaded on the project website and which will be also sent to the subscribed users. The users will find a newsletter registration form that will inform them about the privacy policy and the applying terms and conditions.

As it has already been described in D5.2 – 'Data Management Plan', specific measures must be taken, fully compliant with the rules laid down in the Grant Agreement to **ensure open access to all peer-reviewed scientific publications and to research data relating to the project's results. 'Access'** includes not only basic elements – the right to read, download and print – but also the right to copy, distribute, search, link, crawl and mine.

Apart from the first and foremost priority of the authors to publish in open-access, high-quality journals without any charges, the 2 other main routes to open access are:

A. Self-archiving / 'green' OA – the author, or a representative, archives (deposits) the published article of the final peer-reviewed manuscript in an online repository before, at the same time as, or after publication.

B. Open access publishing / 'gold' OA – an article is immediately published in open access mode. In this model, the payment of publication costs is shifted away from subscribing readers. Partners may also decide to publish in journals that sell subscriptions, offering the possibility of making individual articles openly accessible (hybrid journals). In such a case, authors will pay the fee to publish the material for open access, whereby most high-level journals offer this option.

The relevant beneficiary will moreover **deposit** at the same time the research data needed to validate the results presented in the deposited scientific publication **into a data repository** as it has been described in the data management plan (e.g. H2020 Open Access Research Data Platform - OpenAIRE).

2.5.2 Educational sessions

The research and educational institutions are identified as relevant stakeholders of the project. Therefore, educational sessions integrating the knowledge developed within the project are offered at local as well as international level to students (undergraduate and postgraduate) and researchers in high level Engineering courses in AUTH and MDH, thanks to the presence in the consortium of senior researchers and professors from these institutions as well as the already established collaborations.

At least 2 PhDs specific programmes will emerge from the project and have either already started or are about to start. Moreover, AUTH and MDH will involve a number of MSc students that will focus on HECARRUS related topics, under the supervision of senior researchers and professors.

Moreover, the education related activities and the material that will be generated throughout the research that is being done, will be deployed at various seminars and workshops per year about aircraft and engines conceptual design along with the electrification of future propulsion systems.

2.5.3 Liaison/collaboration with other parties

The consortium will be actively seeking liaison with the most relevant European communities, involving the interested stakeholders and the relevant Clean Sky 2 community. Upon invitation by the CS2JU, the INEA and European Commission (Directorate-General for Research and Innovation),

common information and dissemination activities will be performed by HECARRUS to increase visibility and synergies between CS2JU supported actions.

Moreover, joint dissemination actions (Common Dissemination Booster) will be sought with parties from other ongoing H2020 – CS2 projects (e.g. ELICA, UNIFIER19) of the framework of Small Air Transport (SAT) Transverse Activities (TA) and potentially, other related mechanisms such as the Technology Evaluator, Engine demonstrators etc. The collaboration of all projects can stimulate a mutual benefit of sharing data, also useful to strengthen the future exploitation of the results of the project.

2.5 Dissemination output

HECARRUS will produce a rich and diverse series of outputs. In addition to the outcome that is expected to emerge as a KER, technical details will result from the project publications and publicly available deliverables. The present chapter summarizes the public deliverables that will effectively disseminate the project's progress and results (Table 4) in a timely manner.

Table 4. HECARRUS project public deliverables.

WP	Activity	Channel	Due Date (in months)
WP1 *Efficiency and TRL of each component of the powertrain*	State-of-the-art technologies on research and developments underway in the field of alternative propulsion architectures **[D1.1]**	Project website, e-Newsletter, Journal/Conference publications, Physical dissemination: Workshops, conferences, educational sessions	**M6**
	Report on numerical methods and tools developed for modelling and simulating advanced GT engines **[D1.2]**	Project website, e-Newsletter, Journal/Conference publications, Physical dissemination: Workshops, conferences, educational sessions	**M12**
WP2 *Integrated systems level and powertrain architecture optimization*	*Assessment of hybrid electric architectures for a small commuter aircraft* **[D2.1]**	Project website, e-Newsletter, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M9**
	Sizing, layout and performance of critical technologies **[D2.3]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M36**
WP3 *Small commuter aircraft conceptual design*	*Numerical investigation on the aerodynamic design of a hybrid commuter aircraft* **[D3.1]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M24**
	Preliminary structural modelling of a hybrid commuter aircraft **[D3.2]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M30**
	Final report on the preliminary design review of a conceptual hybrid commuter aircraft **[D3.3]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M36**
WP4 *Evaluation of environmental performance and economic viability*	*Techno-economic and environmental risk assessment* **[D4.1]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M30**
	Life Cycle Analysis **[D4.2]**	Project website, Journal/Conference publications, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M36**
WP5 *Project management, dissemination and communication*	*Data management plan* **[D5.2]**	Project website, e-newsletter	**M3**
	Dissemination, communication and exploitation plan **[D5.3]**	Project website, e-newsletter, communication material, Physical dissemination: Workshops, seminars, conferences, educational sessions	**M6**

3. Communication Plan

Communication activities are undertaken to support targeted dissemination activities and promote objectives and findings of the project. They aim at promoting the project to various audience, comprising the media and the general public, and at raising awareness on the addressed topics and findings. Communication activities are especially aimed at:

- creating a project visual identity and public image;
- providing up-to-date information about the project;
- sustaining the diffusion of results to the general public; and
- translating the scientific/technical results into messages for public outreach, comprehensible also by the non-technical general public.

3.1 Communication means/channels

As already stated in the project's dissemination strategy, one of its objectives is to build an adequate and effective communication plan to ensure the maximum impact of the project results. Therefore, the communication activities will include as well as exploit the following communication means/channels:

- project public image;
- project website;
- social media and research platforms;
- communication material (project leaflet, poster and presentation template);
- e-publications and e-newsletters.

3.1.1 Project public image

The project image (Figure 1) allows for an easier identification by the public and ensures visibility and recognition. HECARRUS adopts a captivating **project logo** as a common project and graphical visual identity to attract external visitors and increase interest on all the communication material content.

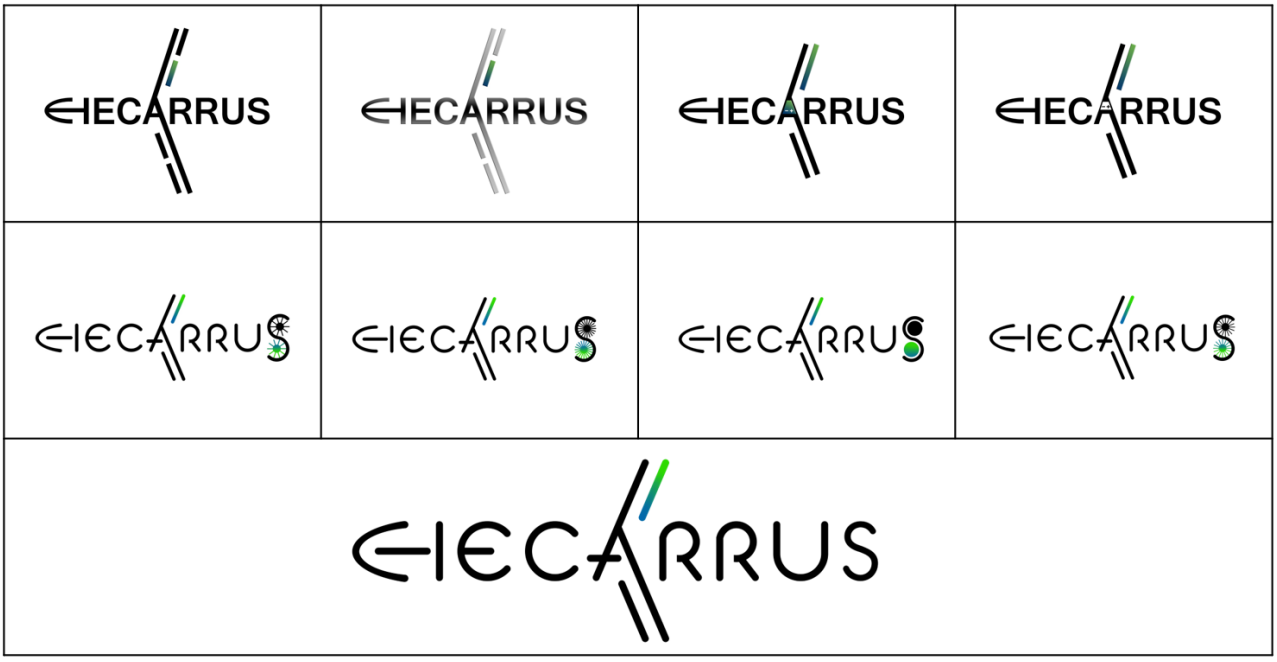

Figure 1. Project logo development.

There have been several versions of the logo prior to the final selection. Initially, the schematic refers to the structure of an aircraft consisting of a conventional layout. The colored engine represents electrification and hybridization. The concept here aims to demonstrate that the aircraft engines of this novel concept will not be identical, as it is so far known for conventional aircraft around the globe. Moreover, the initial idea of having several engines aims to represent the concept of redundancy and provide a sense of distributed propulsion to the aircraft. The concept of not having all engines oriented in the same direction represents the different concepts of pusher and/or puller engines or even the counter-rotating propeller concept. The battery observed at the mid of some of the logos represents that this is a hybrid-electric aircraft, in order to differentiate from turboelectric concepts. The second group of logos employs a futuristic font and also includes two engines at the 'back' of the aircraft, as an attempt to demonstrate the boundary layer ingestion concepts that constitute a part of research within this project. Finally, the larger logo displayed at the bottom of Figure 1 is the actual logo that is selected, as simplicity is selected over complexity. Only the basic elements are selected, to represent the hybrid aircraft of the future.

3.1.2 Project website

As it is described in the project official proposal, a project website is developed as the main dissemination channel, to ensure the largest project impact and dissemination. The website of the HECARRUS project is available for the public at: **www.hecarrus.eu** . Additionally, the following domain has been reserved and will redirect the users to the main website domain: *www.hecarrus.com*. The website is officially available since the 4th of October 2019 and will be maintained online as well as after the project's completion, to increase visibility and raise general awareness of the targeted stakeholders.

The development of the website aims to provide visibility to the project besides giving public access to relevant, non-IP sensitive results via a summary page on progress and achievements, downloadable publishable periodic activity reports and other publishable documents. The website is directly linked with HECARRUS social media and research platforms (Facebook, LinkedIn, Research Gate) to increase awareness of all interested parties about the project's progress and initiatives.

The **main target groups** of the HECARRUS website and general media channels are vast. First and foremost, from a generic point of view, the overall community of aerospace and aeronautical engineering. More specifically, governmental parties consisting of regulatory and economic authorities, manufacturers of propulsion systems, integrated aircraft systems and MRO (Maintenance, Repair & Overhaul) companies, airframe manufacturers and even from the energy sector communities (including battery developers, energy utilities etc.) as the development of electric aircraft will completely lead to a rethinking of flight and the latter community needs to work in close collaboration with the aviation sector, to achieve the optimal outcome with regard to overall environmental footprint. Furthermore, the scientific community gravitating around the specific scientific and technical fields tackled by the project and finally, the media and the general public.

3.1.2.1 Technical details and website structure

The website is developed in the PHP programming language basing on a MySQL database. It is fully responsive and adapts to all screen analyses of any device (Figure 2).

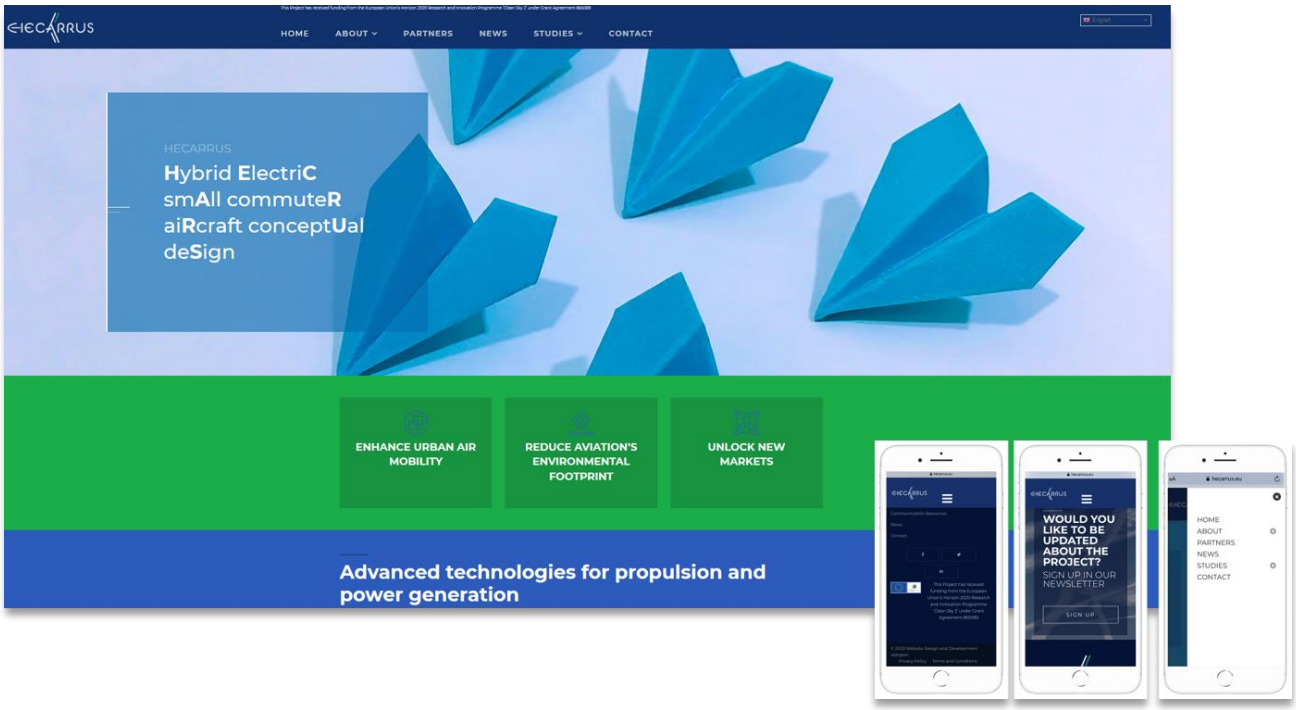

Figure 2. Website developed to fully adapt on every screen.

Moreover, sophisticated techniques for showing and displaying the various elements of the website have been used. The text font selected is a Google Font to provide a uniform display of the content regardless of the device used to visit the website. The particular Google Font selection provides a user friendly and easy-to-read font suitable for all devices (computer monitors, tablets, smartphones). The web server hosts all the security requirements and its operating systems are currently the latest versions of PHP and MySQL. The public section of the website describes the project and its partners in detail and will be regularly updated with various news and announcements to be posted on the relevant sections.

The structure of the website has been developed in such a way so that it quickly addresses the key questions that external visitors to the website are expected to have, such as:

- What is the importance of the project and what specific challenges does it address?
- What are the objectives of the project?
- What is currently being done in the project?
- Who is behind the project?
- What are the relevant results that emerge out of this research?

The website is structured in such a way so that it addresses the abovementioned questions. Hence, it consists of the following main elements:

→ The **homepage** (Figure 3) communicates the user to the main aspects of the project. The home page is organized in six subsections (i. A slider including an attractive three-image formation, ii. Project objectives and challenges, iii. Highlights of the project, iv. Quick access to the project's latest news on press and events, v. Partners of the project).

→ The **header** which composes of the main navigation menu (Figure 4). This allows for a navigation through the various subsections and is described in greater detail in the following subsections.

→ The **footer** which appears in all main and sub-pages, home or content pages and contains links to the social media, research platforms, funding acknowledgment, terms and conditions and privacy policy (Figure 5).

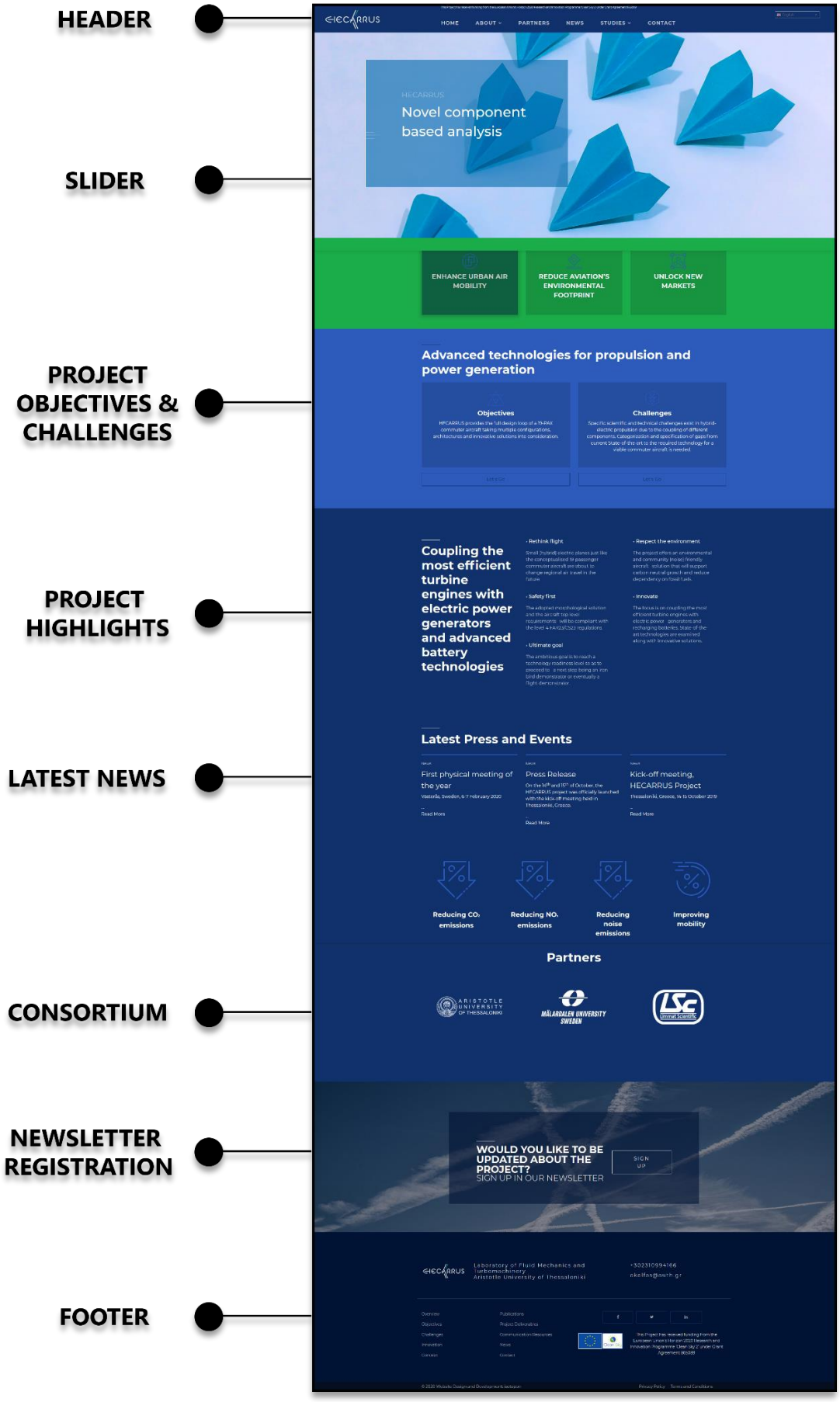

Figure 3. HECARRUS project homepage.

Figure 4. Website main navigation menu.

Figure 5. Website footer including acknowledgment and general media.

It should be noted at this point, that the **latest press and events** field is an interactive section in the website's homepage that contains all the news of the website including events, articles and publications of the project, newsletters, conference special sessions, public deliverables etc., as soon as they are readily available. They are presented in a chronological order with the newest being presented first. Clicking on the title of the desired article will direct the user to the full content of the respective subject.

Finally, an invitation banner is added at the bottom of the homepage, indicating to the interested website visitors to stay in touch with the project, by registering to the **project's newsletter**.

3.1.2.2 Website sections

3.1.2.2.1 About

OVERVIEW

The scope of this section is to inform the public about the features of the HECARRUS project by introducing its key-points and answer some of the fundamental questions that an interested visitor may have. A comprehensive figure is provided to demonstrate the approach of the under-design aircraft (Figure 6).

OBJECTIVES

The purpose of this section is to briefly present to the public the main objectives that the HECARRUS project pursues. The key objectives are shown in Figure 7. Each main objective extends to a more detailed description if the user wishes to find out more about each of the objectives described.

CHALLENGES

The HECARRUS Project addresses some specific challenges related to the reduction of the environmental impact of small aviation technologies, as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe. This proposal is submitted under

Horizon 2020 work programme "Clean Sky 2", in the Call H2020-CS2-CFP09-2018-02, topic "JTI-CS2-2018-CFP09-THT-03: Conceptual Design of a 19 passenger Commuter Aircraft with near zero emissions". In addition to each of the specific challenges described, the proposed solution by the project can be found in a user-friendly selection (Figure 8).

Figure 6. Overview of the project.

Figure 7. HECARRUS main objectives.

CONCEPT AND APPROACH

This section aims to provide an overview of the project's approach. The project's scope is to explore and establish regions of the design space previously unexplored and identify regions of technology development where significantly enhanced outcomes can be achieved. Hence, the intermediate steps that will be taken throughout the project are presented, along with the expected outcomes that have emerged, in line with the project's main objectives (Figure 9).

INNOVATION

This subsection describes some of the steps that will be taken during the project's cycle life that will advance current state-of-the-art technologies to novel methodologies and results (Figure 10). The electrification of modern aircrafts, and, in particular those related to small aviation is inherently characterized by the ground-breaking nature of the integration of highly innovative and efficient components that synthesize a state-of-the-art technology. The main areas of advancement beyond the current state-of-the-art include simulation and optimization tools processes for the components of the powertrain (gas turbine, energy storage system, motors/generators) and integration of the components at systems' level. Moreover, novel architectures will be designed for the small commuter aircraft of the future.

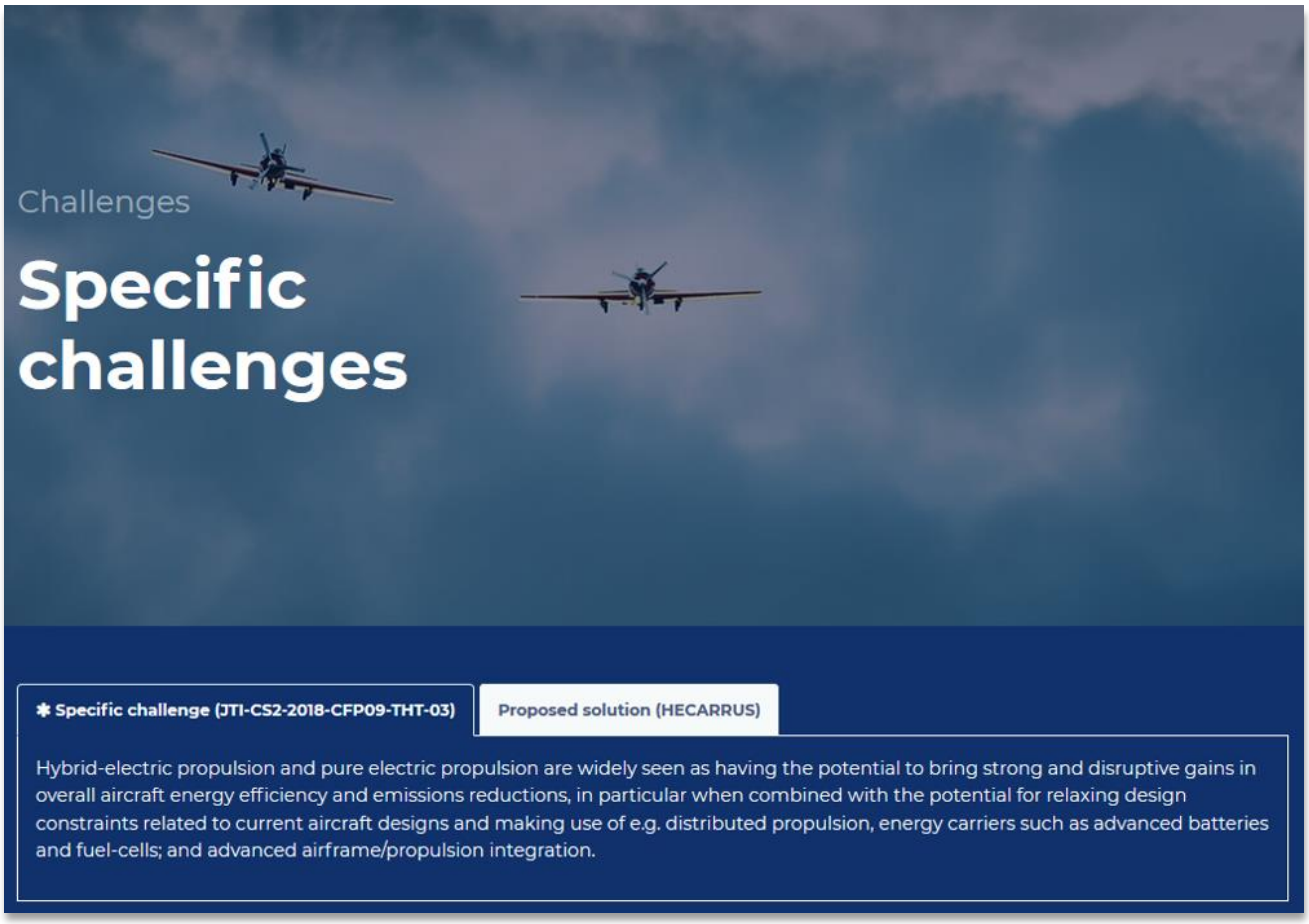

Figure 8. Specific challenges of the project.

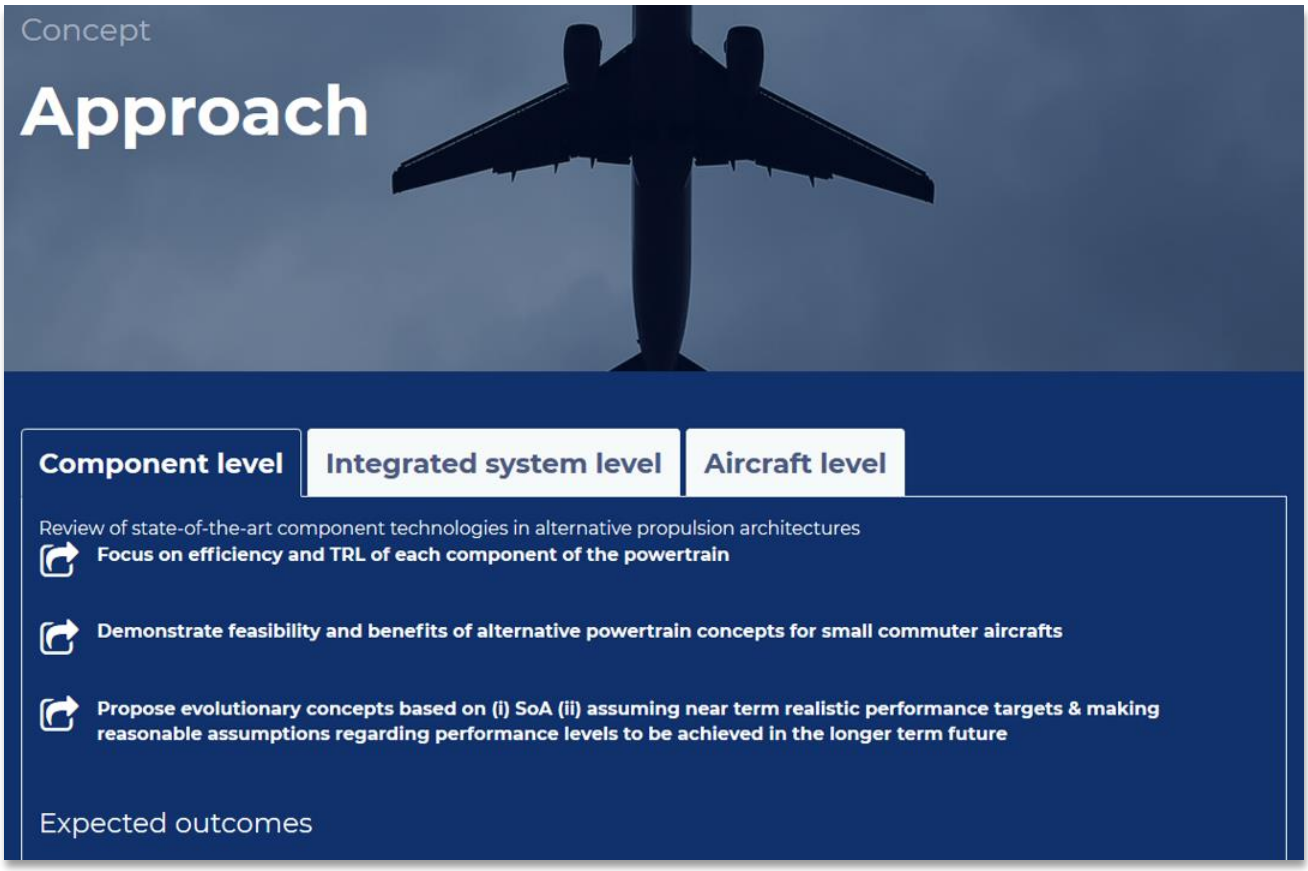

Figure 9. Overall project approach.

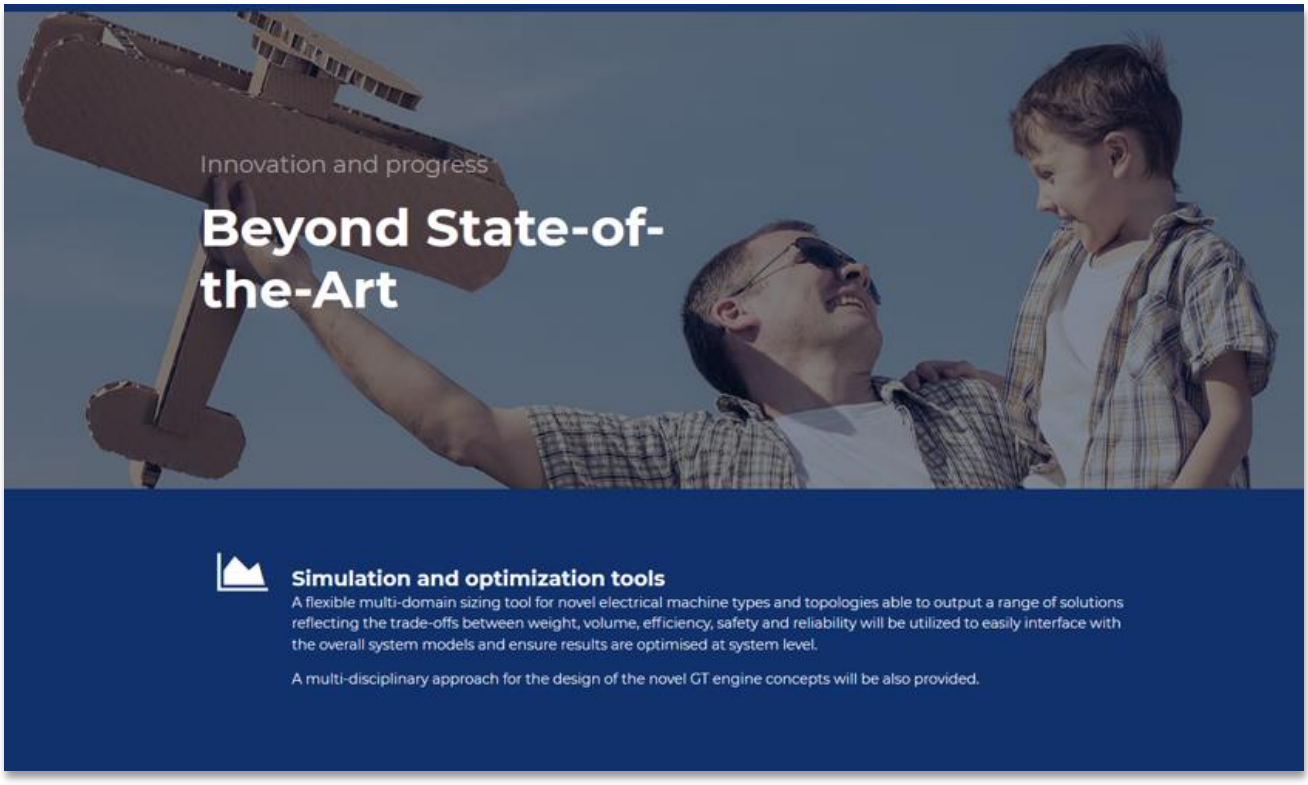

Figure 10. Progress of the project beyond state-of-the-art.

FUNDING

This section provides basic information about the funding of the project. In addition to the funding acknowledgment, which appears in all pages, this section includes more details about the funding received for this research and innovation programme.

As it is shown in Figure 11, this submenu includes a link which redirects the visiting user to the Clean Sky 2 Programme, so that interested users may have the opportunity to easily access the Framework that is funding the current project. Additionally, a short description of the Action's details is provided, regarding the submission, approval and beginning dates of the project.

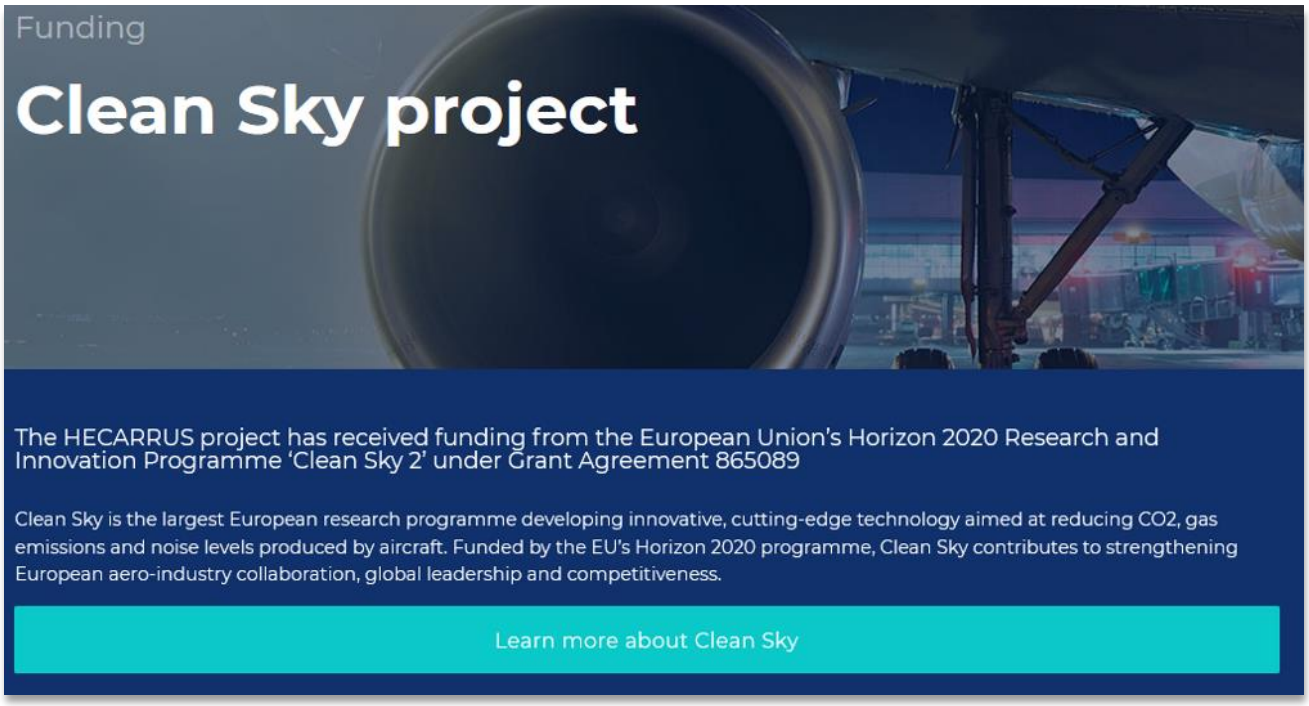

Figure 11. Details on funding of the HECARRUS project.

3.1.2.2.2 Partners

The following section consisting the website header is the 'Partners' list that contains the list of participants within HECARRUS consortium (Figure 12). Whenever the user clicks on a partner's logo, more details unfold, providing further information about each partner's role in the project.

Figure 12. Consortium partners.

3.1.2.2.3 News

The following section contains the 'News' of the project, including project events, press release and e-newsletters. This section has as its main goal to keep the visiting users updated on the project's progress, by regularly uploading the most recent news, which will include pictures, videos, useful and promotional documents. The 'News' tab consists one of the most crucial sections as a means of the project's dissemination.

3.1.2.2.4 Studies

The 'Studies' section includes most of the scientific and technical details that result from the project's progress. All relevant publications and public deliverables (Figure 13) will be made available through this category. One of the project's general dissemination and communication strategies focuses on the exploitation of results, as it is also described in the last part of this work. Hence, there is a strong focus on disseminating the project's results once they are mature enough to clearly show the benefits that a new technology can provide to relevant communities. Thus, the scope of this section is to include the publications of papers and articles in conferences and journals (Figure 21). It should be noted here that all of the scientifically related publications will be open-access to disseminate the results and methods to the community. Moreover, this page will provide download links for the public deliverables of the project, which will become available as soon as the deliverables are completed and evaluated.

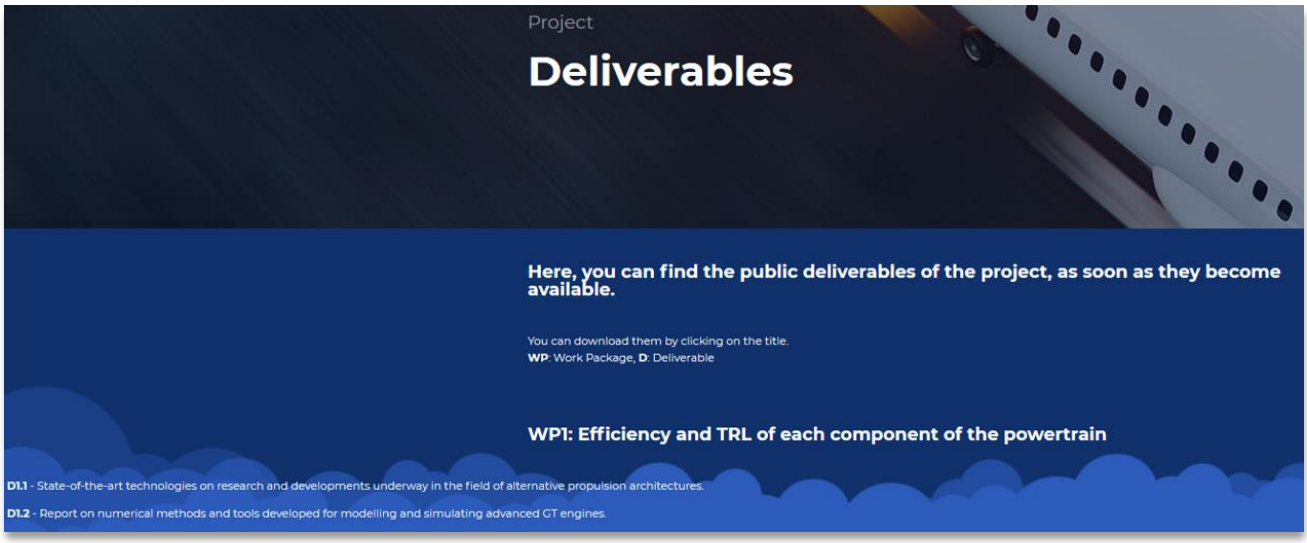

Figure 13. Public deliverables' list.

3.1.2.2.5 Contact

The final section is the contact page. It provides all the necessary details so that every interested person may use it to directly contact the project coordinator and the project chief engineer. Additionally, the challenge-response system CAPTCHA[2] security is added to deter between spam-originated use and avoid inserting any malicious or frivolous codes. The contact page allows for useful and creative feedback on the project's goals and bring the interested parties into direct contact with the project coordinator and chief engineer.

3.1.2.2.6 Accessibility

In order to communicate the basic information in more languages, a Google Language Translator plug-in is added (Figure 14). Despite that the official language of the website is English, the 'translate' feature is provided to meet different user needs and preferences and provide a worldwide profile.

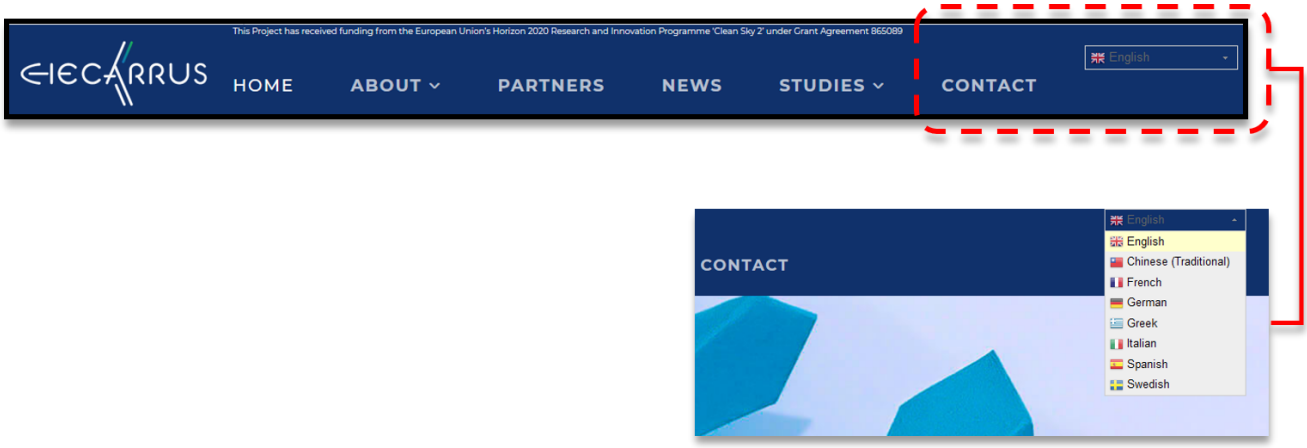

Figure 14. Accessibility in various languages.

3.1.3 Social media and research platforms

Research Gate

HECARRUS is a Thematic Topic as part of Research and Innovation Actions (RIA). As various publications and results are expected to occur throughout its entire duration, as well as after its conclusion, the consortium has created a project profile under the name '**HECARRUS**' in 'ResearchGate'. ResearchGate is a professional network for scientists and researchers. Its purpose is to

have all publications shared in a mutual platform and allow for scientists to connect and discuss on common research topics. As such, any research item developed by the project and related to the project, will be uploaded onto this platform as well. In this way, the project will further enhance dissemination and communication actions and will also enable open-access to a significant number of published articles, not restricted by any copyrights.
The link of HECARRUS can be find in https://www.researchgate.net/project/HECARRUS.

LinkedIn

The LinkedIn profile is named **HECARRUS Project**. Its purpose is to allow for engaging of the interested stakeholders in an easy manner. The interested users can directly connect to this account and get familiar with the project's updates (Figure 15). The overall purpose is to create a community around the HECARRUS project to further enhance promotion of the environmentally friendly, new technologies. Besides, success on social media will result in better longevity to the project's brand.

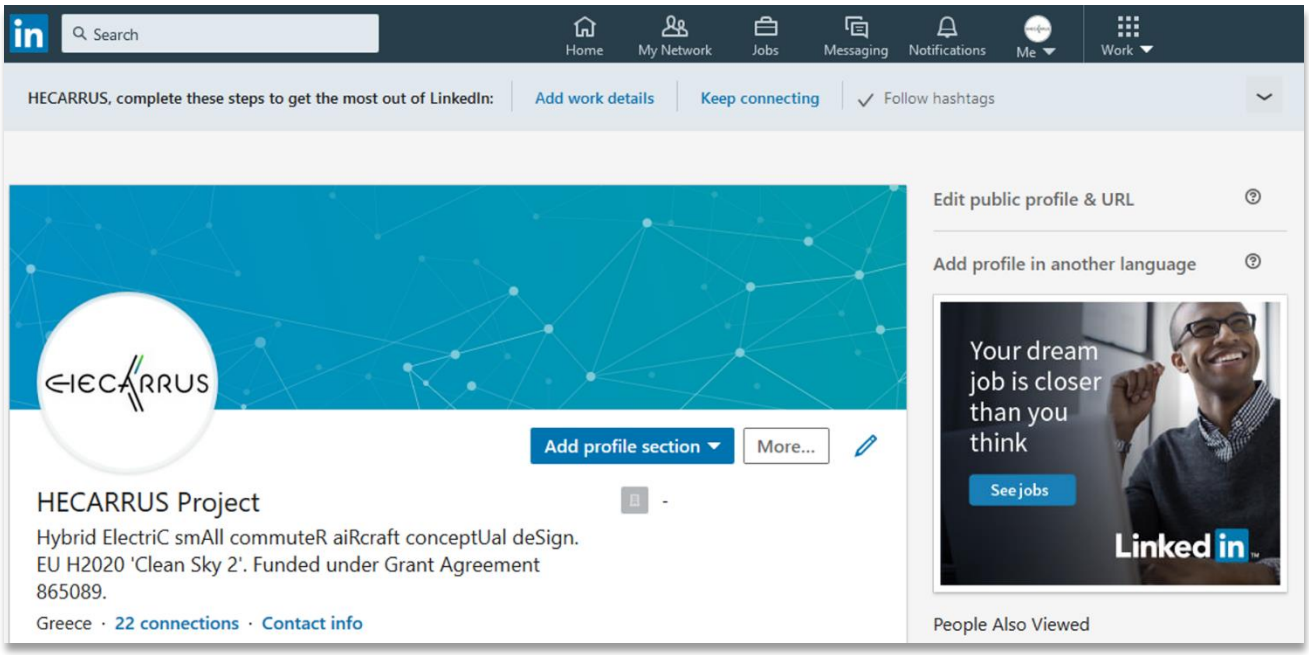

Figure 15. HECARRUS project. LinkedIn profile.

Facebook

The Facebook profile is named **Hecarrus Project** and can be followed at https://www.facebook.com/Hecarrus-Project-116585126409260/?modal=admin_todo_tour (Figure 16). It will consistently be updated with all related news and initiatives. The social networking services of Facebook will assist in the project's online presence. Its main purpose is to attract both interested parties and also, people that are not directly related to the subject, but are interested to follow up with its updates. Moreover, as the Facebook has the most active users out of the other social media, it may provide a tool of statistical significance due to the sample size. This approach also creates a natural opportunity to reach out to industry insiders and get their opinion as there are also other Facebook groups that are oriented towards the same industry as the HECARRUS project.

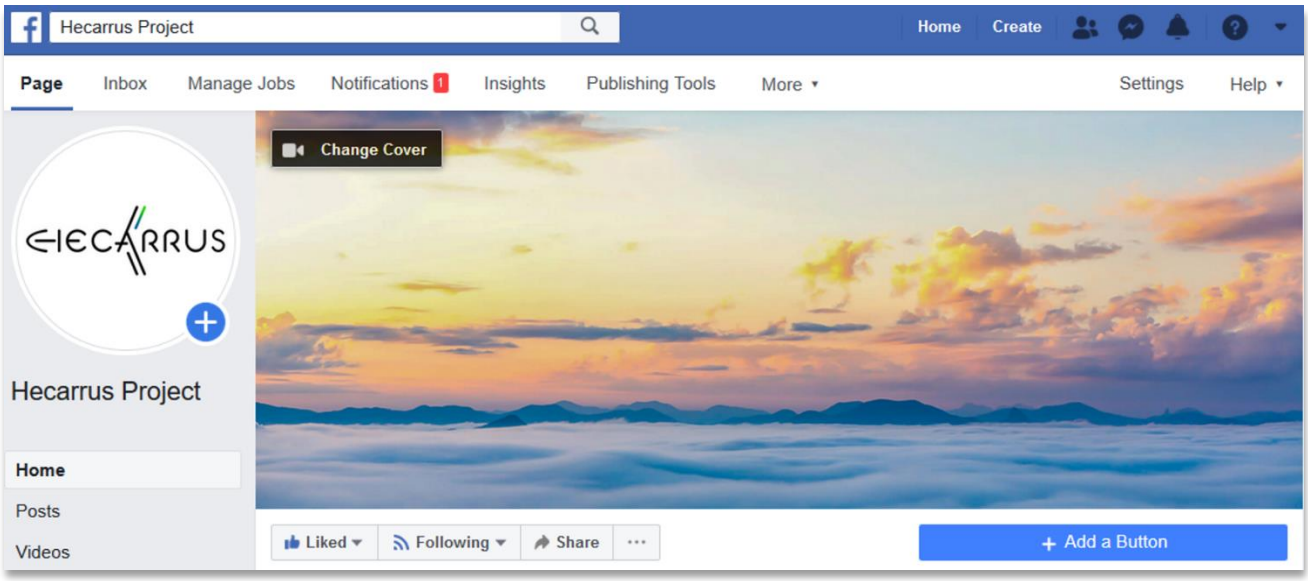

Figure 16. HECARRUS project. Facebook profile.

It should be highlighted that the website of the project is directly linked with HECARRUS social media accounts in order to increase awareness of all interested parties about the project's progress and initiatives.

3.1.4 Communication material

The development of a project leaflet and poster, enhances the project visual identity and public image and hence, allows an easier identification by the public, ensuring visibility and recognition. The communication material described are presented below.

3.1.4.1 Leaflet

The main objective of the project leaflet is to provide to all the different types of identified target audience of HECARRUS project with an attractive and written project overview as well as a summary of the main project objectives and characteristics. Therefore, to assist in the overall dissemination strategy, a promotional, tri-fold project leaflet is available online, in .PDF format, at the "Communication Resources" page of the website. The leaflet is written in English, with a clean, modern and attractive design that implements the art of visual communication.

The two sides of the unfolded leaflet can be seen in the following page. Figure 17 presents the external side of the leaflet while the internal part can be seen in Figure 18. The graphical representation of the external leaflet page symbolises the main topics investigated and integrated throughout the project's duration. The outer page of the three-fold includes HECARRUS visual identity, logo and details of funding. Moreover, the main key messages of the project including the challenges at international, national and aircraft level appear along with the project's goals and objectives that aim to address them. Details of the project consortium, technical advisory board and contact point are also provided. The internal side includes a roadmap that describes some of the milestones of the project, throughout the 36-month duration. Additionally, some key aspects of aircraft conceptual design and hybrid-electric configurations that are assessed in the project are provided. Lastly, part of the key features of the project, including multidisciplinary optimization and CFD studies on boundary layer ingestion-based engine designs are presented.

According to project Key Performance Indicators (KPIs) which are described in the following section, an estimation of more than 1,000 leaflet copies is deemed to be an excellent performance metric for the first round of the project's dissemination.

3.1.4.2 Poster

A general project poster is designed to be used in public events and exhibitions and is shown in Figure 19. The poster is prepared in English and provides the reader with intuitive and succinct textual and graphical information about the project general idea and innovative concept. It is created to attract stakeholders and a variety of audiences. The poster's printable version is available in the website's "Communication Resources" section. The project and EU logo are clearly displaced, along with the declaration that "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 865089". Furthermore, more details about the type of action and funding are provided, together with a user friendly and attractive map where the partners and members of the TAB of HECARRUS reside.

3.1.4.3 Presentation template

HECARRUS will be represented by its members in several conferences, project meetings as well as other events such as workshops and exhibitions to disseminate project results and further enhance the overall dissemination efforts. For this reason, a project characteristic presentation template in .pptx form has been designed, in line with HECARRUS graphic identity. The template is shown in Figure 20.

Figure 17. Leaflet external side.

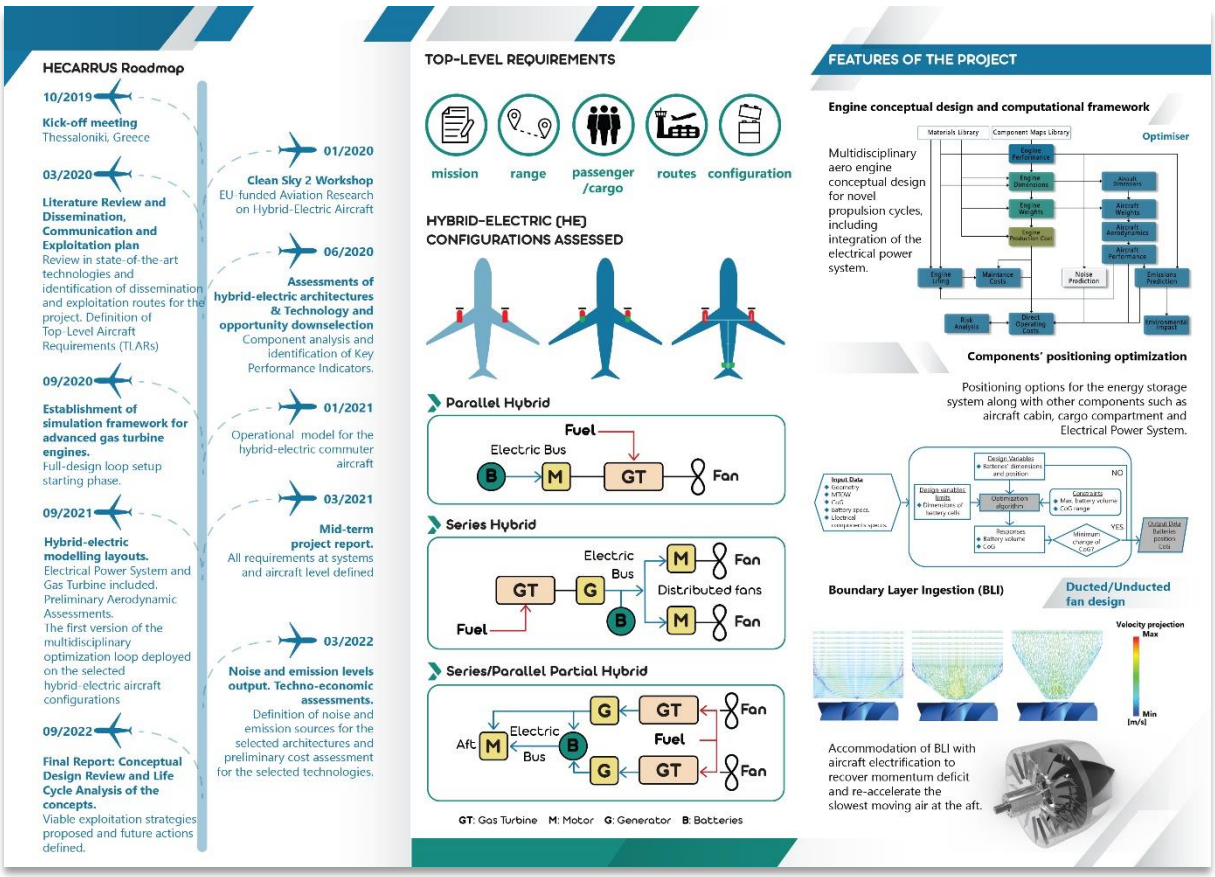

Figure 18. Leaflet internal side.

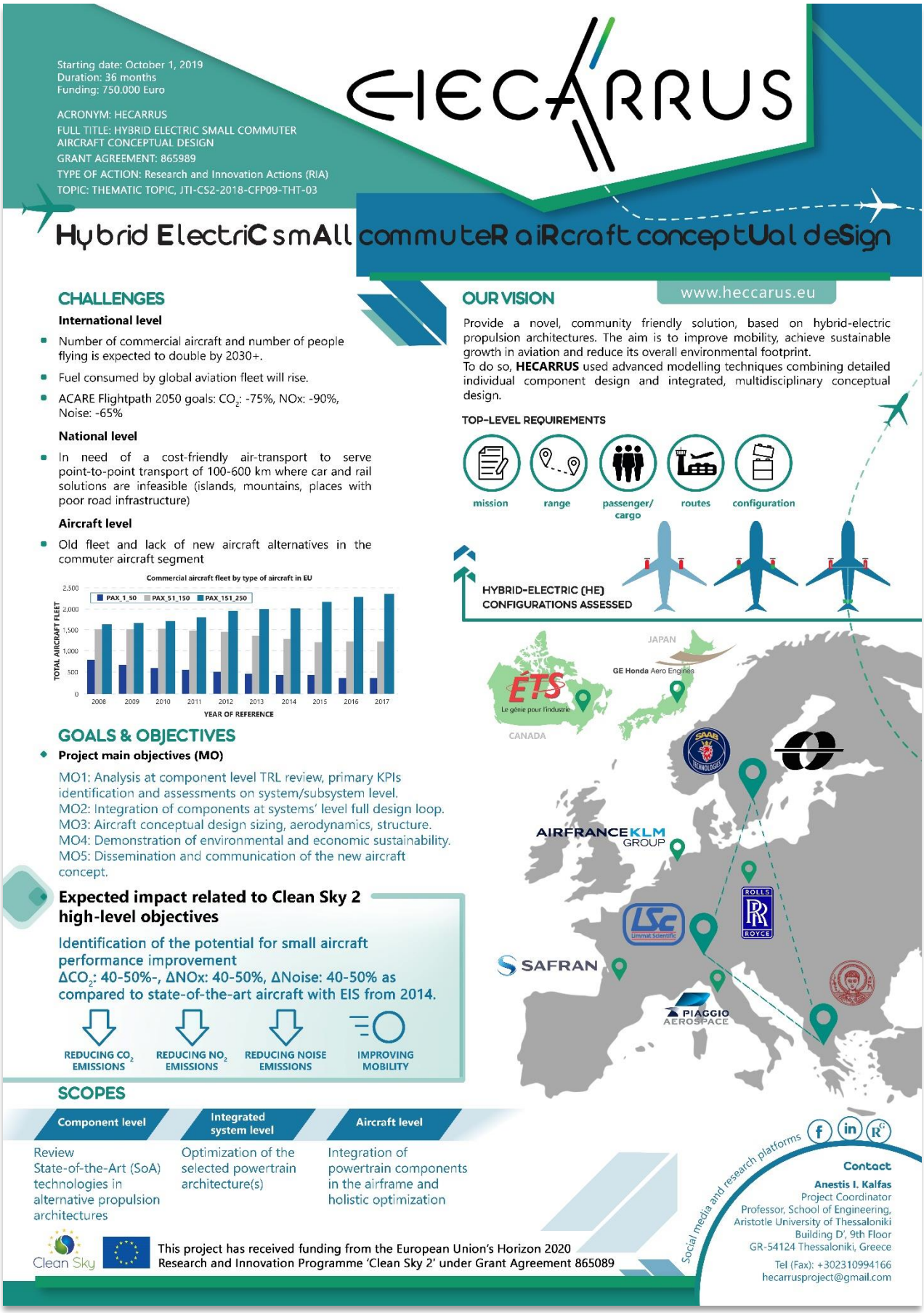

Figure 19. HECARRUS Project poster.

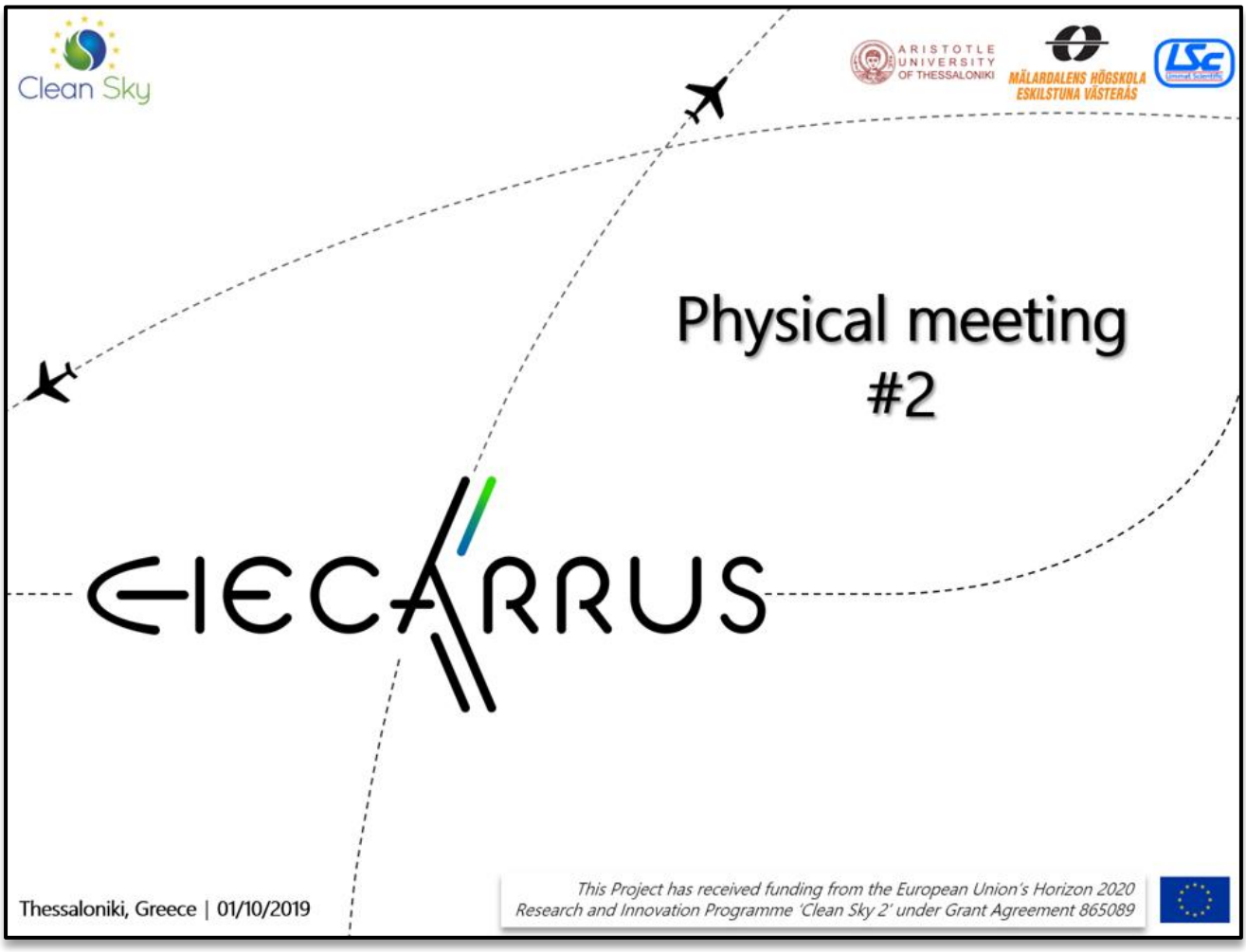

Figure 20. Presentation template.

3.1.5 E-newsletters

The e-newsletter is an electronic document that is used to inform the interested audience with key findings and topics of the project. It will be released on a regular basis, in order to provide to relevant communities with up-to-date information about the project. The newsletter will be sent to relevant stakeholders beyond the project community through electronic means (e-mail). It will also be uploaded on the project website. Additionally, the users may register in the website either through the respective banner, at the bottom of the homepage. The e-newsletters that will be issued will provide useful information about:

- Project-related news (e.g. meetings, interviews)
- Announcements of the project's progress
- Dates, details, comments regarding project related conferences, meetings, events or publications
- Upcoming workshops
- Other information that will be provided by partners

3.2 Dissemination and communication strategy evaluation

The successful planning of a dissemination and communication strategy should be framed by a regular evaluation process. This process helps in evaluating and correcting the planned actions by the respective work package and task leaders. Therefore, setting up some metrics as a means of

dissemination efficiency evaluation, is deemed essential. The analysis of these metrics unveils possible weaknesses of the planned dissemination and communication process and helps the consortium improve the overall effort. Depending on the nature of an action, there are certain indicators that can actually imply the achieved impact, such as:

- The number of visits/views of the project website and social media (monitoring tools like "google Analytics" or similar are usually employed to capture this indicator)
- The number of downloads, which is a measure that applies in knowledge documents such as publications and public deliverables and will be made available on the website
- The number of followers/friends/connections/likes is an indicator of popularity and has become famous due to the widespread adoption of social networks
- The number of publications (journals, conferences, e-books, books) along with the respective impact factor will demonstrate the impact of the project activities to the related scientific community
- The number of events organized and attended by the consortium

Since one of the fundamental roles of this deliverable is the scientific dissemination plan, Table 5 presents a list of all the scientific activities along with the impact indicators, their target values and the way to be measured:

Table 5. Project Dissemination Key Performance Indicators (KPIs).

Dissemination Activity	Impact Indicator(s)	HECARRUS target	Source of measurement
Conferences and Events	Number of events with HECARRUS presence	<5 = poor 5-10 = good >10 = excellent	Project reporting
	Total attendees (target audience)	<3000 = poor 3000-7000 = good >7000 = excellent	Participants' list
	Potential interested stakeholder identification	<5 = poor 5-15 = good >15 = excellent	Participants' list
Workshops	Number of workshops organized/participated	<2 = poor 2-5 = good >5 = excellent	Project reporting
	Attendance (target audience)	<100 = poor 100-200 = good >200 = excellent	Participants' list
Scientific Dissemination	Number of publications in Journals	<3 = poor 3-5 = good >5 = excellent	Project reporting
	Number of presentations in Conferences	<3 = poor 3-7 = good >7 = excellent	Project reporting
	Possible collaboration with the industry	0 = poor 1 = good >1 = excellent	Project reporting
	Specific PhD research topics on the studied topic	0 = poor 1 = good >2 = excellent	Number of PhD theses
	Downloads of online communication material	<50 = poor 50-100 = good >100 = excellent	Monitoring tools
	Project website and social media visits	<2.000 = poor	Monitoring tools

		2.000-5.000 = good >5.000 = excellent	
Promotional material	Copies of leaflets	<500 = poor 500-1.000 = good >1.000 = excellent	Monitoring tools
	Number of press releases	<2 = poor 2-5 = good >5 = excellent	Monitoring tools

3.2.1 Potential risks and contingency plan in dissemination plan

A successful dissemination plan requires that any potential risks are identified and mitigated. Table 6 provides some of the dissemination implicit risks along with the mitigation actions to be taken. The presence of leading members within the HECARRUS consortium and TAB constitutes a mitigation factor for the following risks and anticipates that effective measures will be taken to achieve a successful dissemination strategy.

Table 6. Dissemination related risks for implementation.

Type of risk	Description of risk	WP	Risk	Impact	Likelihood to occur	Proposed risk-mitigation measures
Administrative, Financial & Legal	The Stakeholders' contact list remains poor and the engagement of relevant people from both the industry and academia is low. This will influence the project's effective dissemination, communication and exploitation.	WP5	L	M	M	The establishment of the TAB including world-recognized experts in the field of aeronautics and the leading people of the HECARRUS consortium which are active members in the committees of world known conferences (ASME Turbo expo, Global Power and Propulsion Society etc.) will ensure an effective stakeholder engagement. Project workshop(s) open to the public are also considered.
	Global crises such as the recent coronavirus epidemic (COVID-19) may impact the dissemination plan as various already planned events/publications are either cancelled or moved forward in time.	WP5	M	M	L	Identification of other events of equal or greater quality to be attended to ensure that results are published, and the overall project implementation is not affected. If any of the events are to be held by the project consortium, the goal will be not to cancel events. Instead, the consortium will seek for rescheduling in a later stage.
	Goals set in the dissemination evaluation are not met, thus leading in poor dissemination in some of the activities.	WP5	L	L	M	The overall dissemination and exploitation plan will be regularly updated and evaluated, in order to mitigate the potential discrepancies and improve the efforts.

4. Exploitation Plan

Exploitation aims at making use of all results generated during the project for scientific, societal or economic purposes [3]**.** The latter is mainly determined by the Technological Readiness Level (TRL) of the derived concept as it roughly determines whether it will enter the market or advance to the next level of design maturity. The **exploitation-oriented dissemination** strategy described so far, aims at maximizing the project's impact and accentuate the solutions provided by the concepts studied in HECARRUS. This will enable the future implementation of studied technologies and allow for further development which will be detailed component design and an eventual flight/iron-bird demonstration of the concept. **Phase II** of dissemination strategy focuses on the exploitation-oriented dissemination of results (M24-M36). This phase has a strong focus on disseminating the project's results once they become mature enough to clearly show the benefits that HECARRUS can provide to potential adopters. Moreover, **Phase III** will prepare the final phase of strategic exploitation that will include the final results of the project and will be stimulating the need to further cooperate with partners from the industry for the future demonstration of the concept.

The final section of this report aims to indicate a preliminary methodology that will be employed by the HECARRUS consortium to manage exploitation activities, including the preliminary roadmap of managing Intellectual Property (IP). In particular, the Exploitation Plan will describe **How** and by **Whom** will the specific activities be taken to ensure exploitation beyond the project itself. It is essential that the entire generated foreground of the project is kept under control through specific measures before any exploitation activities are performed. The latter aim at guaranteeing that the results are formulated and compiled into secure forms and are processed, securing its exploitable content and at the same time, protecting any confidential information disclosure that may exist regarding the partners and the TAB. As a result, **an appropriate IPR strategy and a final protection and exploitation plan is developed within the project and will be defined in the final deliverable D5.4 – "Final plan for use and dissemination of results, including business models and IPR management plan**".

At the very beginning of the project, the exploitation strategy can only preliminarily be defined as this is a part that requires constant updating and may be considered as a 'living document' throughout the entire project life cycle. **So far, the consortium has agreed for the protection and exploitation of the project foreground in accordance with the Grant Agreement and within the Internal Consortium Agreement, that has already been signed in M1 of the project.** In addition to these agreements, the partners have agreed terms on which access rights will be granted and terms relating to transfer of ownership in foreground and management of jointly owned foreground. The WP leaders will consider whether any of the WP's results are capable of exploitation (including scientific, industrial or commercial applications) and will inform the specific person responsible for the overall data management of the project for such results that will require either post-processing to remove any confidential aspects or protection, before they are released.

Since HECARRUS is a small collaborative project, a person from the Coordinator (AUTH) side will be selected as the data access and innovation manager. The person will work in close collaboration with WP leaders who are responsible of the emerging results of their associated tasks. All partners of HECARRUS may exploit the project results in various manners, keeping in mind that this is an early design concept, at a low research TRL. A preliminary exploitation pathway is defined and will be constantly updated throughout the project's duration (Figure 21):

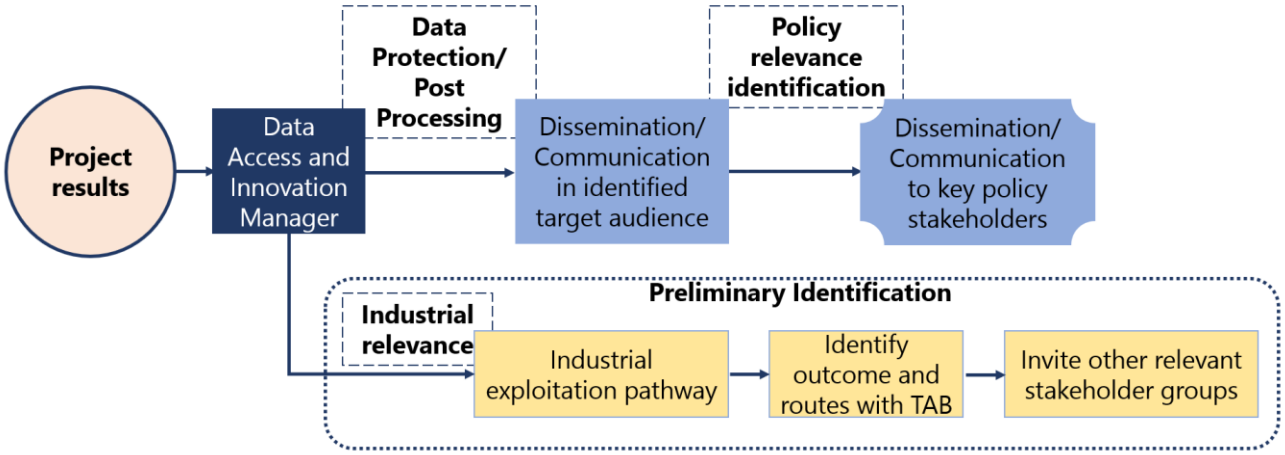

Figure 21. Preliminary exploitation pathway.

According to [4], an indicator of innovation potential is the IPI (innovation potential IR) composite indicator that includes three sub-indicators as commonly used assessment criteria in the context of innovation potential assessment exercises. These include **market potential, innovation readiness and innovation management**. Hence, the role of Data Access and Innovation Manager is a key aspect since it is the main responsible person to determine the possible routes of further results' exploitation and define next steps of the project. Moreover, this point will identify and set down the appropriate means for the potential IPR arising, based on a dedicated strategy that will be defined with the Project Executive Board (PEB) and Technical Advisory Board (TAB). In addition to the previous point, in collaboration with the people responsible for project dissemination, the Data Access and Innovation Manager will support in the supervision of exploitation activities as well as in the definition of a detailed business model and a future commercialization strategy, in a later phase of the project.

The overall exploitation of HECARRUS will be ensured through research activities, commercial exploitation activities, skills and educational training and policy making. It is agreed by the consortium that each partner will utilize project results in further research activities and to further develop its already established modelling and experimental tools and aim in the future development of products or processes that will be readily available for commercial use. For the latter reason, activities done within HECARRUS project will be pursued after the project end and will target to pave the way for future research projects that will further enhance its initial, ambitious goals.

A successful exploitation plan will be settled with efficient management in coordinating and WP leading level through constant and proactive monitoring of the project outcome. Moreover, accurate risk and contingency planning along with the effective protection of project output will further increase the success of the dissemination-oriented exploitation plan.

4.1 Exploitation target groups

The target groups of exploitation differ from the groups that have been described in the dissemination section in that they constitute of groups of stakeholders who may be interested in further exploiting and commercializing the results of the project. The vast experience of the consortium in engine and aircraft conceptual design and performance and also, the leading persons of all partners result in close connections to the stakeholders of the industry, academia and authorities.

Other direct groups can be the members participating in the TAB that constitute of experts in the aerospace industry and academia, with interest in the results of the project and main focus in the possible outcomes of the project. Further main target groups include:

- Industry:
    - OEM's in the aerospace industry;
    - Service providers such as test laboratories;
    - R&D companies;
    - Aviation MRO companies;
    - Consultancy service companies.
- Scientific community including researchers and higher educations.
- Intergovernmental/Non-governmental organizations focusing on novel aircraft solutions and the electrification of the future aircraft.

4.2 Identification of Key Exploitable Results

A Key Exploitable Result (KER) is an output generated during the project which can create impact during and after the funded activity is finished, either by the project partners or by other stakeholders. Such output may be data, prototypes, publications, policy recommendations, reports, skills and knowledge, educational materials and patents. In order to identify KERs, an assessment of the market and an efficient communication with the stakeholders must be ensured. As already described, the Exploitation Plan which is presented herein at the beginning of the project, will be regularly updated and will be finalized at the end of the project along with the foreseen business models, in the upcoming deliverables and milestone. A thorough analysis and validation of the market potential and also, a market penetration and development plan will be concretized. To justify the need of drafting the final exploitation routes by the late stages of the project, it must be noted that the Intellectual Property which is based on project results must be generated and properly protected, before it is to be exploited. The corresponding IP protection will result from:

- The knowledge in the field of aeronautics and aerospace;
- Evaluation of possible industrial outcome for the research results obtained during this project;
- Estimation of the economic impact of the technologies and processes developed under the project;
- Observation of market trends and positioning of project results;
- Market analysis (actual market needs and size in Europe).

A list of the identified exploitable results of the project is provided in Table 7, describing the exploitation perspective of each technology as well. As it is observed, most of the exploitable results aim in the reusability of developed models for future projects and further collaboration including laboratory experiments that will enable validation in the detailed component analysis. The reasoning for this observation is based on the low TRL of the investigated technologies that will enable for the design of the novel, hybrid-electric commuter aircraft.

Table 7. List of Exploitable Results and perspective.

No.	Exploitable Results	WP	Partner	Short Description	Exploitation Perspective
1	Thermal Management System development	1, 2	AUTH, MDH	Thermal management concepts and system configurations, heat exchanger CFD modelling	The partners aim to exploit the developed modelling approach to employ in future projects and scalable aircraft concepts
2	Multi-level, Multi-physics modelling of hybrid propulsion systems	2	MDH	Gas turbine system multidisciplinary optimization	Reusability of models for future projects, further collaboration and research projects
3	Multi-level, Multi-physics modelling of the on-board electrical systems	1, 2	AUTH, MDH	Development of models for the Electrical Power System with emphasis on electrical machines and energy storage	Reusability of models for future projects, further collaboration and research projects
4	The HECARRUS configurations/architectures for the small commuter aircraft	1, 2, 3	AUTH, MDH, LSC	Gas turbine systems and sub-systems, propulsion and electrical system layout, thermal management concepts and system configurations	Further development of concept and commercialisation
5	Multi-level analysis of components positioning concepts and structural integration	1, 3	AUTH, MDH, LSC	Integrated modelling of sizing, positioning and structural effects of various components inside the airframe	Reusability of models for future projects, further collaboration and research projects
6	Publication of innovative modelling concepts or original designs	1, 2, 3, 4	AUTH, MDH, LSC	International conference and journal papers	Dissemination of activities and results, increased reputation, further collaboration
7	Inclusion of aircraft electrification into School's Curriculum through undergraduate and postgraduate courses	ALL	AUTH, MDH	Teaching materials and expertise	Greater development of course material and lecturer expertise

During the second part of the project, after M18, the consortium may participate in exploitation strategy seminars, to meet with experts and increase its level of maturity in exploiting the potential results of the project, in the best possible manner. The purpose will be to finalize the already identified KERs and identify any others that have not yet emerged. Moreover, any potential conflicts of interest and weaknesses of the developed exploitation plan will be mitigated.

4.3 Preliminary Characterization Table of KERs

The list of exploitable results described, will be further analysed in the upcoming months of the project. Each of the project results will be characterized based on a series of criteria, namely:

- Description of the result(s);
- Problems to be addressed and how the scientific community resolves so far;
- Innovation as compared to other concepts;
- Target audience and potential early adopters;
- Market niche;
- Other similar studies/Competitors;
- Public acceptance/Social impact;
- Legal, normative or ethical requirements (if any at this early design stage);

- Competence of project consortium;
- Technical Advisory Board participation;
- Status of IPR;
- Definition of how the KER will be further exploited (as a new service, software, process, platform, product, roadmap etc.);
- TRL after project's completion;
- Partner(s) contribution to the development of the exploitable result;
- Partner(s) involved expectations;
- Sources of funding anticipated after the end of the project.

4.4 Preliminary Exploitation Routes

The main foreground generated by the project may be subject to different types of exploitation. The main types will be **academic and research centre exploitation** due to the low TRL of technologies, still at conceptual design phase. However, it must be noted that the maturity of most of the models developed within HECARRUS allows for use in the **industry** as well, since several of the modelling tools have been validated over the last 10-15 years through peer-review exercises with specialists from the EU aviation industry, as well as against experimental data available in the public domain, and other commercially available tools.

At this first stage of the project [M6], preliminary exploitation routes are identified by the consortium partners. The main exploitation can be ensured **through research, consultancy, training and services** in the conceptual design of a commuter aircraft. This is attributed to the fact that two of the participants are coming from the Academia and one participant is a spin-off company that has emerged from a University. The latter is an example of how successful ideas may be facilitated into companies offering products or results. The term 'product' may refer to any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected. The term 'result' as already mentioned, refers to reusable and exploitable entities as such, or elements (knowledge, technology, networks) with potential to contribute for further work, research or innovations.

The basic routes for exploitation can be summarized into the following options the potential of which will be examined throughout the project's duration [5, 6]:

Direct exploitation

- Use for further research
- Developing and selling own products/services
- Standardisation activities (new standards/on-going procedures)

Indirect exploitation

- Spin-off activities
- Cooperation agreement/Joint Ventures
- Selling IP rights/Selling the (IP based) business
- Licensing IP rights (out-licensing)

As part of the overall exploitation strategy of the project, relevant activities and deliverables have been foreseen to be performed throughout the project's duration. These include workshops dedicated to the identification of the potential exploitation routes and which will ensure that the exploitation potential of the project remains at the highest levels for the consortium participants. Relevant activities also include the business models and IP protection plan.

4.5 Preliminary analysis on the IPR protection plan

The complete IPR management plan is under constant development throughout a project's duration and is to be included in the final stage of the project. The basic aim of this section is to delve into the **fundamental principles of intellectual property (IP) and intellectual property rights (IPR)** and pave the way for an efficient protection plan. The overall IP strategy will be communicated with close collaboration with the TAB and the CS2 Officer in order that IPR of relevant participants is not endangered. It should be discussed that the proper confidentiality agreements have been established between the project consortium and the members of the TAB.

Initially, IP includes elements such as products of the mind, products of research and experimentation, products of creativity, intellectual properties as physical properties and in a similar manner, intellectual properties as assets which can be traded by any means. Intellectual property rights (IPR) on the other hand constitute legal rights to protect the IP. Table 8 includes information on such items of protection by IPR which will be further analysed in the future actions of the project implementation:

Table 8. Protection by IPR [6]

IP	What for?	Registration?
Patent	New inventions	Registration is required
Utility model	New inventions	Registration is required, but conditions are less stringent than for patentability
Trademarks	Distinctive signs	Registration is required
Industrial Design	Appearance of products	Registration is usually required, but it is possible to acquire an unregistered design right
Copyright	Literary, artistic and scientific works	Not required, but it can be registered in some countries
Confidentiality	Confidential business information/trade secrets	Not required, but internal protection measures needed (i.e. NDAs)

According to the webinars provided by the European IP Helpdesk [6], a sound IP management differs with regard to the specific programme (e.g. Joint Undertaking). According to IP rights as described by the CS2JU, the IP framework has an impact on the outcome of the project evaluation. As this project is a **Thematic Topic launched outside the complementary framework of IADP/ITD/TA**, specific conditions for IP apply. Moreover, the size of consortium and stage of proposal maturity of project implementation has an impact on the overall IP management.

During the project implementation, the overall exploitation and IP management plan will be continuously updated for the exploitation and dissemination of results. Moreover, a regular monitoring of relevant external factors affecting the exploitation potential (other projects, publications, patents, markets, competing technologies, standards, norms etc.) will be established.

With respect to the project results, IP protection of the new technologies and knowledge developed in the project and its applications, will be filed, owned and funded by the inventing/developing partner. After the project, the owners will be free to maintain it at their own expense. If the inventing/developing partner is not willing to protect it, general rules of H2020 and CS2JU will apply, unless exploitation interests of other members of consortium or TAB. The basic rules are summarized into the following:

- All IP is owned by the partner generating it.
- If more than one partner/member contributes to the creation, the partners will enter into an agreement of joint inventions, detailing in particular the rights and strategy for commercial exploitation and the ownership shares according to the individual contributions. Such an agreement might also foresee transfer of ownership following the procedures of the Grant Agreement.
- All partners will have access to IP generated in the project if they need it to carry out their project tasks.

Finally, to ensure a suitable management of IP related matters in the course of the project, HECARRUS will closely collaborate with the TAB. The TAB will screen the results obtained in the project and the planned publications for market-relevant solutions, which should be protected. Thus, the TAB will ensure a patent is filed before the results are made public, which would infringe the novelty status of the corresponding patent application. HECARRUS will generate IP related to the project results. Partners may need access to these results to perform their R&I work or for use. If specific IP cases require clarification, the TAB will take the case and act as a mediator and advisor to the consortium. HECARRUS will build on a considerable IP portfolio and generate new IP throughout the project lifetime.

5. Remarks

This report aims to present the plan for the dissemination, communication and exploitation of results in order to outline the main steps to be taken to further exploit the outcomes of the project. As this is an ongoing process based on the progress and outcome of the project, an additional, more detailed document will be provided at the end of the project.

The present report describes the overall strategy and actions for the exploitation of all the HECARRUS results along the project, forthcoming plans for the dissemination of knowledge gained during the work and the future exploitation plans for the Consortium as a whole.

The final aim of the current plan is:

- The description of dissemination and communication activities;
- The description of the exploitable knowledge and results;
- The description of the way for the exploitation of HECARRUS, together with the purposes of future dissemination actions and IP management.

It is important to highlight that both dissemination and exploitation activities together with the description of business models for each exploitable result will be updated in D5.4 during the project's final stage of implementation.

6. References

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