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 How Airbus's ZeroE blended wing concept planes could look in flight. Photograph: Airbus
© Photograph: Airbus

Almost everybody on the planet knows what a passenger aeroplane looks like. Its shape hasn't changed for decades.

Take the world's bestselling liner, the Boeing 737: the first model in 1967 looks roughly the same as the latest version, the 737 Max. Yet that extraordinary run may be about to change as manufacturers look at a new wave of innovations that could literally change the shape of aviation.



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Longer, thinner wings, jet engines with uncovered fans, and an approach that blends the wing into the body of the plane are all being considered by manufacturers, in a potential shift away from the decades-old "tube and wing" approach.

The aviation industry is under pressure to cut the carbon emissions from aircraft, which are responsible for 2.5% of global emissions (but **4% of warming effects**). Yet the possible solutions touted have been limited in different ways: "sustainable" aviation fuel (SAF) is not being **produced at industrial scale**, batteries are not yet dense enough for most flights, and there has been **no hydrogen technology breakthrough**.

But aircraft manufacturers believe there are still major gains that can be made on fuel efficiency instead as they gear up for new planes by the middle of the next decade. That could make air travel cheaper. More efficient planes could also give the industry some political cover, even as total carbon emissions continue to rise.

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"We're going to be out of runway in terms of conventional design," said Richard Aboulafia, the managing director at AeroDynamic Advisory, a consultancy. "To have a prayer of getting fuel burn under control, radical ideas are already the way to go."

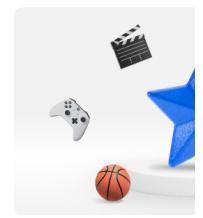
Less of a drag

Boeing is under particular pressure to come up with a breakthrough design.

Flying-Vs and longer wings: how the familiar shape of passenger planes is about to change

It updated the same rough blueprint for the 737 series over decades, but that approach ended after design compromises contributed to two crashes and 346 deaths in 2018 and 2019. [Boeing faced an existential crisis](#), and has fallen far behind Airbus.

In July, Boeing appointed Robert "Kelly" Ortberg as its new chief executive. At some point soon, he will have to turn his attention towards the [embattled company's](#) next plane. The "transonic" truss-braced wing, being developed in partnership with the US space agency, Nasa, could help. It combines a longer, much thinner wing (braced by a truss) capable of transonic flight (just below the speed of sound). Boeing said initial tests showed a 9% fuel burn reduction. It hopes to get to a 30% reduction, combined with other technologies, and is aiming to fly a demonstrator in 2028, with an in-service target of between 2030 and 2035.



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In a factory in Bristol that originally built Blenheim bombers during the second world war, Airbus is also pushing for advances in wing technology.

Sue Partridge, who leads Airbus's commercial aircraft operations in the UK, said last year that "the physics tells us the wing needs to be longer and more slender" to give more lift for less drag.

"The wing should give us as much impact on fuel burn as the next generation of engines," she said.

Airbus's chief executive, Guillaume Faury, has indicated that the next generation of aircraft will probably look fairly similar to those in service now. However, the European planemaker is also looking at a concept that merges the main body with the wing. That would be a much more radical departure, giving the advantage of the plane's body itself contributing to lift.

A startup, JetZero, claims its "blended wing" can cut fuel burn in half. And Delft University in the Netherlands has tested a 3-metre model of its [Flying-V aeroplane concept](#), which shares a similar approach.



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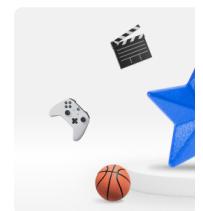
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Different designs could work better for different uses, said Jerry Lundquist, a consultant and former US air force officer who previously led McKinsey's aerospace consulting. Blended wings may work better for longer journeys, but they could also throw up problems.

For one, passengers would be seated across a significantly wider area, putting them further from any windows – and maybe requiring screens to simulate daylight. And those seated on the outside could find their stomachs lurching as they feel greater “moment”, or turning force.

“You need to make sure they aren’t subjected to intense forces,” Lundquist said.



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Engine of change

Efficiency gains from engines will still be vital for the industry.

The most marked change in the appearance of engines could be the return of the open propeller. The design dispenses with the nacelle – the cover – to allow for a bigger fan that offers more propulsive force. Superficially, it will look like existing turboprop engines, but with the ability to fly at Mach 0.8, or 80% of the speed of sound – the same as current jet engines.

CFM, a joint-venture between America’s General Electric and France’s Safran, has said that its [open fan Rise engine](#) could theoretically reduce fuel consumption and carbon emissions by 20%. The company says it can reduce noise, which put paid to a previous prototype in 1986. It will still have to persuade regulators and passengers that the engines will be safe if a blade breaks in midair.

As well as radical changes to airframes or engines, manufacturers are constantly looking for ways to salami-slice fuel burn via small gains.

Winglets, the curved tips of wings, were first introduced in the 1970s in response to the then oil crisis, mimicking birds’ wings to reduce drag. The [split winglets](#) on the 737 family since 2014 can reduce fuel burn by as much as 2% during a long journey, according to the Seattle-based manufacturer Aviation Partners. (For plane-spotters, they double as the easiest way to distinguish a 737 from an A320.)

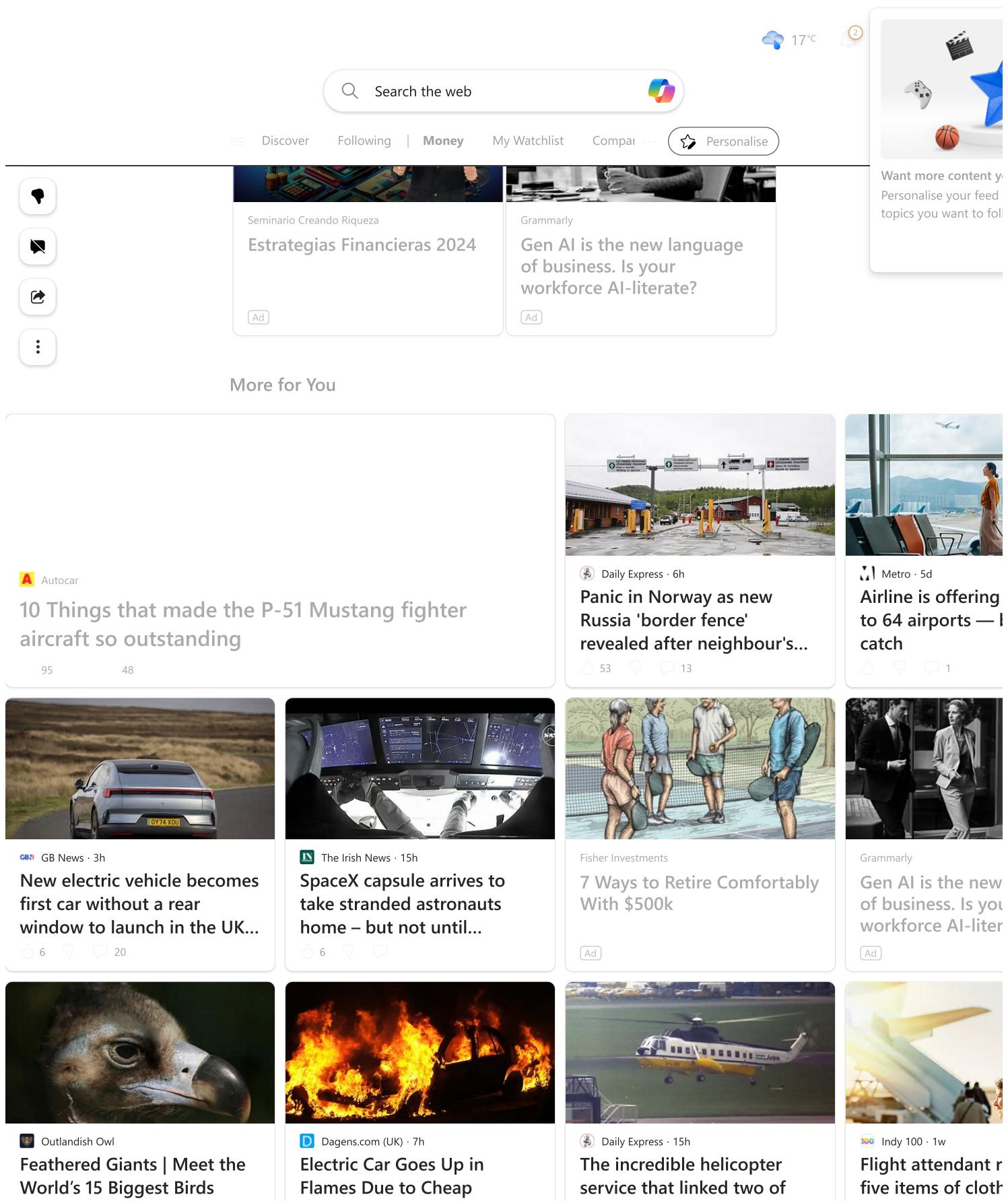
Birds have had millennia to evolve the ideal features for efficient flight, so aviation designers have constantly used them for inspiration. Airbus is experimenting with gust sensors on the front of the aircraft to register during turbulence, with automatic responses from control surfaces of the wing, similar to a bird’s constant adjustments to movements in the air.

Concorde, which flew on only a limited number of routes, was the last passenger plane in service with a truly distinctive design. The supersonic jet, which had swept-back, delta wings, [was retired in 2003](#). Boom Supersonic, a startup, is testing the technologies for a proposed “son of Concorde” with a similar look.

That plane would only ever be a niche service, flying 80 passengers at a time on premium routes. But there is a possibility that Boeing and Airbus take radically different approaches to the workhorses that carry billions of passengers each year.

If the manufacturers go in different directions, then passengers might start paying serious attention to plane design, says Addison Schonland, an analyst who tracks the industry at AirInsight.

"I don't think we've ever had a situation before, to look at an aeroplane and say, 'that's completely different,'" he says. "How will people react to seeing those novel shapes?"



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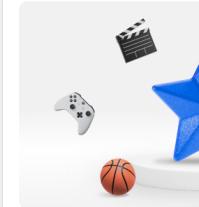
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There's a simple reason why we all board planes on the left-hand side

Story by Sinead Butler • 6mo • 2 min read



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L There's a simple reason why we all board planes on the left-hand side
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TikTok viewers have shared their surprise at learning why exactly we all board **planes** on the left-hand side.

In the viral video from Dougie Sharpe (@dougiesharpe), the fun fact connoisseur explained the historical reason for passengers boarding on the left side of a plane rather than the right.

"The reason why we always load and unload planes from the left-hand side is a holdover from when humanity moved on boats," he began.

"Since ancient times, the left-hand side of the boat was always the side people would load and unload cargo and passengers from."

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"This made things simple logically and would allow ships to travel all over the world from port to port and always have the correct equipment on the correct side no matter where they went."

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