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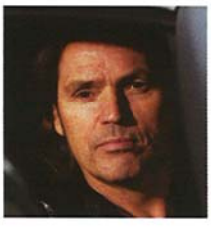

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Boom times ahead for UK aerospace?

There's no doubt that the UK's aerospace sector once enjoyed greater public visibility than it does today. Industry consolidation over the past few decades has seen many of its household names gobbled up, whilst the absence of a major domestic aircraft building programme unsurprisingly prompts many to wonder whether the sector is in a state of terminal decline.

But as our October cover story (High flyers, p15) illustrates, this grim assessment couldn't be further from the truth.

Today, the UK boasts the second largest aerospace sector in the world. It makes the most expensive and complicated bits of many of the world's aircraft, is home to around 3000 separate companies, employs 230,000 people and generates around £24 billion for the UK economy every year.

With global demand for commercial aircraft predicted to soar over the coming years, the civil aerospace sector is particularly buoyant. And the UK's expertise in developing the technology that enables aircraft to keep track with demanding environmental targets, should ensure that it remains at the heart of this growing industry.

"the UK boasts the second largest aerospace industry in the world

Elsewhere in this issue our Q&A feature (p19) examines an issue that many believe is critical to the continuing growth of the UK's own air capacity: a Thames Estuary Airport.

Whilst the concept is still very much on the drawing board, our expert panel outlines some compelling advantages, and the idea seems to have moved on from its early "Boris Island" days, when it was widely viewed as little more than a crackpot vanity scheme dreamed up by London's Mayor.

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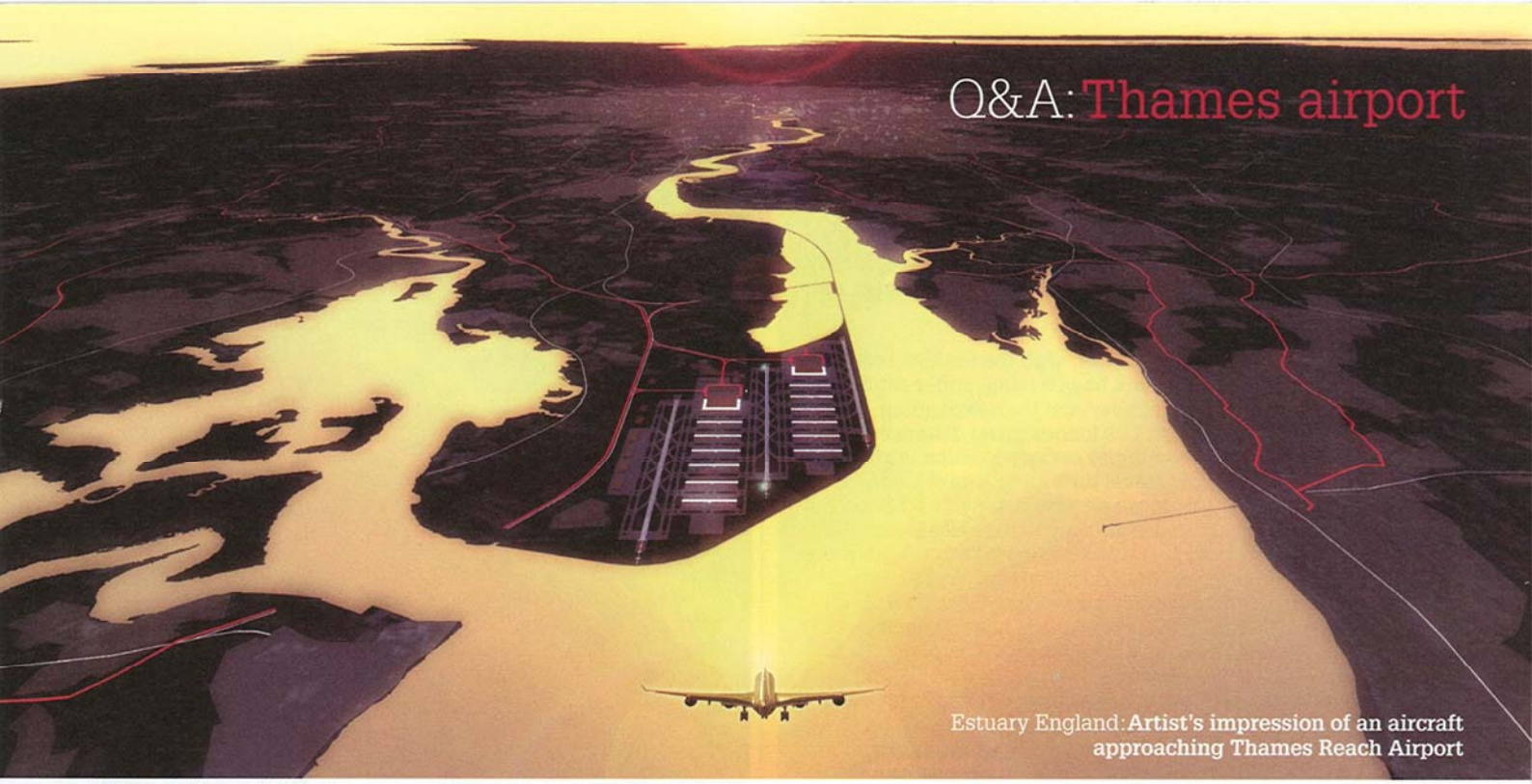


Estuary England: **Artist's impression of an aircraft approaching Thames Reach Airport**

Testing the water

Our expert panel answers your questions on plans to build a Thames estuary airport Stephen Harris reports

A Thames Estuary airport is back on the agenda thanks to opposition to expanding Heathrow and enthusiasm from the mayor of London, Boris Johnson. As the government's Airports Commission considers the best way of expanding the UK's air travel capacity (although it is mainly looking at south-east England), we put your questions to two of the teams who have put forward proposals for a new hub in the Thames Estuary:

- The **Metrotidal Tunnel and Thames Reach Airport** consortium has been working for more than 10 years on plans for a privately funded £29bn three-runway airport on reclaimed land on the Hoo peninsular that would also include the Metrotidal project to build a tunnel under the estuary providing new road and rail loops, flood defences and tidal energy generation.
- Architecture company **Foster + Partners** has proposed building a privately funded £24bn four-runway 'Thames Hub' airport on a raised platform on the Isle of Grain in the model of its artificial island airport in Hong Kong, linked to London via several rail lines including HS1 and Crossrail.

■ Why would a Thames Estuary airport be preferable to expanding our existing infrastructure at Heathrow, Gatwick and/or Stansted given the considerable extra costs involved and the extra time it will add to passengers' journeys?

Foster + Partners: The £24bn cost of a brand-new airport is less than two new runways at Heathrow. [Heathrow estimates building a third runway would cost £14bn–£18bn, of which £4bn–£6bn might come from government. A fourth runway would cost a further £8bn–£14bn.] Passengers would be able to take a direct train from St Pancras to the new airport in approximately 26 minutes using HS1, and journey times for passengers from Birmingham or Manchester would be drastically reduced. Heathrow requires major surface access improvements in an already congested area. Gatwick is as far, and Stansted further, than Thames Hub and they would both require substantial surface access improvements.

There are many other advantages to a four-runway Thames Estuary airport, not least the opportunity to relieve five million Londoners of the noise, pollution and dangers of flight paths over the capital. Without the constraints of an urban site, the airport would be more cost effective to build and, unlike Heathrow, it can operate 24 hours a day, due to the sparsely populated area. It ->

Q&A: Thames airport

can open with capacity for 110-million passengers per annum within 16 years — the same timeframe as a third Heathrow runway, which would be full within a decade of opening. The proposed site is also strategically located close to the south-east's major ports to enable the successful economic integration of rail, sea and air freight.

Thames Reach: Thames Reach Airport, with the surface access provided by Metrotidal Tunnel, will have a much larger catchment area and better connectivity for lower cost than expanding Heathrow, Stansted or Gatwick. The longer travel distance from north-west and west of London to the estuary location is more than made up by the more efficient travel time air-side and land-side when passing through the purpose-designed, new-build airport. If the route for HS2 did not go out of its way to help Heathrow, the benefit of Thames Reach Airport would be even better. With a site to the east of London close to HS1, the comparative proximity of Thames Reach Airport is also much better than Heathrow for all areas north-east, east and south from central London, including northern Europe as far as Paris, Brussels and Amsterdam.

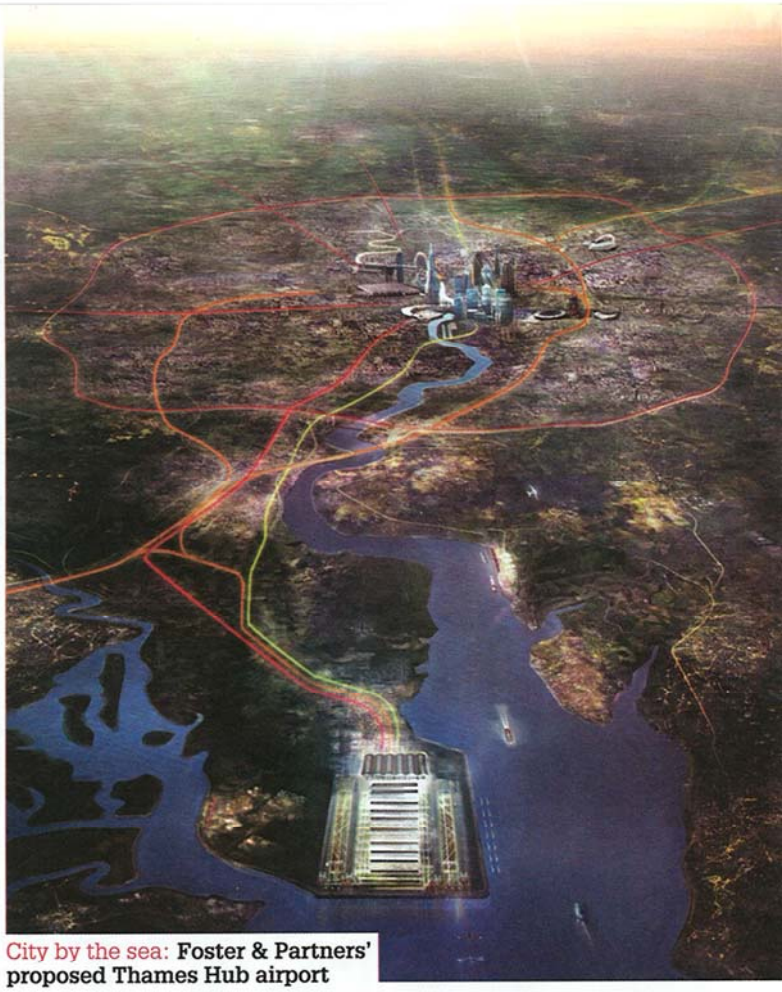
■ What would be the biggest engineering challenges involved in the project and how do you intend to overcome these?
FP: Although it is a large project, it is relatively straightforward in engineering terms. The construction of the airport platform would use well-established civil engineering technologies, which have been used to build major airports on reclaimed land elsewhere in the world, such as Chek Lap Kok airport in Hong Kong. In Europe, similar reclaimed land techniques have been used extensively in Holland for many decades.

TR: The biggest civil engineering challenges are: the construction of the Metrotidal pool impoundment and weirs so that they are environmentally and hydrodynamically neutral for the Thames tideway while providing maximum flood storage capacity and tidal pumped-storage output; and the subsequent timely construction of the airport platform within the pools. The configuration for the pool impoundment and weirs will be tested and refined on numeric models of the Thames tideway. This will optimise the flood defence benefits during storm surges, while managing flow rates and sedimentation during normal tidal cycles, and provide a stable self-scouring system that requires no more maintenance dredging than at present.

■ How would the airport impact on tidal defences and flood risk and what measures do your plans include to mitigate against this?
FP: The airport itself does not change the nature of wider flood risks, but the development is an opportunity to integrate future flood protection with a wider infrastructure strategy. The Thames Estuary 2100 report from the Environment Agency looks closely at the impact on flood defences and habitat loss in the light of thermal expansion in the oceans and storm severity. This validates earlier work that we based our designs on to found the base level for the airport platform 7m above sea level, negating any flood risk.

TR: Metrotidal Tunnel is designed to provide the next generation of London's flood defences without requiring a permanent barrier across the shipping channel, by using the controlled flood storage capacity of the pools. The pools would provide a throttle for storm surges and a reduction in tidal squeeze (loss of intertidal areas due to rising sea levels) upstream while not throttling the tideway in normal tidal cycles, and provide tidal-pumped-storage renewable energy output to offset transport energy demands. They would also reduce the cost of the tunnel by increasing the proportion of cut-and-cover areas protected from the tides during construction, and create a balance of materials on site for raising the airport platform, while minimising the embodied energy and carbon audit of the platform construction.

■ How much of a threat is the sunken US warship SS Richard Montgomery that lies in the estuary and still contains around 1,400 tonnes of explosives, and what measures would you include to protect against the potential tsunami that may occur if the explosives were detonated?



City by the sea: **Foster & Partners' proposed Thames Hub airport**

Check in: **Artist's impression of the Foster & Partners airport**

TR: The SS Richard Montgomery falls well outside the Metrotidal Tunnel and Thames Reach Airport impoundment. However, there is a case for the Environment Agency to tender solutions and resolve the matter now. Solutions include raising a blast levee by pumping sediment around the north, west and south sides of the wreck and laying time-co-ordinated directional explosive charges to direct blast and associated waves towards the outer estuary. The Metrotidal pool impoundment would protect the airport from residual wave propagation westwards.

■ What specific measures would you take to replace the environments for internationally important breeding and migratory marine and bird species that will be lost during construction, and to where will the species be displaced?
FP: These natural habitats are already under threat from rising sea levels and storm surges yet there is limited funding available to protect them. An airport could be a catalyst for conservation initiatives, not only to mitigate the impacts of the airport development but to address wider habitat loss. Existing schemes such as Wallasea Island have shown that estuary birds will readily use newly created habitats, so long as conditions are suitable.

TR: There are two strategies for providing replacement intertidal area and low-lying land. The first is to determine sites where managed retreat would be an economical solution to provide new designated intertidal areas without loss of existing sites. The second is to research sites in the outer estuary away from the airport platform where a stable new island habitat surrounded by intertidal areas can be formed by raising an impoundment on or beside existing shallows using tidal pumped-storage energy from the London Array and other local wind farms.