

HAMPSHIRE-SURREY JET ZERO CLUSTER



enterprise **m3**

Delivering prosperity through innovation

Leading the way in the journey to
net zero in the aviation sector

The transition to more sustainable aviation is a core element of the wider journey to net zero carbon.

Across Hampshire and Surrey, there is an **emerging cluster of activity focused on the transition to net-zero** within the **aviation sector and across its supply chain.**

Hampshire and Surrey provide **perfect locations for businesses looking to develop their jet zero credentials**, with world-leading research and development, a workforce trained in the aviation and space sectors, and close proximity to major international airports.



“At current rates, aviation is expected to become one of the UK’s largest emitting sectors by 2050. Aviation’s success must no longer damage the planet...[there is a need to] secure a more sustainable future for our climate, but also for our aviation industry, and the critical role it plays in boosting trade, tourism and travel.”

National Jet Zero Strategy: Delivering net zero aviation by 2050

OUR EMERGING JET ZERO CLUSTER: IN NUMBERS

138 businesses and organisations within the Enterprise M3 geography (i.e. large parts of Hampshire and Surrey) are already engaged with the Jet Zero agenda*.

295 further businesses and organisation engaged across the wider aviation, aerospace and defence sector (but not specifically undertaking 'jet zero' activity)

48% of businesses engaged in the Jet Zero agenda currently employ between 1-10 employees



Key assets including Farnborough Airport, NATS HQ and Farnborough International Airshow



Globally-significant players including:

BAE SYSTEMS

QINETIQ

Gulfstream

47% of working age population qualified to degree-level (NVQ4+) or above

3rd most productive LEP area nationally

£24m of Innovate UK funding awarded to jet-zero related activity in Hampshire and Surrey since 2003/04



Cutting edge research and innovation & talent development being delivered locally



UNIVERSITY OF
PORTSMOUTH



* - this is based on a web-crawling exercise undertaken by glass.ai, which has identified the number of companies that have clear credentials or activities in relation to jet zero.

INTRODUCTION

Both Hampshire and Surrey are home to exciting businesses in high value growth sectors. These include space and satellites; aerospace and defence; digital and cyber security; life sciences and med-tech; and 'Createch' (creativity and technology, including video gaming).

In the midst of this is the internationally significant aerospace, defence and space activity which is concentrated in Farnborough and the surrounding area. Within it are some of the world's leading firms such as BAE Systems, Boeing and QinetiQ.

We want to build on these strengths by fostering new technologies and encouraging the formation and growth of businesses which will support the transition towards net zero carbon across aviation and more generally. In harnessing the expertise that we already have, and building strong relationships between industry, SMEs, and academic institutions, we will play a key role in advancing the UK's transition to 'Jet Zero'.

This document sets out Hampshire and Surrey's offer in what we regard as an emerging Jet Zero cluster. The cluster is still developing, but it already has many of the ingredients to thrive and to accelerate the wider journey to net zero carbon in aviation.

This document draws on evidence gathered through an independent research study which was commissioned by Enterprise M3 LEP and completed by SQW and glass.ai*.

**Supporting the development of the Jet Zero Cluster in the EM3 LEP area – Evidence Report.* Research study completed by SQW and glass.ai (September 2023), and commissioned by EM3 LEP

What do we mean by the emerging Jet Zero cluster in Hampshire and Surrey?

We are defining the emerging cluster as inter-related activity across the wider aviation value chain (including aviation infrastructure, manufacturing and operators, and their supply chains) that supports the transition towards net zero in aviation.



Why Hampshire & Surrey?

- Strong existing knowledge economy
- Presence of globally-significant players
- Nationally important assets
- Well-established networks
- Specialist labour force
- Cutting edge research and innovation landscape
- Connectivity to major UK airports



Presence of globally-significant players

Hampshire and Surrey is home to globally-significant businesses in relation to jet zero. These include Qinteq, BAE and Gulfstream, all of which are developing and deploying industry-leading technology within the aviation and space sectors.

Strong cluster of activity locally

Our area has a long history of aviation activity, being the location of the UK's first powered flight. Research on the emerging cluster has identified 138 businesses and organisations within the Enterprise M3 geography (i.e. large parts of Hampshire and Surrey) that are already engaged with the Jet Zero agenda*. There is a particularly strong concentration of activity around Farnborough Airport. Alongside the large globally-significant players, there is a relatively high incidence of SMEs that are engaged in activities linked to Jet Zero and some of them are local spin-outs. Evidence suggests that around half of businesses currently engaged in activities relating to Jet Zero currently employ less than 10 people, with many having strong growth potential.

Nationally important assets

Strategically important organisations are also located in the area. This includes the HQ of NATS (which is leading research into route efficiency), Farnborough Airport and Farnborough International Airshow (attracting hundreds of thousands of people into the area every two years).

Growing networks

There are already good networks that connect industry to academia, government and local assets. We are home to the Farnborough Aerospace Consortium; a regional trade association that provides support to over 250 members in the aerospace and defence industry.

There are plans to strengthen these networks as we develop our own 'Jet Zero Cluster Partnership' locally to lead on the sector's development in the area, with ambitions to deliver employment space, business support and investment.

* - this is based on a web-crawling exercise undertaken by glass.ai, which has identified the number of companies that have clear credentials or activities in relation to jet zero.

Specialist labour force

The quality and depth of the labour market is well recognised by local businesses as a reason for locating in our area, with three universities offering courses relevant to Jet Zero-related activity. Nearly half of our working-age population is qualified to degree-level.

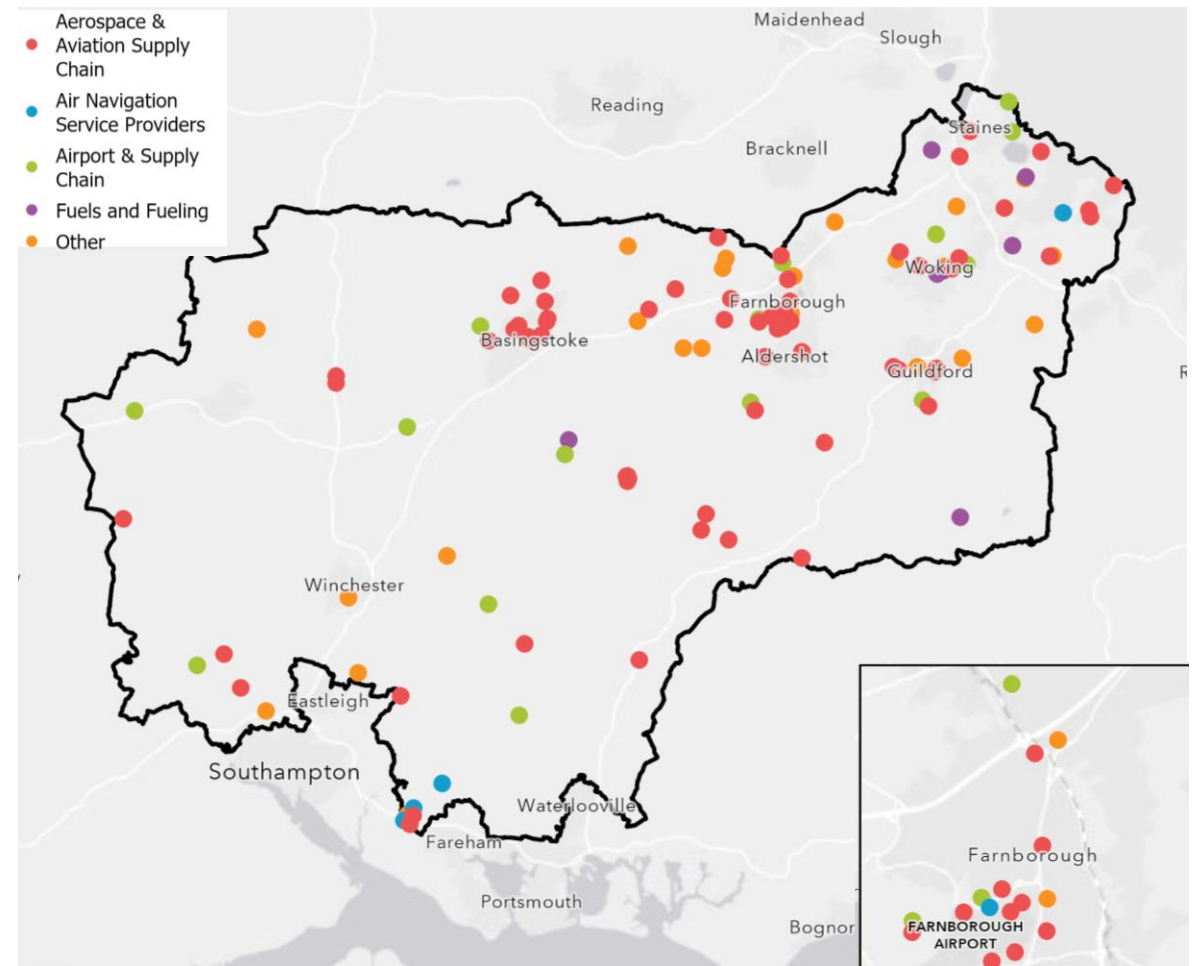
Cutting edge research and innovation landscape

Our local universities (Surrey, Southampton and Portsmouth) are all delivering leading-edge research in Jet Zero. All three have well-established relationships with local industry and research bodies.

Connectivity to major UK airports

Hampshire and Surrey are very close to major international hubs at Heathrow and Gatwick airports. Farnborough Airport is Europe's number one for business aviation.

Location of Businesses with activity linked to Jet Zero by sub-sector



Source: Produced by SQW 2023 based on glass.ai data. License 100030994. Contains OS data © Crown copyright [and database right] [2022]. Note: based on sample of 158 business identified by glass.ai as having activity linked to Jet Zero

WHAT ARE THE OPPORTUNITIES?

System Efficiencies

Improving the efficiency of our existing aviation system: our aircraft, airports and airspace

What are we doing locally?

- NATS, headquartered in our area, recently implemented the biggest airspace change ever undertaken in the UK, introducing Free Route Airspace to allow airlines to fly more optimal routes
- TISICS has developed technology to reduce the weight of key aircraft parts, reducing fuel consumption of aircraft
- The University of Surrey's School of Mechanical Engineering Sciences is working with the Surrey Space Centre to develop light-weight satellite components.

Sustainable Aviation Fuels (SAF)

Transitioning to renewable or waste-derived fuels that can be used in existing opportunity

What are we doing locally?

- Farnborough Airport made SAF available to its customers in 2021, and became the first airport in the world to trial SAF at the same price as its standard JET A1 fuel.
- Our local manufacturers, including QinetiQ and Gulfstream, are adapting aircraft produced locally for SAF, with a SAF mandate set to be introduced in the UK by 2025 (supported by a revenue certainty scheme).

Zero Emission Flight

Creating new forms of aircraft with zero emissions; ambition nationally to connect different parts of the UK by 2030.

What are we doing locally?

- TISICS is developing scalable manufacturing methods capable of delivering large liquid hydrogen storage tanks for future aircraft.
- The University of Southampton's Energy Technology Research Group is investigating more efficient hydrogen combustion concepts for zero-emission power and propulsion.
- The Solent Cluster is seeking to invest in hydrogen production facilities, to supply hydrogen in the nearby Solent area.

SKILLS AND THE LOCAL WORKFORCE

People are a critical element of genuine clusters and our area has a particularly strong labour market.

The area is already home to specialist skills. Given the legacy of aviation in Farnborough and the surrounding area, there is a wealth of talent available locally. Indeed, this is a reason many of our current businesses are located here.

In addition, there is new talent coming out of local universities and further education institutions. All of our local universities have engineering schools, and are developing graduates with expertise in aerospace, space, renewable energy and materials. Farnborough College of Technology also has specialism in the aviation sector, with both the Emerging Technologies Centre and an Aerospace Research and Innovation Centre located on-site.

More generally,

- the local area has a highly-qualified labour force, with nearly half of the working-age population qualified to degree-level or above
- organisations in Hampshire and Surrey benefit from the workforce skills that exist across the Greater South East (including potentially London). There is therefore a large labour market on which to draw.

**47% of working age population
qualified to degree-level (NVQ4+) or
above**

**3rd most productive LEP area
nationally**

Key Assets in our Area

University of Surrey
University of Southampton
University of Portsmouth
Farnborough College of Technology

Achieving Jet Zero requires all parts of the sector to work together to develop, test, implement, and invest in the solutions we need. This involves a partnership between government, industry and academia to drive the delivery of new technologies and innovative ways to cut aviation emissions.

National Jet Zero Strategy: Delivering net zero aviation by 2050

MODE A	7000
MODE C	029
SFL	
BPS	
G/SPEED	G106*
IAS	
HDG	
ROC/ROD	+0/MIN
CAPABILITY	NONE
A/C ID	
A/C ADDR	

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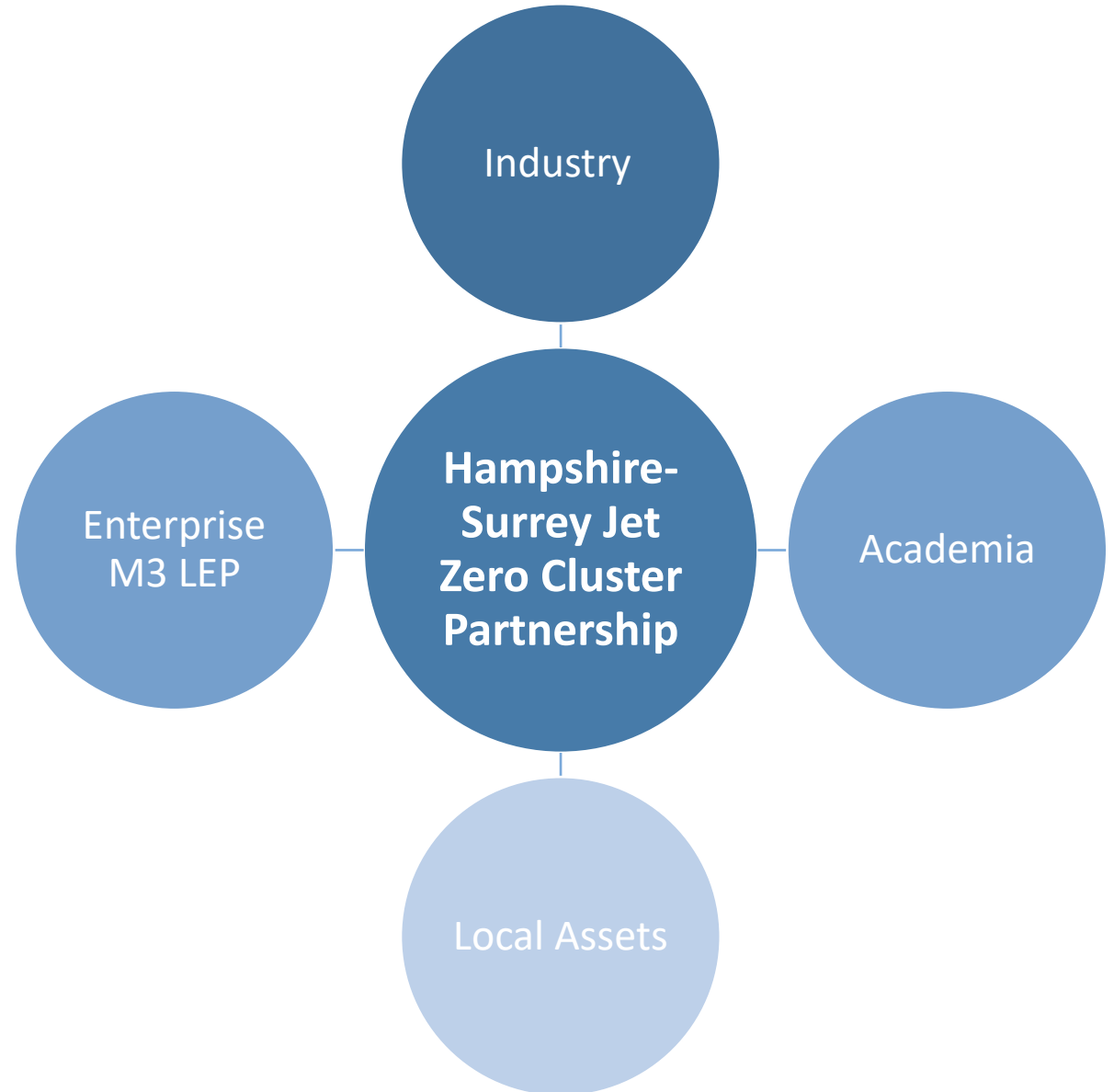
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WORKING AS A PARTNERSHIP

To support the development of the emerging Jet Zero cluster locally, government, industry, local assets and academia have come together to form the *Hampshire-Surrey Jet Zero Cluster Partnership*. Industry-led, this partnership is seeking to grow the cluster locally.

The partnership's objectives include:

- Building relationships across relevant organisations within Hampshire and Surrey, developing a closer-knit business, academic and government community.
- Developing a stronger identity for the Jet Zero cluster locally, nationally and internationally, using the Farnborough Airshow as a platform to the world.
- Directly delivering actions that will support the growth of relevant businesses, including employment space, business support and investment support.



EXAMPLES OF CURRENT ACTIVITY WITHIN THE HAMPSHIRE-SURREY JET ZERO CLUSTER



QINETIQ



FARNBOROUGH AIRPORT



UNIVERSITY OF SURREY



University of Southampton



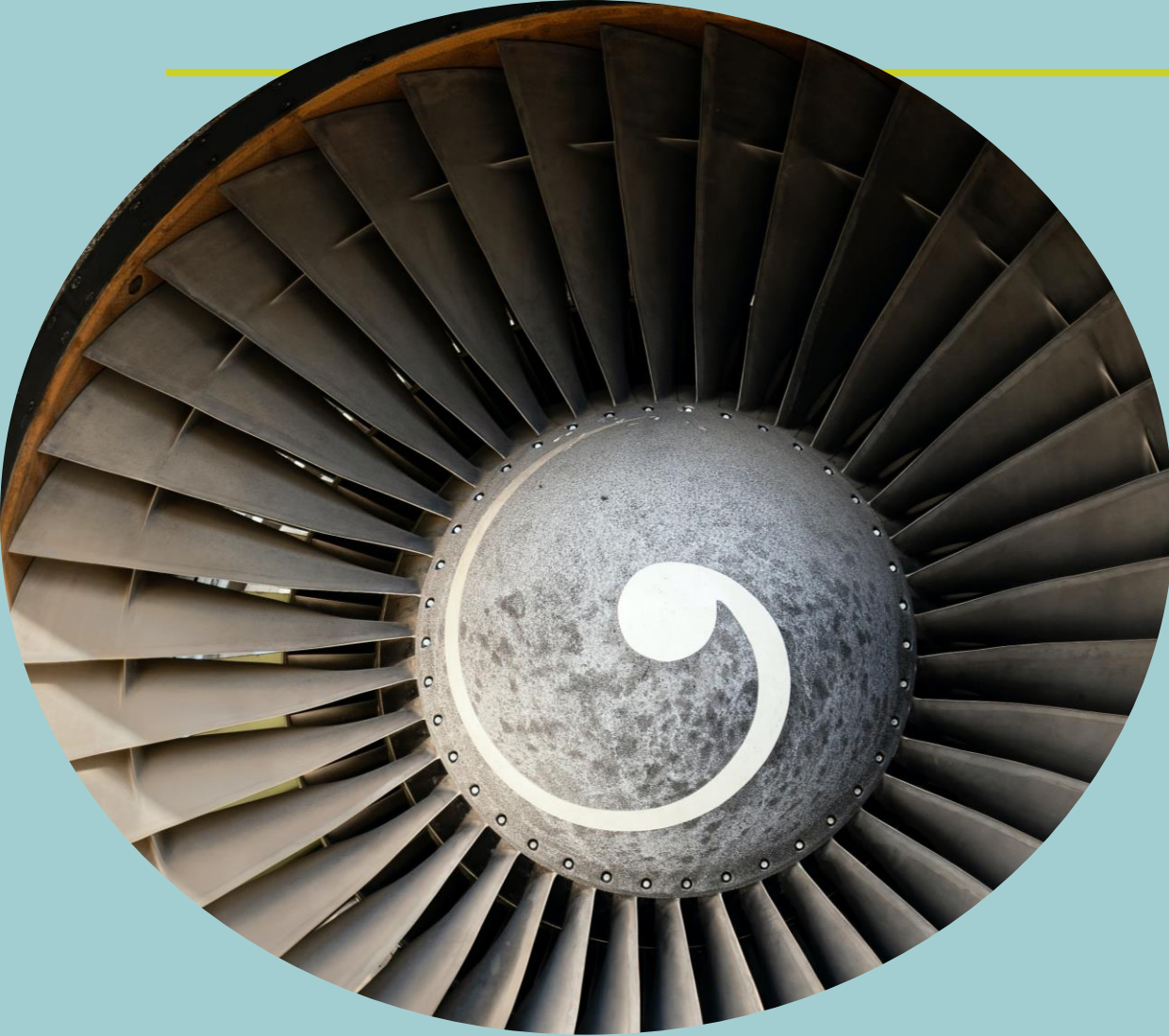
TISICS
Metal Composites



Farnborough College of Technology



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QINETIQ

QinetiQ is a multinational science and technology company that generates Intellectual Property for high-end technologies that deliver capabilities to the UK and other armed forces globally.

At its Farnborough site at the Cody Technology Park, QinetiQ works closely with Defence Prime Contractors, local universities and SMEs. It is also a member of Farnborough Aerospace Consortium and through this route, it has shared insight in terms of how companies can approach the Defence market.

While QinetiQ's R&D activity is primarily Defence and Security focused, the resultant technology IP has been adapted into many other applications. Some of the by-products of its research have the potential to aid the transition to net zero in aviation. For example, carbon fibre composites (ultra-lightweight materials) developed by QinetiQ are currently under further development through partnership with BAE Systems and with Boeing. In another example, QinetiQ's research into non-lithium ion batteries (i.e. batteries that use a non-conventional technology and chemistry) could soon provide new ways to power aircraft equipment or seat units.



FARNBOROUGH
AIRPORT



FARNBOROUGH
AIRPORT

Farnborough Airport is Europe's number one for business aviation and the home of British aviation, with the first UK powered flight taking off from the airfield in 1908. Today the town's airport is known across the world for hosting the pre-eminent aviation and aerospace trade event - the Farnborough International Airshow.

Farnborough Airport was recently awarded the highest level of carbon neutral accreditation, having become the first business aviation airport in the world to achieve carbon neutral status in 2018.

The Airport made Sustainable Aviation Fuel (SAF) available to its customers in 2021, in support of the decarbonisation of the wider aviation industry. While in 2022, it committed to be Net Zero for those emissions it can control by 2030 or sooner, setting some of the most ambitious targets in the industry.

As home to more than 70 tenants, including Gulfstream, Farnborough Airport is the largest employment site in the borough, continuing to drive inward investment and support jobs and economic wellbeing.



UNIVERSITY OF
SURREY

University of Surrey is a public research university located in Guildford, home to around 11,000 undergraduate and 4,000 postgraduate students (2022/23 academic year).

University of Surrey has several strands of research work relevant for the net zero transition in aviation. These include:

- sustainable aviation fuels (SAFs) in chemistry and chemical engineering
- battery technology
- advanced materials
- sustainable hydrogen production.

In addition, as work around jet zero technologies progresses, there is scope for bringing in researchers from the university's principal research areas such as artificial intelligence or tourism. The University of Surrey sees the jet zero agenda as a research opportunity with potential to bring in funding and industry partnerships.

With respect to hydrogen research in particular, the University engages in industry and research collaborations through its Thermo-Fluid Systems University Technology Centre, founded in 2003 with support from Rolls-Royce.



The University of Southampton is a public research university, one of the founding members of the Russell Group of universities and is ranked among the top 100 universities globally. The University's main campus is located just outside of the EM3 geography, but it works closely with local businesses and other collaborators, and Southampton Science Park is within the EM3 area.

There are many active research groups, including:

- **Aerodynamics & Flight Mechanics Group** – undertakes research in aerodynamics and mechanics of flight whereby technological advancements can benefit academia, industry and society.
- **Astronautics Group** – undertakes a range of fundamental and applied research in space physics and spacecraft engineering.
- **Electrical Power Engineering** – researches electrical technologies with a focus on efficient power transmission, satellite technology and renewable power generation.
- **Engineering Materials & Surface Engineering** – works to develop enhanced materials performance and improved designs.
- **Transportation Group** – undertakes research to help to secure sustainable transport for the UK and globally, including in the aviation sector.



TISICS

Metal Composites

TISICS is an advanced materials company that develops high-strength and ultra-lightweight metal composites for use in planes, spacecraft and industrial equipment. TISICS was founded in 2005 from QinetiQ (a Farnborough-based R&D company focused on defence and security) to commercialise this world-leading materials technology.

TISICS' specialism in ultra-lightweight materials is key to enabling system efficiencies in aviation by producing lighter aircraft components that can reduce fuel consumption and emissions. Its advanced materials technology has received support from Innovate UK and UKRI towards its development.

Given the nature of its work, TISICS requires highly-qualified individuals with specialist manufacturing and engineering skills. It has established strong links with the University of Surrey's materials department. TISICS has funded six PhD students at the University. Engagement with SETsquared, a business incubation partnership between six universities in the South of England (including the University of Surrey), has also provided helpful connections on TISICS' journey.



Farnborough College of Technology (FCoT) is a technical education provider that offers courses from Level 1 to postgraduate level. The college has campuses in Farnborough and Aldershot, is an accredited institution of the University of Surrey and has both an Emerging Technologies Centre and an Aerospace Research and Innovation Centre (opened 2021). The college has approximately 3,000 learners (young people and adult) and over 600 apprentices.

FCoT works in partnership with businesses, including those in the aviation supply chain, on both research and meeting local skills needs. Its research into the use of future aviation technologies and research on non-carbon emissions will both support the transition to net zero. Similarly, it is partnering with major aviation business, including Farnborough Airport, Gulfstream and Vistajet, to train young people to work with advanced materials and metal composites that will be used in future aircraft designs.





Farnborough Aerospace Consortium (FAC) is a regional trade association that provides support to over 250 members in the aerospace and defence industry. It offers support that includes brokering to help members win new business, supporting investment into aerospace and defence into the region, acting as the principal voice for aerospace and defence SMEs in the region, developing funding sources for its members, membership services, and working with appropriate partners on skills development of the existing and future workforce.

The consortium is engaged with several key areas of Jet Zero. It helps member organisations identify Jet Zero funding streams, works with the national initiative Composites UK on making aircraft lighter, and acts as a partner in the planned Solent Hydrogen cluster.



Contact Us

If you are interested in hearing more about our emerging Jet Zero cluster, please get in touch with us:

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