From flying taxis to electric planes, what does the future hold for air travel?

It’s nearly 120 years since the world’s first motor-operated plane took flight.

American brothers Orville and Wilbur Wright are generally credited with inventing – and successfully operating – the first piloted aircraft in North Carolina in 1903.

The duo’s ground-breaking achievement, a feat almost impossible to comprehend at the time, would mark the birth of an industry that would change the world.

More than a century on and the aerospace sector is worth hundreds of billions of pounds to the global economy.

Britain’s aerospace industry is now the second largest in the world, only behind the US, with more than 3,000 aviation companies operating in the country.

In 2020, the UK’s aerospace sector had an annual turnover of £35bn and it provided more than 120,000 highly skilled jobs.

In the two years since, the industry has been ravaged by the pandemic, with giants including Airbus and Rolls-Royce forced to undergo major restructuring programmes in a bid to cut costs.

Last year, however, industry body ADS said the sector was focusing on its future – and returning to long-term growth, despite the uncertainty that remains around air travel.

Airbus also announced this month it had surpassed its annual delivery target for 2021 – with 611 commercial aircraft sent to 88 customers, including the last ever A380.

But what does the future hold for the industry? “Incredible change”, according to Bristol-based aerospace expert Dr Steve Wright.

Dr Wright, a senior research fellow in avionics at the University of the West of England (UWE) and a systems engineer who has worked for Airbus and Boeing, says he is “excited” about the developments in the sector, particularly around the rise of electric flight.

“I have worked in aerospace for 30 years and in that time I have not witnessed anything like the revolution I have seen in the industry in the last five years,” he told *BusinessLive*. “It’s bonkers.”

Dr Steve Wright is a professor at UWE and an aviation expert (Image: Bristol Post)

He says the sector is driving towards decarbonising aviation and electric planes, but the new technologies being developed will take some time before they are commercialised.

“The strength and weakness of the aerospace industry is that nothing happens quickly. Electric flight is coming but it’s going to take longer than you think; probably about five

years."

According to Dr Wright, the sector is developing a "tranche of solutions" as it attempts to become more sustainable, much in parallel to the evolution of the automotive industry.

"Here we are at the end of the second era of aviation and there is no one-size-fits-all solution to sustainable aviation," he explained.

"There is a place for smaller, pure electric aircraft, but there is also very much a place for hybrid electric, just as we have seen play out in the automotive industry.

"We hope that pure electric will work its way up the stack of aircraft size and in 20 years everyone will say that is the way it's done, but it will take a long time."

There are currently around 200 different electric and sustainable aviation projects taking place around the world, including a large number in the UK.

One such project being undertaken at UWE is for a hydrogen-powered vehicle that could travel port-to-port between Bristol and Cardiff.

Businesses across the industry, from major heavyweights such as Rolls-Royce and Boeing, to agile start-ups, are also investing heavily in electric flight.

Rolls-Royce's battery powered 'Spirit of Innovation' plane "smashed" the fastest all-electric flight world record in 2021, after reaching a top speed of 345.4mph over three kilometres at Boscombe Down in Wiltshire – breaking the existing record by 132mph.

Meanwhile, Bristol-based Vertical Aerospace is leading the race to develop the world's first all-electric 'flying taxi'.

The company, founded in 2016 by Ovo energy boss Stephen

Fitzpatrick, is developing a so-called all-electric vertical take-off and landing (eVTOL) vehicle.

In June last year, the business announced 1,000 pre-orders for its aircraft with the likes of American Airlines and Virgin, after confirming it would become publicly traded on the New York Stock Exchange and being valued at nearly $2bn (£1.4bn).

The company is planning to develop and launch a Virgin Atlantic-branded short-haul ‘flying taxi’ in the UK. The joint venture will see Vertical Aerospace’s electric vehicles based at UK airport hubs including London Heathrow, Manchester and Gatwick.

These new electric ‘flying taxis’ are not for long-haul journeys, says Dr Wright, but for “short city hops or hops over water” between places that are difficult to get to in Britain by other forms of transport.

Vertical Aerospace is based in Bristol and is developing an all-electric ‘flying taxi’

(Image: Vertical Aerospace)
“Wouldn’t it be great if we could fly from Bristol to Gatwick and connect immediately? Another example would be from Oxford to Cambridge, because you end up beating your way across radial roads. It’s a perfect example of that frustration that could be solved.”

Dr Wright, who is also working for Samad Aerospace – a Bedfordshire-based technology company developing a range of civil hybrid-electric e-VTOL aircraft – says Scotland is also “crying out” for these new technologies.

“Especially the Highlands and Islands,” he said. “We have been looking at the jump from Prestwick Airport to the Isle of Arran. To drive, it takes so long.”

Dr Wright admits the first commercial trips are probably still three-to-five years away, however, with flights over longer routes some decades away.

“When will we have the first electric passenger-carrying hop from London to New York? I don’t see it happening before 2050. We have electric flight, and in three-to-five years we will see it in a very real sense with these short hops.

“The future in the meanwhile is hybrids. It will be a gradual transition but it will be decades long as it will happen so slowly.”

What is sustainable aviation fuel?

A Leonardo helicopter completes a flight from Bristol Airport to Yeovil, in Somerset, using SAF
(Image: Simon Pryor)

Sustainable aviation fuel (SAF) is another hot topic within the aerospace industry, but Dr Wright believes the sector will be burning hydrocarbon for “a long time yet”.

“The very last drop of hydrocarbon fuel that is burnt on planet earth will be in an aeroplane,” he said.

SAF is non-conventional (fossil derived) aviation fuel that is being used to replace traditional fuels in a bid to cut carbon emissions. There are different types – or so-called ‘generations’ – of SAF and some are causing controversy within the sector.

One of the “big complaints”, explains Dr Wright, is creating SAF by growing crops that could be used for food.

“Essentially we are growing fuel and it is taking crops that could be food,” he said. “In a world full of starving millions

that is a really difficult problem. But here is the good news; the production processes are evolving."

Dr Wright is referring to the three different processes that have evolved over time to make SAF more sustainable – and, arguably more importantly, more ethical.

He explained: "With the first generation you take corn, mash it up, and brew it into fuel. The second generation takes organic matter that would otherwise be wasted and chemically turns it into fuel. But where it gets really interesting is the third generation, where we are essentially growing the fuel using special cultures of algae."

Dr Wright explains that scientists are now able to use genetically modified algae which captures sunlight and pulls carbon dioxide out of the atmosphere, and turns it back into hydrocarbon fuel that can be used in planes.

"It's still expensive, but it can be used for aircraft models that already exist. People are blending sustainable fuels with conventional fuels."

Looking ahead to the next 12 months, Dr Wright believes 2022 is going to be a "consolidation year" as industry experts like himself continue on the slow road to sustainable aviation.

"It will be another year of rising frustration for many people saying 'come on, we want electric flight'. It is coming, but it will take some time yet."

He added: "As a country our heart is in the right place and we are aware there is an opportunity to be seized."