FUNDING REVIEW FOR JET ZERO CLUSTER

November 2023

enterprise M3

Delivering prosperity through innovation

TABLE OF CONTENT

EnterpriseM3 LEP is investigating the aviation sector's transition to net zero (Jet Zero). This paper introduces the main funding streams available to support the development and growth of the EM3 Jet Zero Cluster initiative.

Some of the funding options introduced below as part of a funding review could be considered in support of the preparation and delivery of the action plan for the Jet Zero planned over the next 24 months.

The Foundations of an emerging JET ZERO cluster with:

- Farnborough Airport and Farnborough International Airshow
- 158 business/organisations identified as being linked to 'jet zero' in the EM3 geography (across Surrey and Hampshire
- Location of some major global players such as BAE Systems, QinetiQ, Surrey Satellite Technology, Boeing.
- Some long-established networks with FAC, Space South Central, BASE Bordon.
- Specialist local skills available with Farnborough College of Technology
- Research intensive are with the University of Surrey, Surrey Research Park, SETSquared.

1. UK FUNDING SOURCES

The main UK funding sources to be considered for the Jet Zero cluster would be:

1.2 Innovate UK

Innovate UK is the UK's national innovation agency. It supports business-led innovation in all sectors, technologies and UK regions. It helps businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate.

Innovate UK runs competitions for a range of grants and loans for which innovators can apply to help develop their technologies. Innovate UK's funding competitions change as new schemes are launched and others close, but businesses involved in JET ZERO can benefit from support for innovations across all elements of the aviation supply chain.

Innovate UK also funds additional activities which may support businesses working in the JET ZERO cluster, including:

- Sustainable Aviation Fuel Innovation Programme which aims to help build and accelerate the UK Sustainable Aviation Fuels (SAF) industry. This programme will build a network of innovators, publish analysis and reports, help you access finance and investment and empower you with expert technical knowledge through dissemination, working groups and masterclasses.
- Showcase for Climate Tech Investing and Capital to Climate events providing opportunities for innovators, selected after a competitive application process,

in a range of sectors relevant to JET ZERO to pitch to invited investors and corporates and providing guidance and information to investors to demystify a range of climate tech sectors. The session on Sustainable Fuels, including SAF, will be in Bristol in early February and applications from invited innovators are open now.

Innovate UK also provides funding to develop clusters, for example the Accelerating the Green Economy Centres is currently open offering up to £5m to establish an accelerating the green economy centre to support the growth of emerging green industries, in economic geographies across the UK. Applications must be led by a UK research organisation and collaboration and co-creation between researchers, businesses, investors and local stakeholders is essential.

1.2 UK Shared Prosperity Fund

The UK Shared Prosperity Fund (UKSPF) funding stream began in April 2022 and forms part of the UK government's Levelling Up agenda and part of its support for places across the UK. The fund will be used to help create jobs and promote economic growth, as well as to invest in infrastructure and skills. The UKSPF will also focus on addressing regional and local disparities in income, employment and health.

It provides £2.6 billion of funding for local investment through to March 2025. All areas of the UK receive an allocation from the Fund through a funding formula rather than a competition. UKSPF is the replacement for the European Union Structural and Investment Funds, whose programmes come to an end in the UK in 2023 as result of the UK's departure from the European Union.

UKSPF aims to achieve the following:

- Stimulate growth in the public sector to boost productivity, pay, jobs and living standards
- Spreading opportunities more widely within the UK and improving public services
- Restoration of a sense of community, local pride and belonging
- Empowering local leaders and communities

The Supporting Local Business investment priority would be relevant to JET ZERO. The objectives of this investment priority are to create jobs and boost community cohesion, promote networking and collaboration amongst businesses and increase private sector investment to grow businesses and the economy.

Delivery will be through lead local authorities in England and each lead local authority was invited to develop a local investment plan, which detailed how the UKSPF funding would be spent.

1.3 Visit Britain's Business Events Growth Programme

The Business Events Growth Programme forms part of the UK Government's commitment to grow the business events sector. The programme supports the attraction of international business events, which align with the Government's priority industry sectors, the growth of the international profile of business events in the UK, as well as the creation of new business events. Through the programme, VisitBritain supports all organisations in hosting international business events in the UK. Whether you would like to win international events or to develop, grow and internationalise your events, the Business Events Growth Programme can support.

This could be relevant to help grow or develop a showcase event for JET ZERO.

1.4 Aerospace Technology Institute

The Aerospace Technology Institute (ATI) creates the technology strategy for UK aerospace, which builds on the UK's strengths and responds to the challenges faced by the UK civil aerospace sector. It provides a roadmap of the innovation necessary to keep the UK competitive in the global aerospace market, and complements the broader strategy for the sector created by the Aerospace Growth Partnership (AGP). The ATI works in partnership with the Department for Business & Trade (DBT) and Innovate UK to offer funding streams designed to accelerate innovation in the UK to maintain global competitiveness. All projects submitted must align with the UK aerospace technology strategy, Destination Zero, which identifies the following priority areas: zero-carbon emission aircraft technologies, ultra-efficient aircraft technologies and cross-cutting enablers.

Funding flows through their Strategic Programme, which enables technology research and development for the benefit of the UK aerospace sector delivering clean growth, and their SME Programme, which is tailored to the needs of SMEs to strengthen and further encourage technology innovation within the supply chain and civil aerospace sector. The ATI Programme is open to new applications.

1.5 Potential other source of funding

There are alternative potential sources of funding which are periodically available to support the JET ZERO cluster or businesses within it. These include:

- Department for Energy Security and Net Zero (DESNZ) where programmes such as the Net Zero Innovation Programme (NZIP) include programmes which have supported relevant technology areas, including bioenergy (to bring down costs and reduce barriers within the full biomass to energy value chain, including improving the productivity of the UK's biomass supply, the availability of conversion technologies, and the generation processes for energy vectors such as biomethane, green hydrogen, biofuels and electricity) and disruptive technologies (to support energy entrepreneurs to develop the best ideas for technologies, products and processes in energy efficiency, power generation and storage, in particular the Energy Entrepreneurs Fund has previously supported businesses working on SAF). Future grant competitions may be relevant for JET ZERO.

- The Department for Transport (DfT) runs programmes such as the Advanced Fuels Fund, for which the Government has allocated over £135 million for the development of sustainable aviation fuel production plants in the UK. The first round of grant recipients was announced in December 2022 and the second on 17th November 2023. The Zero Emission Flight Infrastructure (ZEFI) programme is funded by DfT and led by the Connected Places Catapult. It brings together government, industry, regulators and academia to better understand the infrastructure changes required at airports and airfields to prepare for hydrogen-powered and battery electric aircraft. DfT also published the Decarbonising Transport plan in 2021 and the one year review in 2022.

- The Jet Zero Council (JZC) is a partnership between industry and government to bring together ministers and chief executive officer-level stakeholders, with the aim of delivering at least 10% sustainable aviation fuel in the UK fuel mix by 2030 and zero emission transatlantic flight within a generation, driving the ambitious delivery of new technologies and innovative ways to cut aviation emissions.

  It has two delivery groups:

  - Sustainable Aviation Fuels Delivery Group provides advice on how government and industry can work together to establish UK production facilities and accelerate the delivery of the fuel to market. It is currently focusing on development of a SAF mandate, commercialisation of SAF, and technologies and feedstocks required for SAF production
  - Zero Emission Flight Delivery Group provides advice on how government and industry can work together to best accelerate the adoption of zero emission flight and put the UK in a leading position in the race to achieve zero emission flight. It is currently focusing on zero emission aircraft, ground infrastructure to support zero emission flight and regulatory requirements for zero emission flight.

2. EU FUNDING SOURCES

2.1 Horizon Europe Programme

2.1.1 Introduction

Horizon Europe is THE European Union's Framework Programme for Research and Innovation to provide new knowledge and innovative solutions to help overcome our economic, societal and ecological challenges. It has a budget of **€95.5 billion** and will run from 2021 until 2027. Horizon Europe helps researchers and top class innovators to develop and deploy their ideas. It teams up the best talent and equips

them with world-class research infrastructures and supports breakthrough innovations and helps to create new services and markets.

Horizon Europe is implemented also through the European Defence Fund and complemented by the Euratom Research and Training Programme.

Horizon Europe funding is available for projects which:

- Involve ground breaking research or new technologies
- Improve research training and development, or research infrastructure
- Create growth in sectors including advanced manufacturing, materials, biotechnology, information and communication technology, nanotechnology and space
- Increase private investment in research
- Respond to challenges including climate change, food security or healthcare for an ageing population

The Cluster 4 of Horizon Europe for: Digital, Industry and Space is particularly relevant to JET ZERO.

Key areas of intervention covered include: manufacturing technologies, key digital technologies including quantum technologies, emerging enabling technologies, advanced materials, AI and robotics, next generation internet, advanced computing and Big Data, Circular industries, low carbon and clean industries, space including earth observation.

2.1.2 Horizon Europe and UK organisations

Despite Brexit, UK organisations can apply under the Horizon Europe Programme, this was confirmed in an official UK Government Announcement on 7 September 2023:

The UK withdrew from the EU on 31 January 2020, however on 7 September 2023 the UK government announced that *"UK researchers can apply for grants and bid to take part in projects under the Horizon programme, with certainty that the UK will be participating as a fully associated member for the remaining life of the programme to 2027. Once adopted, the UK will also be able to join the governance of EU programmes – which the UK has been excluded from over the last three years – ensuring we can shape collaboration taking place next year. And UK researchers will be able to lead consortia in the next work programme of Horizon Europe projects."*

- *UK to associate with Horizon Europe and Copernicus programmes through a bespoke new agreement with the EU.*
- *British scientists are encouraged to apply now for grants and projects with certainty.*
- *All calls within Horizon Europe work programme 2024 and beyond will be funded by the UK's association to Horizon Europe.*

- *The UK government Horizon Europe guarantee has been extended to cover all remaining Horizon Europe grant calls that are funded under work programme 2023 irrespective of the call closing or grant signature date.*
- *UK confirms it will take forward its own fusion energy strategy instead of associating with the Euratom programme.*

"Horizon will give UK companies and research institutions unrivaled opportunities to lead global work to develop new technologies and research projects, in areas from health to AI. This will not only open up cooperation with the EU, but also Norway, New Zealand and Israel which are part of the programme – and countries like Korea and Canada which are looking to join too."

UK organisations can apply to bid, fund and lead Horizon Europe Work Programme 2024 and can be one of the 3 organisations from different countries in a consortium.

Regarding the Horizon Europe Work Programme 2023, UK organisations can apply but must be a 4th organisation in a consortium and a beneficiary partner in the proposal. The UK government guarantee applies in case of 2023 calls.

UKRI Innovate UK KTN works closely with the National Contact Points, Innovate UK Edge and the FCSO/Science Innovation Network for UK based applicants.

For UK based applicants the National Contact Point for Global Alliance, European Programmes can provide advice and support on:

- How to form a consortium, organising consortium building activities and events in selected topics
- Offer "travel grants" to attend European brokerage events
- Manage international collaboration platforms
- Engage with International Partnerships and Technology Platforms
- Provide sector specific advice on market opportunities and project impact
- Help applicants to apply for Horizon Europe funding

More information on the Horizon Europe Guarantee available at: https://www.ukri.org/apply-for-funding/apply-for-horizon-europe-guarantee-funding

2.1.3 Examples of Horizon Europe calls open for the aviation sector

A- Assessment of air pollutant emissions from low-carbon fuels in the heavy-duty, aviation, and maritime sectors

A single-stage call with a deadline of 18 April 2024. Budget: 7M€

This Innovation Actions call is to support the Zero Pollution Action Plan of the EU and to contribute to the following outcomes:

- The air pollutant emissions from combustion-based heavy-duty vehicles (including Non-Road Mobile Machinery like excavators, bulldozers, harvesters etc.), aircraft and ships using alternative fuels, with a broad coverage of existing (at least in advanced prototype form) powertrains and exhaust after treatment technologies, are measured and characterised according to real-life scenarios of use.
- Emerging pollutants resulting from the use of novel low-carbon fuels are identified and quantified.
- In light of recent WHO guidelines, concentrations of ultrafine particle emissions down to at least 10nm are also measured and chemical compounds present on those particles are characterised (in particular carcinogenic compounds like aldehydes, PAHs and NPAHs).
- Air pollution exposure projections based on plausible technological trajectories are produced, up to the year 2050.
- Technology packages to mitigate the emerging forms of pollution are proposed and projections updated accordingly.
- Reliable scientific data to guide future policy and technology choices following the “do no significant harm” principle is provided.
- Guiding principles for optimized Design, Operation and Maintenance, to minimize emissions, for designers and operators.

Scope of the call:
Low- or zero-carbon fuels proposed for use in the next decade can be covered, however the priority is on fuels that have already been demonstrated in real world applications or are foreseen to gain market share according to the projections made in the context of the ‘Fit for 55’ package.

A complete polluting emissions speciation should be performed in different working conditions encountered in real use. Therefore, the pollutants expected to be quantified should go beyond the list of the currently regulated ones.

Since accessing ships and aircrafts for testing is not straightforward, and no fuel or engine development work should be funded in the proposals, cooperation with existing projects where such fuels are tested is expected.

A study of possible mitigation actions should focus on any new pollutants that have a high toxicity, a high global warming potential, or both.

The potential from upstream emissions and of secondary pollutants formation in the atmosphere deriving from the new emissions should also be considered and

quantified. Any trade-offs between GHG effects over the next 20-year period, health and other environmental impacts should be identified and assessed.

The projects should assess impacts on human health, in particular those of any emerging pollutants.

In consideration of the above, proposals should address all the aforementioned aspects and issues in order to achieve the expected outcomes

B- Accelerating climate neutral aviation, minimising non-CO2 emissions

A single-stage call with a deadline of 18 April 2024. Budget: 10M€

This call aims to minimise aviation non-CO2 emissions, contributing to specific outcomes:

- Increase scientific understanding of aerosol impacts on clouds and aviation NOx emissions' contribution to climate change.
- Investigate support for potential policy measures identified in the EASA study, assessing their proportionality, feasibility, and overall climate impact reduction.
- Analyze the optimal balance between costs and climate impact.
- Characterize engine gas and particle emissions in cases where data is incomplete.
- Conduct flight tests to demonstrate the benefits and fuel burn trade-offs of avoiding climate-sensitive regions.
- Research hydrogen and aviation drop-in fuels to reduce non-CO2 emissions.
- Develop real-time decision-support software for airlines and air traffic management to predict contrail formation locations and their global warming impact.

The scope acknowledges that a significant portion of aviation's climate impact is due to non-CO2 emissions and emphasises the need for research to address uncertainties. It discusses the potential of avoiding climate-sensitive regions to reduce impact at low costs. The integration of data analytics and weather forecasting into decision-support tools aligns with the project's goals. Collaboration with EASA, ICAO, SESAR3, and other relevant groups is emphasised for standardisation, safety, and international cooperation. Synergies with Digital Sky Demonstrators and Destination Earth are also encouraged.

C- Competitiveness and digital transformation in aviation – advancing further composite aerostructures

A single-stage call with a deadline of 18 April 2024. Budget: 15M€

This Research and Innovation Actions call aims to focus on advancing composite aerostructures and introducing new tools and processes to support the European aviation supply ecosystem.

The expected outcomes include :

- advancements in advanced composite technologies,
- breakthroughs in coupled aerostructures-systems-propulsion integration,
- cost-competitive maintenance of composite aerostructures
- improvements in physical and digital research infrastructures.

Proposals should emphasise the development of advanced composite design and manufacturing technologies to contribute to the digital transformation of the European aircraft supply chain. It underscores the importance of cost-competitive and sustainable manufacturing, addressing issues such as characterization, maintenance, and end-of-life solutions for composite aerostructures. Proposals should also encourage the demonstration of developed technologies in challenging industrial cases and seek synergies with the Clean Aviation partnership, emphasising collaboration and information exchange during the implementation phase.

2.2 Eurostars

The Eureka programme is the world's biggest public network for international cooperation in R&D and innovation. This includes EU and non-EU countries. Countries members of the Eureka network include Europe, North America, South America, Asia and Sub-Saharan Africa.

Eurostars is one of the themes run by EUREKA, an intergovernmental network. The Eurostars network involves 37 countries. The purpose of Eurostars is to strengthen European competitiveness, create new jobs, and support innovative SMEs and project partners (large companies, universities, and research organisations).

'An innovative SME is defined in this programme as any SMEs with the ambition to collaborate on R&D and innovation with international partners to develop new products, processes, and services for European and global markets. Innovative SMEs do not need to have a proven track record of R&D activities.'
R&D: "Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge." (OECD Frascati Manual 2015, p. 44).

Eurostars offers partners EUR 0.5-1.5 million for technology and product development, with an SME funding rate of 50-60%. The amount of Eurostars funding received is managed by national funding bodies, with funding rules varying from country to country. The national bodies decide: which organisations receive funding, which project activities can be funded and the funding rates and thresholds.

Eurostars provides co-funding for R&D activities and priorities projects that explicitly stand to support the UN Sustainable Development Goals (SDG 17). Eurostars has

provided €1.75 Billion of public/private funding since 2014 with a success rate of 29%.

Eurostars provides SMEs with opportunities to join an international network of SMEs, universities, and research organisations, gain access to public funding, collaborate on innovative and market driven R&D projects, access support networks and improve private investors perception of your organisation.

Typically, an EUROSTARS consortium has:

- 3-4 participants
- 2-3 counties
- 30 months average duration of project
- Average project cost of €1.4million

Criteria for eligibility:

- ☑ The lead organisation of your consortium is an innovative SME from Eurostars county
- ☑ Your consortium includes at least 2 Eurostars countries with one organisation from EU or Horizon Europe Associated county
- ☑ At least 2 independent entities
- ☑ The budget of SMEs involved is at least 50% of total budget (including subcontractors)
- ☑ No single participant or country should dominate for more than 70% of total budget
- ☑ Max duration of project is 3 years
- ☑ Should have civilian purpose

The figure 1 below introduces the full list of Eurostars Countries participating in the Eureka Programme.

Figure 1 : list of Eurostars Countries

Please note that organisations from non-Eurostars countries can also participate but by self-funding their project costs.

Now that the UK rejoined Horizon Europe, the UK is a full participating country in Eurostars.

Since Eureka started in 1985, the UK has a healthy portfolio with over €2.3 billion UK project value spanning over 2000 projects, 2,300 SMEs and organisations, having cooperated with 46 member countries.

The top collaborators of British companies under Eureka to date have been with Germany, Netherlands, France, Spain and Sweden.

The national body for Eurostars in the UK is Innovate UK, Innovate UK contribution is £2.5m per call.
Grant is available £360k or 60% cost, whichever is least.
UK subcontracting is capped at 20% of the UK partner eligible costs.
Overheads are capped at 25% of Labour. The UK entity in the consortium must have at least 12 months trading history at the point of submission deadline.

Next round of call opening in January 2024 and closing in March 2024 with a 2 phase application process.

TO CONTACT THE AUTHOR: kathy.vuillaume@enterprisem3.org.uk