

General Information	
Preliminary title of the European Partnerships	European Partnership on Clean Aviation
Short description of the partnership	The European Partnership will support impact-oriented research and demonstration of integrated aircraft technologies in order to accelerate a deep de-carbonisation of the sector, while ensuring safety, security and European leadership.
Services directly involved	DG RTD, DG MOVE, DG CLIMA, DG ENER
Context and problem definition	<p>Aviation, apart from being the safest and fastest mode of transport, is currently the only one suitable for rapidly covering mid- and long-range distances. It is also a highly competitive industrial sector, which significantly contributes to the EU economy, 75% of its €220 billion annual turnover is exports.</p> <p>Recent data shows significant and sustained growth of the aviation sector, by consequence the ecological footprint of aviation is also growing. Today global aviation CO₂ emissions represent more than 2% of the global anthropogenic CO₂ emissions and are rising fast. While annual air traffic increases by 4.4% (doubling every 15 years) and the annual fuel and CO₂ emissions increase by around 3%, incremental technology improvements may reduce fuel consumption and emissions only by 1-1.5% annually. Without transformative solutions, aviation's CO₂ emissions will be approximately 80% higher by 2050, compared to 2020¹.</p> <p>This is not consistent with the agreed international objectives of the Paris Agreement, the European Union's targets for an environmentally friendly transport, the EU vision for "A clean planet for all", the new EU industrial policy strategy, and the EU Mobility Package. In addition, the European Union's efforts contribute to the commitments and initiatives made at the International Civil Aviation Organisation (ICAO) level.</p> <p>Aviation is a sector where the path towards zero emissions is not obvious and solutions – which are key elsewhere, such as batteries, electrification, and fuel cell technologies – cannot be simply transferred to the aviation sector without proper investigation regarding their safety and efficiency.</p> <p>In order to achieve deep de-carbonisation and other environmental goals, aviation research will need to follow parallel approaches:</p> <ul style="list-style-type: none"> • Accelerate R&D – and eventually deployment – of major improvements across the whole existing technology spectrum to improve the environmental performance of existing aeroplane architectures. • Start ambitious research projects introducing and swiftly maturing disruptive technologies – e.g. digitalisation, electrification – and reduced ecological footprint advanced aircraft configurations. <p>FP7's Clean Sky and Horizon 2020's Clean Sky 2 already focus on environmental (i.e. CO₂, NO_x and noise reduction). These were also subject to a large number of EU collaborative projects. The previous JUs created a well-structured, EU aviation landscape, with broad and diverse targets. The partially pre-assigned budget and big number of partners led mainly to incremental progress, but with marginal environmental impact at aircraft and fleet level. The new partnership aims at focussed, transformative and impact oriented research and demonstration activities.</p>
Objectives and expected impacts	The objective of the European Partnership for Clean Aviation aims at a focused, transformative, and impact-oriented development and demonstration of integrated aircraft technologies, able to contribute to deep de-carbonisation and significant reduction of all other emissions concurrently, while ensuring safety, security, and EU aviation global leadership.

¹ JRC World Climate and Energy Outlook 2018

	<p>To cut aviation CO₂ emissions in line with the Paris Agreement, the new partnership needs clear planning: due to the life expectancy of aircraft. Flight demonstrators (TRL6) enabling deep de-carbonisation are necessary and should be demonstrated before 2030, for entry into service in 2030-35.</p> <p>The technical content of the proposal will take into consideration all promising streams of technology and demonstrators developed in earlier collaborative research projects and from Clean Sky and Clean Sky 2. The baseline for the Clean Aviation partnership, and the performance benchmark, will be set accordingly. Technologies proposed should have a concrete potential for uptake by industry and generate a substantial impact on the sustainability of aviation. Specific objectives of the initiative are:</p> <ul style="list-style-type: none"> • Deeply de-carbonise aviation by allocating approximately half of the total effort/budget to developing and integrating clean technologies contributing to Carbon Neutral Growth. • Exploit the potential of digitalisation, connectivity and big data in all aspects of aviation – from design, manufacturing and maintenance to operations and regulations – as an enabler for reaching sustainability and competitiveness. • Accelerate the safe and efficient design, development, operation and introduction of urban air-transport vehicles with the potential to reduce traffic congestion, where this has the potential to contribute substantially to EU and international goals towards sustainable aviation. • Provide a platform for supporting projects on new and disruptive technologies and identify the most promising technologies and research results for further development, contributing to the overall sustainability of aviation. A good balance between low and high TRL solutions will ensure promoting disruptive innovations with high impact. • Re-vitalise and accelerate ambitious demonstrators with a high TRL to bring products to the market faster, therefore contributing to European industrial competitiveness, while delivering on related International and European policy objectives. • Institutionalise and fully exploit synergies with other EU, national and regional programmes. • Re-invigorate research to compensate shortage of innovative technologies at lower TRL levels (3-4) that could be translated into research, development and demonstrations at higher TRL levels. <p>An ecosystem approach introducing disruptive technologies will help to determine a ‘skip a generation’ mind-set, towards meeting the Paris Agreement on climate change mitigation, ICAO environmental goals (i.e. on global emissions, local air-quality, and noise), and EU mobility targets.</p> <p>The proposed partnership further aims at amplifying the impact of European aviation research and innovation on the Energy Union, the EU Mobility Package, the renewed industrial policy strategy, and EU emissions and noise regulations.</p> <p>For competitiveness, the Clean Aviation partnership aims to contribute towards shaping the mid to long-term EU aviation vision, maintaining EU leadership, and thus protecting and creating high-added value EU jobs.</p> <p>Demonstration of the integrated capabilities of the researched technologies is foreseen by the end of Horizon Europe, in 2027. The partnership is expected to exist until 2030.</p> <p>A fully independent Technology Evaluator should be capable to regularly monitor the partnership’s implementation and assess the potential impact of its results/ outputs when these are implemented into the fleet within a relevant timeframe. The impact could be further improved by creating spin-offs,</p>
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	through synergies with other research and industrial ecosystems.
Necessity test: rationale for a European Partnership	<p>European aviation research needs a coherent and holistic ecosystem approach, with a clear EU leadership – not only in aircraft technologies, but also in new business models, maintenance, operations and services to ensure the largest impact for European citizens. No single country in Europe has the financial, technological and human resources to invest in an ambitious and transformative deep decarbonisation aviation R&I path.</p> <p>A partnership has also a higher potential to exploit synergies at all levels (national, regional, and private) and to create economies of scale by pooling disperse resources and aligning efforts at EU, national, and regional levels.</p> <p>A partnership provides stability, enabling very complex multi-annual research and demonstrator projects, whilst allowing a renewal and refocussing to meet future challenges. At the same time, the risk sharing between the public and private sectors creates room for more ambitious research programmes.</p> <p>A capabilities-driven partnership, with open membership and non-predefined budgets, promotes the participation of new non-traditional sectorial industries with leadership and innovation in areas such as electrification and digitalisation and will deliver on the Horizon Europe criteria for increased openness and transparency of future partnerships.</p> <p>A coherent European Clean aviation partnership is considered as the best available tool amongst the framework programme's modes of intervention (i.e. regular collaborative calls, procurement, other forms of partnership).</p>
Relevant for the following parts of Horizon Europe	<p>Pillar II 'Global Challenges and European Industrial Competitiveness'</p> <p><input type="checkbox"/> Cluster Health</p> <p><input type="checkbox"/> Cluster Culture, creativity and inclusive society</p> <p><input type="checkbox"/> Cluster Civil Security for Society</p> <p><input checked="" type="checkbox"/> Cluster Digital, Industry and Space</p> <p><input checked="" type="checkbox"/> Cluster Climate, Energy and Mobility</p> <p><input type="checkbox"/> Cluster Food, Bioeconomy Natural Resources, Agriculture and Environment</p> <p><input type="checkbox"/> Cross-cluster</p> <p><input type="checkbox"/> Pillar III 'Innovative Europe'</p>
Currently identified links with other partnership candidates / Union programmes	<ul style="list-style-type: none"> • Integrated Air Traffic Management (successor SESAR) • Clean Hydrogen (successor FCH) • Key Digital Technologies (successor ECSEL) • The Battery Initiative <p>Establishing synergies with relevant EU, national and regional funded R&I programmes, as well as other European Partnerships, is a cornerstone of this partnership. Member States and regions could be directly engaged by exploiting synergies with relevant national research programmes, or through EU programmes such as the European Structural and Investment Funds.</p>
Does the proposed partnership build on currently active ones?	The Clean Aviation partnership builds upon the Clean Sky 2 JU (ending in 2024, with last calls launched in 2020) but will have a strongly improved governance structure, increased capability for managing projects and a much simplified structure increasing efficiency and flexibility.
Expected type and composition of partners	The initiative will bring together the European aviation community (manufacturing industry, SMEs, airlines, fuel producers, public, regulators, research organisations, innovators, and academia) around a limited but impactful set of development and demonstration activities requiring substantial

	<p>and long-term commitment of the involved parties.</p> <p>In addition, it aims at enlarging the aviation ecosystem with participants from other industrial sectors (e.g. leading IT companies for digitalisation, leading companies in electrification). This will allow involving partners from outside the traditional aviation sphere and further increase the geographical coverage of the partnership with increased transparency and openness as one consequence.</p> <p>The participation of citizens / civil society is envisaged in specific areas of the proposed partnership and in particular, in developing better noise abatement procedures that will complement new aircraft noise reduction technologies.</p>
Contributions and commitments expected from partners	<p>The aviation industry, including integrators, engine manufacturers, avionics, and their respective supply chains; will contribute both financially and in-kind to the research and innovation activities. Currently in CS2, there is only in-kind contributions.</p> <p>SMEs, RTOs, and academia will mainly provide an in-kind contribution contributing to the research effort, and making available their research infrastructure, knowledge and production facilities.</p> <p>EASA will have an advisory role and provide technological support from the early stage of planning on the issues within the scope of its functions and responsibilities.</p>
Currently envisaged implementation mode(s).	<p><input type="checkbox"/> Co-programmed European Partnership</p> <p><input type="checkbox"/> Co-funded European Partnership</p> <p><input checked="" type="checkbox"/> Institutionalised European Partnership</p> <p><input type="checkbox"/> Article 185</p> <p><input checked="" type="checkbox"/> Article 187</p> <p><input type="checkbox"/> EIT-KIC</p>
Justification of the implementation mode	<p>Achieving conclusive and mature research results that translate swiftly into the effective introduction of new environment-friendly technologies in a multitude of products onto the market, requires a very close, and long-term, collaboration between the public (EC, EASA, etc.) and the private sectors.</p> <p>In addition, the high complexity and risk level of innovative aircraft design imposes collaboration at all levels. Innovative technologies in aviation will have to be investigated to ascertain if they represent economically viable business cases, without significant economic societal side effects</p> <p>The aviation sector is a relatively large, and stable, industrial sector with well-established links to universities, research organisations, academia, and with established long-term co-operation with public bodies such as the European Union Aviation Safety Agency (EASA).</p> <p>There is a documented history of strong and long-term commitment by the aviation community to achieving long-term research objectives.</p> <p>The governance model will align diverse EU technology roadmaps, optimising the allocation of EU funds, while ensuring that the industrial priorities are aligned with public and environmental targets. The new partnership structure will benefit from lessons learned during the previous two programmes and will be in-line with the Council recommendations (more efficient and transparent setup, impact-oriented that includes collaborative and transformative R&I).</p>
Proposed starting year	2021