



# THE SYNERGY BOOKLET: ADVANCING THE EUROPEAN AVIATION RESEARCH ECOSYSTEM TOWARDS A SUSTAINABLE FUTURE



Funded by  
the European Union

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# WHAT IS AREANA

**AREANA (Aviation Research Ecosystem Advanced Novel Approach)** is a Horizon Europe project under the call "Aviation research synergies between Horizon Europe, AZEA and National programs". The project aims to **strengthen and green the European aviation industry**, fostering collaboration among all stakeholders in the aviation ecosystem. AREANA contributes to the **EU's Green Deal and Fit for 55** objectives by enhancing the **efficiency, sustainability, and competitiveness** of European aviation research.

Structured into three interconnected parts, AREANA focuses on:

- Creating synergies and improving coordination of aviation funding programmes
- Organising AeroDays 2025 under the Polish EU Presidency
- Supporting AZEA in developing hydrogen technology readiness for aviation

Together, these pillars form a shared vision for a **strong, coordinated, and sustainable future for European aviation**.



## A STRONG CONSORTIUM FOR A STRONGER AVIATION FUTURE

The AREANA consortium brings together **15 partners from 14 countries**, coordinated by **VZLU AEROSPACE**, combining expertise in aviation research, innovation, and sustainability.

The project runs from **1 January 2024 – 31 December 2025**, connecting research centres, agencies, funding entities, and clusters across Europe and beyond.

## PARTNERS



# BUILDING SYNERGY FOR THE FUTURE OF AVIATION RESEARCH

Through its **Synergy** lens, the project introduced innovative tools for **joint/joinED funding, research approaches and alignment, and shared infrastructure use.**

A key result was the **JoinED Call**, a flexible cooperation model successfully piloted, a flexible cooperation model successfully piloted and formally launched at scale in 2025/26 with initially 5 participating countries and 8 Programmes (Austria, Germany, the Netherlands, Romania and United Kingdom). To ensure long-term sustainability, the **AREANA Synergy MoU Group (ASMG)** was established in 2025, during the AeroDays in Warsaw, bringing together a growing network of national and European funding entities.

AREANA also demonstrated its global reach through the **International Interim Call**, which attracted binational consortia from 13 countries—including Canada, Japan, and Australia—highlighting the project's potential to support deeper international collaboration in aviation research.

This booklet offers a closer look at the solutions, strategies, and achievements developed through AREANA's dedicated tasks for enhancing synergistic approaches, strategies, and implementation tools.

The following sections provide detailed insights into the key actions, outcomes, and long-term legacy.

# LAYING THE GROUNDWORK FOR INTEGRATED RESEARCH POLICY

By offering practical options to better coordinate previously fragmented national programmes, the project paves the way for stronger, and smarter international collaboration.

At its core, this work is about making European aviation more competitive, more connected, and ready for the future!



# UNLOCKING THE FUTURE OF AVIATION RESEARCH COLLABORATION

## THE PROCESS

The AREANA team conducted a comprehensive survey and drew lessons from the Clean Aviation JU ECARE project.

A series of **workshops** brought together key stakeholders to evaluate how funding bodies could better align their efforts.

This collaborative process led to the identification of **30** potential cooperation models designed to streamline funding coordination across Europe.

From the 30 ideas explored, 7 were prioritized for further development based on their **feasibility, impact potential, and stakeholder input**.

## WHY IT MATTERS

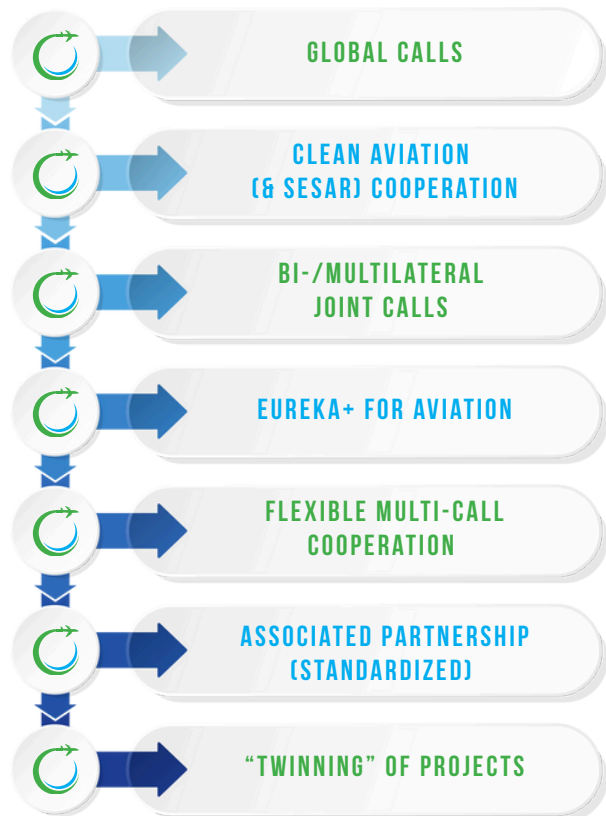
This work provides options for practical cooperation that enable funding bodies to engage in crosslevel cooperation in aviation research.

This range of options, already supporting initiatives like the JoinED Call, pave the way for a more **unified** and **effective** European R&I ecosystem.

### STAKEHOLDERS WHO BENEFIT

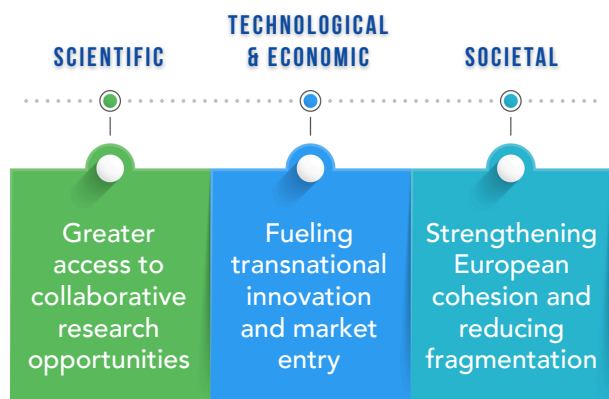
Researchers and Research Facilities  
Academia and Universities  
Clusters and RTOs  
Private Sector, Industry and SMEs  
Policy Decision Makers  
National/Regional authorities  
European Commission

## TOP 7 TAKEAWAYS: OUR MOST PROMISING OPTIONS



Selected options were fine-tuned with further stakeholder engagement during Task 1.4 ("Call Design"), setting the stage for future implementation across Europe.

## REAL IMPACT. LASTING CHANGE.





# STRATEGIC EFFORTS & IT REQUIREMENTS FOR COORDINATED AVIATION RESEARCH

## HIGHLIGHTS & INSIGHTS

The project focused on identifying past and present strategic efforts of aviation research cooperation on all levels (regional, national, European) to avoid redundant work and points of failure, thereby laying the groundwork for stronger cooperation and coherence in aviation research and innovation.

A detailed review of the Clean Aviation ECARE-Project's Synergies Report shows how AREANA builds on ECARE's work to broaden support for research cooperation across EU, associated, and third countries.

The ECARE taxonomy was identified as a practical tool for aligning national and European R&I funding approaches.

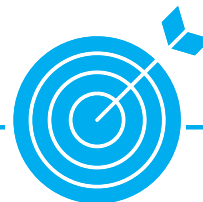
A comprehensive requirements analysis and survey of existing tools resulted in the proposal of the ECARE Digital Platform as the foundation for coordinated funding management. Recommendations ensure usability, legal compliance, sustainability, and support for joint call management.

### STAKEHOLDERS WHO BENEFIT

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Academia & Universities  
Policy Decision Makers  
National and Regional Authorities  
European Commission

## STRATEGIC OUTCOMES FOR EUROPEAN COOPERATION

- Builds on existing project results, saving time and resources.
- Provides insights, recommendations, and tools for more efficient coordination of aviation R&I funding.
- Strengthens collaboration between AREANA, Clean Aviation, and other European research efforts.
- Delivers a ready-to-use IT solution to support cooperation among funding entities, the ECARE Digital Platform.



### STRATEGIC IMPACT AREAS

**Economic & Technological Impact:**  
Provides a practical IT concept to connect stakeholders and strengthen Europe's technological leadership in aviation.

**Scientific Impact:**  
Leverages existing research results to support coordinated funding and collaboration at the EU and international levels.

# ALIGNING EUROPEAN EFFORTS FOR A STRONGER AVIATION RESEARCH FUTURE

## BUILDING A COMMON RESEARCH VISION FOR EUROPE

A structured approach was developed to identify overlapping themes and shared priorities among national and regional aviation research programs.

Through a pilot study, existing R&D programs were mapped across two major thematic areas — **Carbon-Neutral Aviation** and **Advanced Air Mobility (AAM)** — later expanded to include Non-CO<sub>2</sub> Technologies. The work resulted in the first methodology for research alignment across Europe and proposed practical steps toward a **Common Research Strategy**.

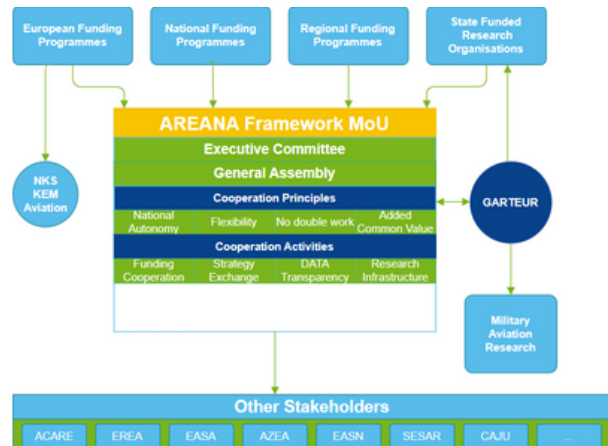
A key milestone was the creation of a **Memorandum of Understanding (MoU)**, signed by five countries (Austria, Germany, the Netherlands, Romania, and United Kingdom) during **AeroDays2025 in Warsaw**, establishing a Central Coordination Working Group and defining a process for annual updates marking a major step toward a shared European approach to strategic R&D governance and implementation.

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# ADVANCING RESEARCH COLLABORATION

## THE AREANA ENVIRONMENT



- Enhances European competitiveness through coordinated research and innovation efforts
- Strengthens synergies between EU, national, and regional aviation program
- Supports strategic alignment for future joint/ed calls and funding mechanisms
- Fosters innovation and impact, ensuring R&I efforts address Europe's most pressing aviation challenges

DRIVING COORDINATION & INNOVATION

### Socio-Economic

Creates stronger cross-European collaboration, boosting job creation and joint development of future aviation technologies

### Economic & Technological

Enhances innovation efficiency, reduces costs, and accelerates the development of advanced technologies through coordinated R&I strategies

### Scientific

Promotes cross-border collaboration, open innovation, and shared data environments that strengthen Europe's scientific excellence

### Societal

Reinforces political and strategic cooperation among European nations, supporting shared progress toward sustainable and inclusive aviation

IMPACTS AT A GLANCE

# DESIGNING THE PATH TO STRONGER RESEARCH COOPERATION

## OUTCOMES & INSIGHTS

The project developed a comprehensive design for future joint or joined international or transnational calls to strengthen collaboration and coordination across European, national, and regional aviation research programmes.

To improve and facilitate international Research and Technology Development cooperation and based on the harmonization of research strategies and results from stakeholders' feedback, three main concepts were selected. The three selected collaboration concepts are (in order of degree of complexity):

TWINNING	FLEXIBLE MULTI-CALL COOPERATION	JOINT CALL
Informal cooperation between already funded projects working on similar topics.	Alignment of existing national or regional calls under national rules and procedures	Fully harmonized joint calls among participating programmes

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# FROM CONCEPT TO COOPERATION: TANGIBLE RESULTS IN ACTION

- The **AREANA Synergies Memorandum of Understanding (MoU)** signed during AeroDays 2025 in Warsaw marks a major milestone for European research cooperation
- A pilot of the **Flexible Multi-Call Cooperation** concept, involved project proposals from over ten countries
- A coordinated **joinedED call** launched in October 2025, engaging at least five countries whose entities have signed the MoU
- An exemplary **guideline** was created to help partners initiate and manage such cross-border research activities effectively



The call design work provides a structured framework for future joint/ed research actions, paving the way for a more connected, efficient, and collaborative European + aviation research landscape.



# STRENGTHENING COORDINATION FOR FUTURE JOINT AVIATION RESEARCH CALLS

## ESTABLISHING A FRAMEWORK FOR COLLABORATION

This activity focused on defining the Call Administration Framework—a key element supporting the coordination and management of joint and transnational calls for aviation research across Europe. Building on the outcomes of Call Design, the framework further develops **three collaboration concepts**:

**Twinning**: Informal cooperation between related projects

**JoinED**: Flexible multi-call cooperation

**JoinT**: Fully harmonized joint calls among participating funding programs

Recognising the key role of Technology Infrastructures (TIs) in aviation research, the framework incorporates recommendations from the Expert Group for Technological Infrastructures (EGTI). It also proposes establishing an Aviation Expert Group on Technology and Research Infrastructures (AEGTRI) to better align European, national, and regional R&I programmes.

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# STRENGTHENING EUROPEAN RESEARCH COOPERATION

- Supports the first steps toward transnational calls, connecting national, regional, and EU-level programs.
- Promotes coordinated funding efforts through shared roadmaps and strategic alignment.
- Encourages long-term cooperation between funding bodies and stakeholders through the MoU process.
- Lays the groundwork for future harmonization of research and innovation in the aviation sector.

## HIGHLIGHTS OF THE WORK



Developed a comprehensive framework for administering and coordinating future joint calls in aviation research



Promoted synergies across funding programs and greater alignment of research priorities



Integrated Technology Infrastructure cooperation into the AREANA model, ensuring continuity between research and technological development efforts



Contributed to the establishment of a Memorandum of Understanding (MoU) between national funding entities committed to implementing AREANA's collaborative approach

## ECONOMIC & TECHNOLOGICAL IMPACT

- By pooling resources around shared research priorities, the framework creates a critical financial mass that strengthens **cross-border cooperation** and improves the **efficiency of R&I investments**,
- Coordinated technological infrastructures and joint actions accelerate innovation, supporting the development of **advanced aviation technologies** and enhancing Europe's global competitiveness.



# MAPPING EUROPE'S AVIATION RESEARCH LANDSCAPE

## BACKGROUND & CONTEXT

Aviation research funding and cooperation across all EU and EU-associated countries were analyzed, focusing on national and regional programs dedicated to the aviation and aeronautics sectors.

The analysis aimed to provide a comprehensive picture of how countries support and coordinate aviation R&I, identifying their main funding mechanisms, strategic priorities, and collaboration models between public and private actors.

## IMPACT & APPLICATIONS

- Offers a clear snapshot of Europe's aviation R&I landscape
- Helps funding bodies and policymakers coordinate strategies and avoid overlaps
- Promotes cross-border collaboration and harmonized research planning
- Serves as a practical reference for future projects and policy design

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## MAIN FINDINGS

- A comprehensive database has been created covering:
  - National & regional ongoing aviation research programs
  - Main funding organizations & mechanisms
  - Technology Readiness Levels (TRLs)
  - Strategic documents, roadmaps, and allocated budgets
  - Types of beneficiary organizations
- Key research priority topics across Europe are related to **air traffic management (ATM) systems** and **drone development**.
- A **complete evaluation** of the degree of cooperation between research institutions, universities, and private sector actors, highlighting strong regional synergies and opportunities for enhanced alignment.

## FROM KNOWLEDGE TO IMPACT

### Socio-Economic:

Provides a foundation for more efficient use of research funding and fosters cooperation across Europe's aviation ecosystem, strengthening economic performance and social value creation.

### Economic & Technological:

Encourages collaboration in developing new technologies by strengthening cooperation among EU partners and engaging associated countries.

### Scientific:

Brings together the European aviation industry and research community to align priorities and leverage synergies across technologies and programs.

### Societal:

Contributes to Europe's journey toward climate neutrality, accelerating research efforts for sustainable aviation solutions

# EXPANDING GLOBAL COOPERATION IN AVIATION RESEARCH

## UNDERSTANDING GLOBAL AVIATION RESEARCH

The goal of this work was to map the global aviation R&I landscape by identifying key funding mechanisms, strategic priorities, and opportunities for collaboration with non-EU associated countries.

To achieve this, an analysis was carried out on national and regional aviation research and innovation programs, gathering data —where direct engagement was possible— on ongoing research activities, funding organizations, and national strategies or roadmaps.

This effort resulted in a comprehensive database covering **11 globally significant aviation nations**, many of which demonstrated a strong interest in future collaboration with Europe on shared innovation priorities.

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## DISCOVERED INSIGHTS

- Compiled a database of aviation research programs, funding organizations, thematic priorities, and national strategies.
- Identified countries with established aerospace manufacturing and supply chains, which typically have the largest national research programs.
- Highlighted growing interest in emerging technologies such as air traffic management (ATM) systems, electric vertical take-off and landing (eVTOL) aircraft, and drone innovation.
- Determined each country's level of engagement and openness to future collaboration within the European research framework.

## EXPANDING GLOBAL RESEARCH NETWORKS

- Helps identify key partners for international cooperation in aviation and aeronautics
- Supports strategic alignment between European and non-EU research efforts
- Encourages knowledge exchange to accelerate low-carbon and sustainable aviation innovation
- Provides a clear picture of the global aviation R&I landscape

### Socio-Economic:

Provides a global aviation research map that fosters cooperation, improves funding efficiency, and supports cost-effective progress toward aviation decarbonization.

### Economic & Technological:

Promotes collaboration and innovation in low-carbon aviation technologies, opening new global markets and strengthening Europe's competitiveness.

### Societal:

Contributes directly to the climate neutrality objective, helping accelerate and optimize research for sustainable aviation.

### Scientific:

Unites the international research community to share knowledge, align technologies, and create synergies across programs.

IMPACT PATHWAYS

# PAVING THE WAY FOR LONG-TERM IMPACT IN EUROPEAN AVIATION R&I

## LAYING THE GROUNDWORK

With the main target of translating AREANA's cooperation concepts into a sustainable, operational framework for long-term European and international collaboration in aviation research funding, the AREANA project aimed at creating a growth implementation path to guide how the project's collaborative funding solutions can be expanded and institutionalized.

The **AREANA Synergy MoU Group (ASMG)** was launched in 2025 as the key platform to sustain project results and is also backed by a General Assembly and a Steering Committee to ensure continuity and expansion.

## EXPANDING GLOBAL REACH

The "International Interim Call" (as part of Germany's LuFo Climate programme) attracted binational consortia from 13 countries, including Canada, Japan, and Australia—proving the concept's appeal beyond Europe and reinforcing global cooperation potential.

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## TURNING IDEAS INTO ACTION: RESULTS THAT RESONATE

Launching of the  
International JoinED Call  
2025/26 | AREANA Synergies

Instruments like the JoinED Call and programmes are already in motion to turn ideas into real-world action.



A growing platform (ASMG) to recruit more partners and scale cooperation.

A clear roadmap for implementing AREANA's solution in the long term.

Delegates at the first in-person AREANA Synergy MoU Group meeting The Hague, 2025



- Ensures lasting impact through a structured, adaptable approach
- Provides actionable pathways for funding bodies to engage in joint, flexible aviation R&I efforts
- Strengthens Europe's leadership in aviation research through inclusiveness and expansion

#### Scientific:

Expands participation to less-represented EU nations, enabling a broader research base.

#### Economic & Technological:

Continuous process refinement ensures lasting innovation capacity.

#### Societal:

Promotes European unity through inclusive international collaboration.

ENDURING IMPACT

# AREANA

AVIATION RESEARCH ECOSYSTEM ADVANCED NOVEL APPROACH



DESIGNED BY EASN-TIS



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