

Aerospace

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Big guns blaze in wide-body war

Airbus and Boeing will battle over long-haul jets at Paris air show, writes *Andrew Parker*

The focus of this week's Paris air show at Le Bourget shifts to the intensifying battle between Airbus and Boeing in the lucrative long-haul jet market.

The last show, in 2011, was dominated by Airbus and a slew of orders for its revamped short-haul passenger jet, the A320neo.

In this latest duel, Airbus is vowing to cut Boeing's lead in the wide-body twin-engine market with its new A350 passenger jet. The Toulouse-based manufacturer is hoping to make a statement of intent by having a test model do a fly-past at the show. The US group is underlining its determination to stay on top by considering launching in Paris the latest and biggest version of its twin-aisle Dreamliner jet – the 787-10.

Increasing demand for these more fuel-efficient aircraft in an era of high oil prices highlights how Asian, European and US airlines are placing big bets on rising air travel to support the most profitable parts of their businesses – long-haul flying.

But with the eurozone still in recession and global economic growth forecasts being cut for this year, some analysts are questioning whether record levels of aircraft production at Airbus and Boeing are sustainable. The companies delivered jets worth about \$88bn to customers last year, and some analysts argue that Airbus and Boeing risk over-saturating the market if production continues at cur-



Long-haul contender: the twin-engine Airbus A350 is rolled out of the factory in Toulouse. The manufacturer is hoping to stage a fly-past at the Paris air show

rent rates. Still, the civil aerospace industry looks relatively healthy compared with the defence sector.

Western governments have made austerity-inspired cuts to defence spending, prompting US and European weapons makers to increase their efforts to secure deals in emerging markets such as India.

One potentially large source of growth – the development of unmanned aerial vehicles for the next generation of combat aircraft as well as civilian uses – is facing strong political and regulatory headwinds. So-called drones will attract some attention at the Paris air show this

week, but the big deals are likely to be in the wide-body passenger jet market, which usually generates higher profit margins than the single-aisle equivalent.

Fabrice Brégier, Airbus' chief executive, recently scoffed at Boeing's response to the A350-1000 – the largest version of the European manufacturer's new twin-aisle jet that is due to enter commercial service in 2017.

Boeing is proposing a major overhaul of its popular 777 wide-body twin-engine aircraft, but Mr Brégier noted the US manufacturer had not finalised the details. "This aircraft [the A350-1000] is real – this aircraft is

not a paper tiger... it will come alive in 2017," he said.

Still, Airbus knows the A350 carries all the same large-scale development risks as the Dreamliner.

Boeing reeled in January when US regulators triggered a global grounding of the 787 after lithium-ion batteries on two Dreamliners burned. This was the first time such draconian action had been taken in 34 years.

The flying ban was lifted only in April after major modifications to the Dreamliner battery system were approved – and this affair was the last

'This aircraft [the A350-1000] is real – this aircraft is not a paper tiger... it will come alive in 2017'

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Aerospace

Malfunctions on 787 encourage cautious mood

Dreamliner Trouble with lighter batteries may discourage innovation, says *Robert Wright*

When reports emerged on January 7 of smoke coming from a compartment on a Boeing 787 passenger aircraft at Boston's Logan airport, it was difficult to separate the incident from the many other minor mishaps to have befallen the highly innovative new aircraft.

Airlines had suffered a number of malfunctions – none ultimately serious – with the aircraft's electrical systems since it entered service, more than three years late, in 2011.

Yet within 10 days of the fire, all 50 787s in operation worldwide had been ordered out of service for what ended up as a four-month grounding – the first such move for an entire aircraft type for more than three decades. A second smoke incident on January 16 in Japan, also involving the aircraft's battery, persuaded the US Federal Aviation Administration to order the aircraft out of service.

The question following these events is whether they will affect the reputation of the 787, which offers far lower fuel use than most of its rivals. Given that many of the 787's problems have resulted from its novel technologies, there are also concerns that the incident will affect attitudes towards innovation in commercial aviation more generally.

The US National Transportation Safety Board is examining how the FAA came to approve the 787's batteries – and could affect how regulators approach new features in future aircraft. Deborah Hersman, the NTSB's chairman, said that the battery risks had been recognised.

"The assumptions used to certify the battery must be reconsidered... by the FAA and Boeing," she said. Ms Hersman called the battery incidents "unprecedented" and said the board was "very concerned". Boeing

has downplayed the gravity of the matter, insisting the battery involved in the Logan incident, which firefighters described as giving off a powerful light and reaching temperatures of 550F (288C), had never truly caught fire.

Loren Thompson (*see page 8*), aerospace expert at the Virginia-based Lexington Institute think-tank, says Boeing worked closely with the FAA to find a solution. But "those efforts were undermined by the sometimes inflammatory language that the NTSB used in public".

The events that led to the grounding had their genesis in Boeing's desire to reduce the weight of the aircraft's power systems. With the 787 Boeing opted to hand over many tasks traditionally done by heavier electrical and hydraulic systems to electric power. The novel lithium-ion batteries weighed half as much as traditional nickel-cadmium batteries and were regarded as more effective.

Controversy surrounds how the risk assessment for the batteries – known to contain more potentially flammable material than the alternatives – so understated their risks. The batteries were cleared for use based on Boeing calculations that they would suffer severe overheating once every 10m flight hours.

Ms Hersman pointed out that when the inquiry was initiated into the batteries' certification – which has yet to report – the batteries had suffered two severe overheating incidents in less than 100,000 flight hours since the 787 entered service in 2011.

"The expectation in aviation is to never experience a fire on board an aircraft," Ms Hersman said. "In two weeks... we saw two cases of battery failure on a 787 and the grounding of the entire fleet by the FAA."

Mr Thompson points out that NTSB



Problematic: a line of out-of-service Boeing 787s at Paine Field, Everett, Washington

investigators have so far been unable to identify what led to the fires. "It's hard to fault Boeing and the original testing when the NTSB itself cannot say what went wrong."

The FAA in April gave the go-ahead for a return to flight for 787s fitted with modified batteries. Insulation was improved to prevent battery wires short-circuiting to neighbouring components and to stop overheating spreading between cells. A new cover should contain any hot electrolytes or smoke coming from a battery and vent them outside the aircraft.

Yet, while Boeing expresses confidence that the fix will sharply cut the chances of future incidents and mitigate their consequences, there are signs that the 787 episode and problems on Airbus's A380 superjumbo may have dulled commercial aerospace's appetite for risky innovation.

Airbus has dropped plans to use lithium-ion batteries in its innovative A350 aircraft, in favour of traditional nickel-cadmium. In March, Tom Enders, chief executive of EADS, Airbus's parent, said Airbus and Boeing had got "carried away" in the past after trying to introduce new technologies that turned out to be not "as mature as they should be".

"The industry needs to make sure the risk-reward balance is the right one," he said. "This is something that we jointly collectively learn from."

Among aviation observers, however, the strong sense is that, provided the new batteries give no problems, the 787's advantages are likely to make it a success. The aircraft had 850 orders before entering service.

"In the near term, people will criticise Boeing for an excess of innovation," Mr Thompson predicts.

"But as the plane proves itself, it will tend to vindicate the company's approach."

'The industry needs to make sure that the risk-reward balance is the right one'

Industry backs moves to reduce emissions

Environment

Global meeting will decide details of plan, writes *Pilita Clark*

It took more than a decade of bitter argument and diplomatic wrangling, but the world's major airlines agreed on June 3 to take an unprecedented step: push for a global market-based system to reduce their greenhouse gas emissions.

The move by the International Air Transport Association trade group, whose 240 members account for more than 80 per cent of global air traffic, followed considerable prompting from the EU and received a mixed reaction from environmental groups.

But it makes aviation the first industry to come up with such a plan and it puts the focus squarely on the International Civil Aviation Organization, the UN body that sets global aviation standards, which is due to finalise a global deal on curbing the industry's emissions at its triennial assembly, which runs from September 24 to October 4.

"It is a strong message that the airline industry seems ready to support a single global market-based measure to keep their emissions in check," says Connie Hedegaard, EU climate commissioner. Now, governments must deliver such a scheme in ICAO, she adds.

Ms Hedegaard spent last year fighting a furious reaction from many of the EU's biggest trading partners – including the US and China – to a move to charge international airlines for carbon pollution by bringing them into the EU emissions trading system, the world's largest carbon market.

The EU plan was shelved

for a year in November but Brussels threatened to reinstate it unless ICAO comes up with a global plan for a similar system and a timetable for achieving it.

Scientists estimate aircraft account for less than 3 per cent of global carbon dioxide emissions, but say the industry's emissions, could have a bigger impact on the climate than those produced at ground level.

For example, it is thought condensation trails and aerosols from aircraft exhausts could affect cloud properties and possibly ozone in the stratosphere.

The resolution, passed at Iata's annual meeting in Cape Town, urges governments to agree in ICAO on a system in which airlines would offset any increase in emissions produced after

country of a flight's departure or arrival, not over the high seas or third countries.

This might end up meaning only 22 per cent of international aviation emissions are covered, some estimates show, and is unlikely to be approved in Brussels.

Several European environmental groups said the Iata plan would be a poor alternative to a cap-and-trade scheme such as the EU's emissions trading system (which limits the use of offsets) because it would not lower the industry's own emissions as much.

"ICAO members should see [the Iata plan] as an encouragement to come up with an effective scheme at the assembly, not as a blueprint for such a scheme," says Tim Johnson, director of the UK's Aviation Environment Federation.

But a number of US environmental groups have welcomed the proposal, which Jake Schmidt, international climate policy director at the US Natural Resources Defense Council campaign group, says at least promised to cover all emissions.

"The trade-off is you get potentially weaker targets," he comments.

The advantage of the Iata suggestion is its simplicity, says Paul Steele, Iata's head of environmental strategy. Trying to get 200 countries to adopt the laws and institutions required for an emissions trading system would take years, he says. "A simple offsetting scheme is by far the easiest way to get something done."

Airlines are keen for governments to act, he adds. "Our concern as an industry is if this activity is left uncontrolled, then we could end up with a massive patchwork quilt of different market-based measure schemes, taxes, levies, environmental emissions trading schemes, you name it."

Airlines would offset any increase in emissions after 2020 by buying carbon permits

2020 by buying carbon permits generated from projects that cut emissions elsewhere.

In deference to developing countries, which argue against a global emissions reduction deal on grounds they should not pay as much for a climate problem that wealthier nations created, the Iata plan would ease the burden on airlines in emerging economies.

Insiders monitoring the negotiations say EU countries remain the main backers of a single global market-based measure, with support from Australia and the United Arab Emirates.

Some countries want a so-called "national airspace approach" that would cover emissions only in the

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Market share by order backlog

Orders won but not yet delivered



Narrow-body



Wide-body twin engine



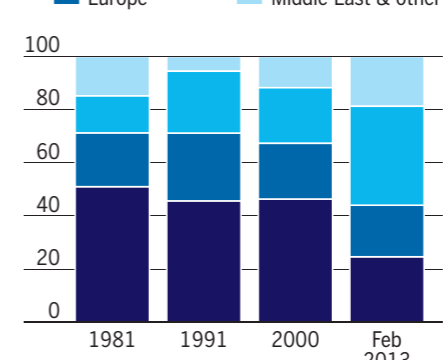
Wide-body four engine



Sources: Agency Partners; Bernstein Research; Teal Group

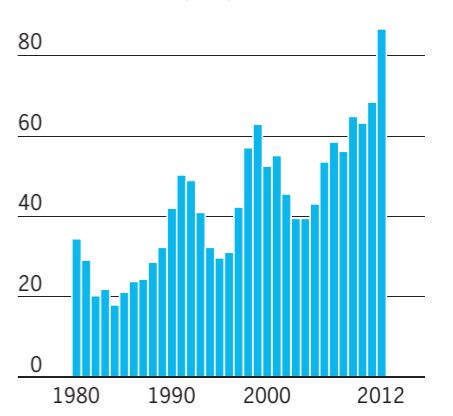
Backlog mix by region

Per cent



Jet deliveries

Value of deliveries (\$bn)



Big guns blaze in wide-body war

Continued from Page 1

thing Boeing needed given the 787 entered service more than three years late in 2011 due to a step change in technology and materials.

Like the Dreamliner, the A350 is made mainly from lightweight carbon fibre reinforced plastic in order to reduce fuel burn, rather than traditional aluminium alloy. And also like the Dreamliner, the A350 is running behind schedule.

The A350-900, the first version of the Airbus jet, is due to enter service in the second half of 2014, which would represent a delay of up to 18 months compared with the original timetable.

With more products in the pipeline than Airbus, Boeing can increase its lead in the wide-body twin engine market, says Randy Tinseth, senior marketing executive at the company's commercial aircraft unit. "We have a great opportunity to grow our market share," he says. "With a full array of products... we actually... box in [Airbus]."

Once the 787-10 is in service, there will be three versions of the Dreamliner, carrying between 210 and 320 passengers. And the proposed overhaul of the 777 – dubbed project 777X – is expected to involve two new versions of the aircraft.

This compares with how Airbus is planning three versions of the A350.

But while Boeing could be better positioned in this market by having a total of five new generation aircraft compared to Airbus'



Workers at the unveiling of the Airbus A350

three, it is not a certain victor. For example, Airbus has the potential to boost its market share by having its A350-1000 in service sooner than Boeing's 777X models.

Some analysts argue these models risk undermining the company's venerable 747 jumbo, and hurt sales of Airbus' flagship A380 superjumbo.

This underlines how the new generation of more fuel-efficient aircraft could have far-reaching consequences for some of the industry's most famous workhorses.

Nick Cunningham, analyst at Agency Partners, a research firm, says: "The 777X will clearly undermine the few remaining prospects for the latest version of the 747 passenger jet, and it will also narrow the

niche role of the A380."

The latest version of Boeing's jumbo – the 747-8 that carries up to 500 passengers – has an order backlog of just 55 aircraft, partly because the air cargo market has suffered during the economic downturn.

The rival A380 has an order backlog of 159 aircraft. But it has yet to notch up any orders this year because of the global slowdown and the discovery of a wing cracking problem that is now being fixed.

Airbus needs A380 orders to hit its target of delivering 30 superjumbos to customers in 2015 – the year when this loss-making aircraft programme is supposed to break even.

While the A380 and 747 may struggle to find many buyers, new levels of fuel efficiency are enabling Air-

bus and Boeing to amass a lot of orders for their new generation of wide-body twin engine aircraft – and even more contracts for their cheaper single aisle jets.

The two rivals have therefore raised production of many of their aircraft to record levels, but analysts are divided about whether this output can be maintained.

Jet manufacturing is a cyclical industry, usually following the ups and downs of the global economic cycle. Yet in spite of this, Airbus and Boeing have enjoyed a decade of almost uninterrupted strong growth.

Douglas Harned, analyst at Bernstein Research, says the current cycle is different, partly because the two manufacturers' outstanding orders are for the first time dominated by fast-growing airlines in emerging markets. "We do not view this [as] a bubble," he adds.

But Richard Aboulafia, analyst at Teal Group, another research firm, disagrees, saying Airbus and Boeing face at least a slowdown in coming years.

He estimates jet deliveries by Airbus and Boeing have increased in value by 12 per cent each year between 2008 and 2012, thanks to a combination of cheap financing and high oil prices. "This unusual combination has created a huge market surge that could turn into a bubble," he says. "If financing gets more expensive, or fuel gets cheaper, these production rates at Airbus and Boeing are not going to be sustainable."

Aerospace

Delay over ground rules hampers civilian progress

Drones Big potential for non-military use means the race is on for a workable flight-safety certification process for UAVs, writes *Carola Hoyos*

One of the UK army's earliest modern drones was so notorious for not returning from its missions in Kosovo in the early 1990s that its handlers nicknamed it "Bugger off". Since then, its successor aircraft have become far more reliable. Their crash statistics have improved dramatically as they have spent thousands of hours gathering intelligence from the skies of Iraq and Afghanistan while their pilots have sat in bunkers firmly rooted to the ground.

But the reputation of Unmanned Aerial Systems or Vehicles (UAS or UAVs) – as the industry calls them – has stuck, contributing to a bottleneck costing billions of dollars, pounds and euros.

Until now, large UAVs have mainly served in war zones or been tested in military airspace far out at sea. Because they were being rushed to the battlefields of Afghanistan there was no time or need for them to undergo the rigorous certification and testing to which their civilian counterparts are subjected.

But now that the troops are preparing to return home from central Asia and businessmen are lobbying lawmakers about UAVs' huge potential for non-military use, regulators are coming under increasing pressure to develop a strict process of certifying that they are safe for flight in civil airspace.

Ideas for their potential deployment include fighting and monitoring forest fires, tending to large areas of crops, searching for victims of natural disasters, such as tornadoes and earthquakes and monitoring oil and gas pipelines and wells.

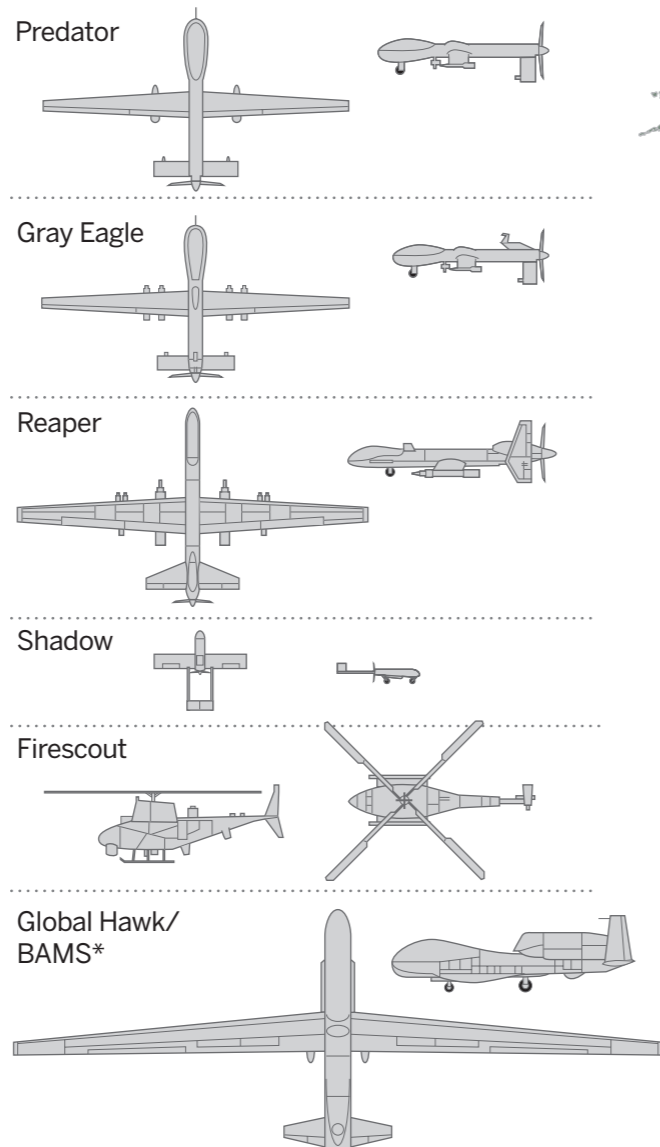
The fear of unmanned aircraft colliding with jetliners and crashing into densely populated towns and cities, however, has led US and European authorities to move slowly and the delay is starting to be costly.

A recent setback came last month when Germany cancelled its order of four Euro Hawks made by Northrop Grumman of the US and EADS, the pan-European aerospace and defence company. German officials cited the escalating costs of getting the UAVs' airworthiness certification as the primary reason for the cancellation.

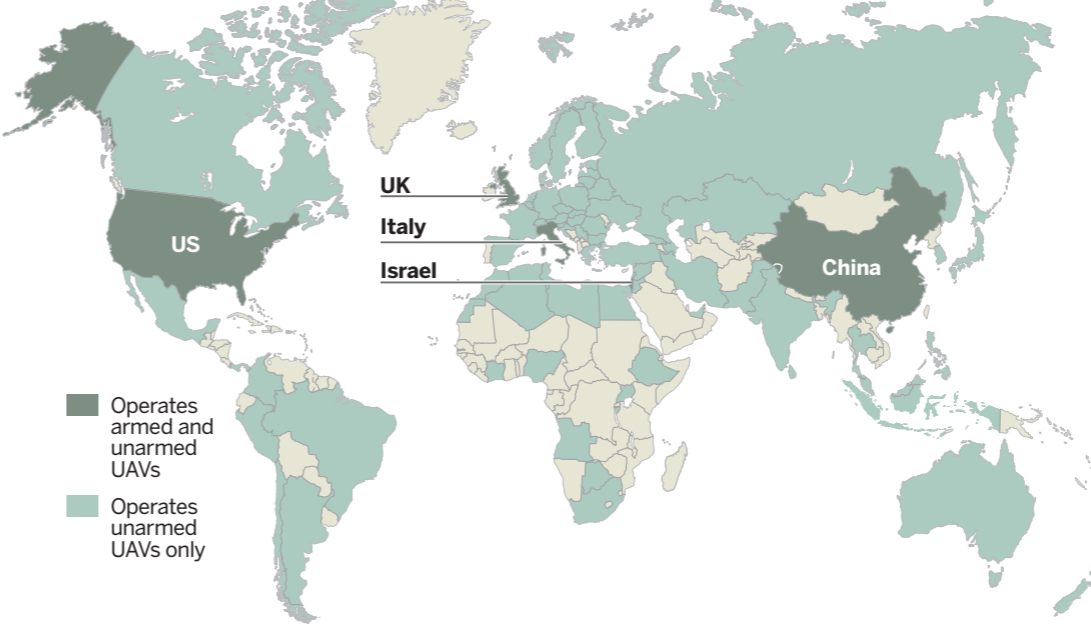
"We are at a stage a bit like in the

Drones in profile

US medium-large UAVs



Countries with unmanned aerial vehicles



Key characteristics of selected unmanned aircraft

System	Manufacturer	Length (ft)	Wingspan (ft)	Payload capacity (lbs)	Endurance (hours)	Maximum altitude (ft)
Predator	General Atomics	27	55	450	24+	25,000
Gray Eagle	General Atomics	28	56	800	40	25,000
Reaper	General Atomics	36	66	3,750	24	50,000
Shadow	AAI, Textron	11	14	60	6	15,000
Firescout	Northrop Grumman	23	28	600	6+	20,000
Global Hawk	Northrop Grumman	48	131	3,000	28	60,000
BAMS	Northrop Grumman	48	131	3,200	34+	60,000

* Broad Area Maritime Surveillance

Sources: Congressional Research Service, Congressional Budget Office, Government Accountability Office, IJSS

very first days of the development of the motor car when a man would have to walk ahead of it with a flag and the coroner's report from the first accident stated that something like, 'this should never happen again', says Fiona Lewinton, head of UAS at QinetiQ, the UK defence contractor that tests and evaluates drones for the

UK and has flown them for the Dutch and Polish armies in Afghanistan.

The US has a similar problem even though Congress has tried to hurry the debate along by mandating that the Federal Aviation Authority come up with its rules and procedures for unmanned aircraft by 2015.

That date is almost certainly

unrealistically optimistic, especially as the US has an additional hurdle to overcome. Several states have already enacted prohibitive laws pushed for by those who fear spying UAVs would violate US citizens' civil liberties and privacy.

Stephen McKeever, Oklahoma's secretary of state for science and

"We are at a stage a bit like in the very first days of the development of the car"

technology, says the privacy issue has delayed until the end of this year the federal decision over which states will get the coveted right to open slivers of their airspace to test UAVs. Oklahoma is one of those vying for the chance.

"The safest way to not have an Unmanned Aerial Vehicle crash with a manned aircraft is not to have UAVs fly at all. Regulators want to sleep at night and the easiest way to do that is to say no, not yes," he says.

That is making the barrier to entry prohibitively high, with only the biggest military and engineering companies, most notably BAE Systems, Dassault Aviation, Thales and EADS of Europe, Lockheed Martin, General Atomics and Northrop Grumman of the US and Israeli firms Elbit Systems and Israel Aerospace Industries, able to afford to develop complex drones and test them over military airspace.

Eventually authorities in the US, Europe and beyond will have to relent, industry executives and politicians say. Though even the most impatient supporter of UAVs agrees that there is a need for regulators and the industry developing the relevant safety technology to get it right lest the industry be killed in its infancy by a deadly crash, the pressure is great, especially in these austere times.

The Association for Unmanned Vehicle Systems International, a US lobby group, believes integrating UAVs would have an economic effect worth more than \$13.6bn and create upward of 70,000 jobs in the first three years. It forecasts that by 2025 those numbers could grow to 100,000 and \$82bn respectively.

Unmanned passenger planes may be difficult to imagine at the moment even for the most ardent supporter. But their ability to spend long hours aloft without putting at danger pilot and crew, their relative cost advantage over piloted planes and the many different shapes and sizes they come in (from as small as a dragon fly to as big as a jet fighter), have prompted much excitement over their potential use. All that will only be possible once they are allowed to fly in civil airspace. For countries and companies interested in capturing the market, the race to be the first to sort out certification and the the relevant technology is on.

Development of autonomous UAVs raises ethical questions

Technology

Opposition grows to unmanned jets that can make decisions, writes *Carola Hoyos*

In a remote patch of Australia's most secretive military airspace, BAE will later this year test Taranis – the world's first radar-evading, supersonic unmanned jet fighter.

The stingray shaped drone marks a sharp departure from the current and past fleet of unmanned aerial vehicles (UAVs) that Britain's army has used for surveillance and to gather intelligence in Kosovo, Iraq and Afghanistan, where it also deployed drones to attack ground targets.

Taranis is designed for dogfights and ground attacks; its shape and technology make it difficult for radar to detect while electronics, agility and speed help it to evade enemies on the ground and in the air.

But its most controversial capability is buried deep within the coding of its software: Taranis is autonomous, meaning it can make decisions on its own.

Autonomous systems go a step beyond what combat UAVs such as Predator and Reaper, which the US uses in its fight against terror in Yemen, Pakistan and Afghanistan, can do.

Those UAVs have prompted debate over whether having pilots sitting safely away from the action, makes it too easy for

US political and military leaders to make decisions that kill terrorists and innocent bystanders alike.

In theory, advanced programming could allow Taranis and competitor UAVs to decide on their own whether or not to bomb a convoy of vehicles or a factory. BAE insists Taranis will never be left to make such decisions, noting: "Any future in-service systems based on such a concept design will be under the command of highly skilled ground-based operators who will also be able to remotely pilot the aircraft."

Autonomous technology, which is also being developed for use in ground warfare, has begun to garner strong opponents.

Christof Heyns, UN envoy on extra-judicial, summary or arbitrary executions, last month called for a ban on developing autonomous weapons like Taranis, arguing they could blur the lines of command in war crimes cases. His report says "modern technology allows increasing distance to be put between weapons users and the lethal force they project".

Though "killer robots", as campaigners call them, are still confined mainly to testing ranges and development labs, Mr Heyns believes there is no time to lose in establishing robust opposition to them. "Time is of the essence. Trying to stop technology is a bit like trying to stop time itself – it moves on," he said.

Advocates of autonomous

'Modern technology allows increasing distance between weapons users and their lethal force'

weapons argue that what matters is how they are used, rather than the equipment itself. But even for those who trust the US and UK to seriously consider the ethical dimensions of using autonomous systems and make well-considered decisions, there remains the reality that engineers working for potential adversaries of the west, including China, and Russia – which have UAVs of their own – are only a few years behind those employed by European and UK companies.

And if western UAVs crash in enemy territory, as was the case in Iran last year, that timeframe can substantially shorten.

Experiences of past weapons programmes, including nuclear missiles, put the odds in favour of BAE and its competitors developing autonomous systems such as Taranis.

"The project will add to the understanding of strategic Unmanned Combat Aircraft Systems, through the demonstration of relevant technologies and their integration into a representative UAV system," says BAE. It says Taranis will give the UK, which is helping fund it, the ability to decide what its future fleet of fighter jets will be.

The fact that Taranis is about to be flown in Australia suggests the UK is ready to push ahead. Money – rather than technology or ethics – is likely to be the main hurdle on the path to further progress.

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Enigmatic entrepreneur dominates domestic flights

Indonesia Lion Air is the biggest airline in the archipelago nation, writes *Ben Bland*

After picking up insights into the airline industry through the travel agency they ran, brothers Rusdi and Kusnan Kirana launched Lion Air in 2000 with \$900,000 and a leased Boeing 737 at a time when Indonesia was struggling to recover from the Asian financial crisis.

From such unpromising beginnings, Rusdi, the 49-year-old chief executive, has built Lion Air into one of the

world's fastest-growing airlines and has been feted by Barack Obama, US president, and François Hollande, French president, after taking out huge aircraft orders with rival manufacturers Airbus and Boeing.

"He has had many ups and downs but has managed to come through all these problems and thrive," says Dudi Sudiby, an Indonesian aviation analyst, who knows Mr Kusnan.

With about 600 aircraft on order –

the majority of them short-range Boeing 737s and Airbus A320s – Lion has plans to step up flights in Indonesia, where it has nearly 50 per cent of the market, and expand into destinations overseas, challenging the dominance of Tony Fernandes' AirAsia, a Malaysian carrier, and other regional low-cost airlines. With a bumpy safety record and very little known about privately-owned Lion Air's finances, there are question marks over its abil-

ity to sustain such rapid growth, particularly given that Indonesia's underdeveloped air travel infrastructure is straining to cope with demand.

Lion Air's dominant position is built on two main pillars, according to analysts and rival industry executives: the strength of the Indonesian domestic aviation market and Mr Kirana's knack for sniffing out opportunities.

The need for air travel is clear in the world's biggest archipelago

nation, with more than 240m people living on thousands of islands that stretch for 3,000 miles east to west. Rapid growth in southeast Asia's biggest economy has created a large and expanding middle class that has the cash to afford air travel.

Domestic passenger numbers have nearly doubled since 2008, reaching 72.5m last year. The market is forecast to hit 100m passengers by 2015 and 180m by 2018, says the Indonesian National Air Carriers Association.

But passengers alone do not make profits. Other Indonesian carriers such as Adam Air and Batavia Air have come and gone, while Lion Air has thrived because of Mr Kirana's stewardship, says Mr Sudiby.

Just one year after Lion Air's fatal crash in 2004, when 25 people died as a McDonnell Douglas MD-82 skidded off the runway in Solo, Central Java, Mr Kirana was able to secure financing for his first big purchase of 30 aircraft, the maiden order for Boeing's extended-range 737-900.

By expanding rapidly, adding new destinations, increasing frequency on main routes, and keeping costs down, Lion Air was able to establish a leading position while Garuda Indonesia and Merpati, the state-owned national airlines, were weighed down by mismanagement and heavy debts.

More recently, the enigmatic Mr Kirana has capitalised on the sluggish global aviation market. He secured favourable financing and terms for huge new orders, for 230 Boeing 737s in November 2011 and for 234 Airbus A320s in March this year.

Lion Air has more than 120 aircraft in service at its main operation. It also runs Wings Air, a regional subsidiary, and Batik Air, a newly-launched full-service carrier.

Brendan Sobie, an analyst in the Singapore office of the Centre for Aviation, a market research company, says that while it seems that Lion Air may struggle to make profitable use of its many new aircraft, Mr Kirana has done his homework.

"Lion Air was one of the fastest-growing airlines last year. There are some sceptics but Lion Air has a lot of flexibility and a good position in Indonesia's domestic market," he says.

Some of the aircraft will be deployed to Malindo Air, a Malaysian joint venture with a state-owned defence company that launched this year, and could pave the way for further regional tie-ups as southeast Asian nations move toward an open skies agreement by 2015.

Any excess aircraft could be temporarily offloaded by Mr Kirana's new leasing business in Singapore, Transportation Partners.

Mr Kirana keeps the privately-owned company's finances and plans close to his chest, and has a reputation for making statements designed to beguile his competitors. The media-shy tycoon's company did not respond to various requests for comment.

"Lion Air say they're profitable but no one knows and every year they say their initial public offering is two years away," says Mr Sobie.

The bigger challenge for Lion Air will come in ensuring that it has the necessary people to meet the needs of rapid growth at home and the higher

'As [Lion Air] becomes more international, it will have to evolve accordingly'

standards of international expansion.

Although it has had only one fatal crash, it remains on an EU list of airlines banned for safety concerns. A number of aircraft have been written off, including most recently a new Boeing 737 that crashed into the sea on its approach to the resort island of Bali in April. The preliminary report into that incident urged Lion Air to improve pilot training, no easy task in a country that is suffering from a serious shortage of pilots and trainers.

"Everyone in Indonesia has infrastructure issues from airports to landing slots [and] training and operational issues," says Mr Sobie. "But Lion Air is the largest and fastest-growing airline. Their approach has worked in Indonesia but as you diversify and become more international, the company will have to evolve accordingly."



Dominant: a Lion Air aircraft takes off from Jakarta airport

Reuters

Military views defence as best form of attack

Russia versus US

The days of Soviet warplanes' dogfight superiority are over, says *Charles Clover*

Russia's Sukhoi and MiG warplanes encounter their natural opponents – US F-15s, F-16s, and F-18s – primarily at worldwide air shows, rather than in combat, so it is hard to tell whose aircraft are better.

Russian aerospace industry salesmen are, quite reasonably, biased: "You won't find a better plane than the Su-27," says a Sukhoi sales representative at Moscow MAKS air show, struggling to be heard above the noise of watching the plane dive and loop above the runway as spectators watched.

"In a dogfight, if it was my life on the line, so to speak, I would choose Sukoi," he adds, grinning.

Ever since the cold war, Russia and the United States, which dominate the market for warplanes, have sought to show their wares have an edge. The US planes have better radar, missiles, and electronic warfare equipment, while the Russian planes are judged to have superior handling and thrust-to-weight ratio, which would give them an edge in a classic dogfight.

But the days of classical dogfighting are over, says Ruslan Pukhov, the director of the Moscow-based Centre



Lift-off: an S-400 missile

for Analysis of Strategies and Technologies, a defence think-tank.

"Ever since Soviet days we have been lagging behind the US in military aviation," says Mr Pukhov. As a result, he adds, Russian air defence systems such as the S-300 and S-400 are the best in the world because Soviet strategic planners invested heavily in air defence, perceiving a gap in aviation.

"It's like boxing, if you have a weak right arm, you need to compensate by a strong left arm. Soviet strategists made up for a weakness in aviation by investing heavily in air defence systems."

The S-300 and the more advanced S-400 are judged to be "game changers" by US analysts for their 200km range and ability to engage multiple targets at the same time. Because of US and Israeli objections, Russia was forced to cancel a contract to sell an S-300 system to Iran in 2010. The Kremlin faces mounting pressure to

scratch a similar contract to sell to Syria, though Russian officials have said the sale will go ahead.

The concern generated by the S-300 shows that many Russian weapons systems are competitive with Nato systems, while being a good deal cheaper than their US counterparts. Sukhois and MiGs are about 30 per cent cheaper than their US counterparts, which has helped pump up sales.

Last year, according to President Vladimir Putin, Russia's military exports topped \$15bn, a 12 per cent increase from the year before, while Russia has stubbornly held on to its second place behind the US in weapons exports since the end of the cold war.

The chief money spinners of the Russian armaments industry are the Su-27 and the two seat version, the Su 30, which is still the most popular Russian warplane worldwide. It is the jewel in the crown of the United Aircraft Corporation, the holding company which includes Sukhoi and MiG.

Russia's Su-35, a next generation fighter, is the successor to the Su-27, while the T-50 is billed as the fifth generation fighter. "It is not a mature product yet," says Mr Pukhov.

He points out that it has only been designated to have initial operational capability, not final operational capability. There are just a handful in service now, with an export contract to sell to China by the end of the year.

China vs US Technology put to test in battle of the airframes

From January, China and Japan scrambled fighter aircraft against each other – China's Chengdu J-10 against Japan's McDonnell Douglas F-15 – in their dispute over the Senkaku Islands, which, controlled by Japan, are also claimed by China.

Although no combat ensued, the development added urgency to the hitherto mostly theoretical question of how Chinese jet fighters compare with their western counterparts.

Military scholars of the People's Liberation Army air force have compared the J-10, started with technology from Israel's abandoned Lavi fighter programme, with some F-16 models. But most western analysts are still sceptical about whether the J-10's avionics can match those of the F-16, and many even see it as inferior to the

F-15. Most analysts agree that the J-10, although it was designed more than a decade after the F-15, and matches or outperforms the US-made fighter in speed, range and overall armaments, would be unlikely to prevail. The reasons are that the J-10 cannot climb as fast as the F-15, its cannon are inferior and cannot fire as quickly.

China certainly did surprise everyone in 2011 and 2012 with tests of the stealth fighters it is developing.

"The Chinese defence industry has shown a strong record over the past year for making impressive progress in the research and development of high-priority weapons programmes [such as] carrier-capable fighter aircraft, large-sized transport aircraft, stealth aircraft," says

Tai Ming-cheung, an expert on Chinese defence technology at the University of California, San Diego.

Analysts both inside and outside China are sober in their assessments of the J-20's real capabilities. They note that while the fighter has an airframe with some stealth characteristics, China is still struggling to produce the engines by itself, and the aircraft is unlikely to be useful without mature radar and sensors systems.

"In addition to that, the Chinese air force, just as other parts of the PLA, is still far behind western militaries in joint operations and digitisation," says a European military official in Beijing. "This comes on top of the problem that most of their people have no combat experience."

Kathrin Hille

Aerospace

Focus shifts to profits after failed deal with BAE

EADS

Governance shake-up aims to give company more say, writes *Andrew Parker*

His much-cherished deal crashed and burned, but Tom Enders, chief executive of EADS, has subsequently secured far-reaching reform of the company's dysfunctional corporate governance.

The collapse last October of the proposed €36bn tie-up between EADS and BAE Systems was a big and very personal setback for Mr Enders, the driving force behind the deal.

But by December he was hailing the biggest changes to EADS' governance since the pan-European aerospace and defence company's creation in 2000 from a pooling of French, German and Spanish assets. The reform, similar to that contemplated in the BAE deal, was meant to turn the company into a "normal" group by reducing scope for political meddling.

"It is BAE-EADS governance without BAE," declared the former German paratrooper at EADS' 2012 results press conference in February, when he explained the governance reform's significance and put a brave face on the BAE deal's collapse.

It was German politics first and foremost that blocked the BAE-EADS deal. Angela Merkel, the German chancellor, balked at the transaction, partly because of concerns that her country would lose out in terms of jobs and status inside what would have been the world's largest aerospace and defence group by revenue.

And German politics provided the final impetus for EADS' governance reform that started to take effect in March. Germany wanted shareholder



Breakthrough: Tom Enders, chief executive, is determined that the EADS board, rather than Berlin or Paris, make decisions affecting the company

Reuters

parity with France inside EADS, and this was achieved in the shake-up.

So if politics is still to the fore at EADS, parent of passenger jet maker Airbus, has anything fundamentally changed at the group? And how will it respond to the failure of the tie-up with BAE, the UK defence company, which was heavily premised on enabling EADS finally to secure a large chunk of the lucrative US market?

In May, Harald Wilhelm, finance director, hinted that the company's new board – elected as part of the governance shake-up – had a unity of purpose that was previously lacking. "All of the board members are clearly devoted to one objective, which is

what is good for EADS and its shareholders," he said. "So I couldn't perceive anybody... was looking after particular interests."

Before the governance reform, there was a shareholder pact at EADS involving the French state, Lagardère, the French media company, and Daimler, the German carmaker, that gave these three investors control of the group. Their representatives on the board would nominate the chairman and chief executive of EADS, and wield veto rights over key decisions – for example in 2008 one of the controlling shareholders blocked plans to buy a US defence company.

Superficially at least the situation

appears to have got worse since the shareholder restructuring, because the percentage of direct government ownership has increased after Lagardère and Daimler sold their stakes.

Previously, France had a 15 per cent stake, and Germany was not an investor – it relied on Daimler to serve as its proxy.

Now, Berlin and Paris are proposing to each hold 12 per cent of EADS, with Madrid having 4 per cent, and together the three countries can act as a blocking minority at the company's annual meetings.

Berlin and Paris have therefore preserved their control of EADS. But Mr Enders believes he has made

significant breakthroughs with the governance reform because the old shareholder pact has been dissolved, and with it the nomination and veto rights.

In February, he underlined his determination that the EADS board – rather than Berlin or Paris – should choose the company's new chairman.

Paris pushed for Anne Lauvergeon, former head of reactor maker Areva and nicknamed "Atomic Anne", to be EADS' next chairman. But Mr Enders resisted, and succeeded with his alternative choice of Denis Ranque, ex-chief executive of Thales.

Now, all eyes are on Mr Enders' review of EADS strategy after the

failure of the BAE deal. He favours abandoning EADS' goal of, by 2020, securing a 50:50 balance between revenue generated by Airbus on the one hand, and, on the other, sales at the group's other businesses, including Cassidian, its defence unit, said two people familiar with the situation.

The BAE deal was the only obvious means to significantly increase defence revenue, in a move that would ape Boeing's business model. The US manufacturer's sales split roughly between civil aerospace and other businesses, led by defence.

EADS is therefore acknowledging that Airbus will probably remain its dominant subsidiary. Mr Enders still wants EADS to remain a significant defence contractor, although he is expected to consider jettisoning some of its less profitable activities, without so far specifying which. Analysts say Cassidian is subscale in certain areas, notably defence electronics, but they add it could be difficult to exit such activities, because the most significant customer is the German government.

Mr Enders' central focus now is on improving EADS' profitability – led by a target to achieve a 10 per cent margin at the level of earnings before interest, tax and one-off items by 2015.

Meanwhile, EADS is still interested in pursuing acquisitions, including in the US, even if it has to confine itself to small deals there.

Two people close to the matter said Mr Enders, who believes the European defence industry is too fragmented, has not given up all hope of EADS combining with BAE, although such a deal faces several hurdles and no fresh attempt at a tie-up is expected this side of the German elections in September.

"We are not looking back, we are looking forwards," he said in February. "The resuscitation of the BAE project is not on our radar screen."

Global hub status at stake if UK makes wrong choice

Commentary

JOHN STRICKLAND

Sir Howard Davies, the respected UK economist, has entered seriously turbulent airspace. As head of the Airports Commission, he's been tasked with drawing up a plan to save the UK's global hub status which is under ever increasing threat from hub airports around the world.

One of his challenges is to cut through the jungle of opinions and highly factional lobbying ranging from irate residents, whose homes flank the current UK hub at Heathrow, to rival airports keen to snatch a bigger share of business. There is also a political desire to strengthen air transport in the regions to balance out economic inequalities in the country and stimulate employment where it is badly needed.

Flawed recommendations leading to a political fudge would be calamitous. If the government takes the wrong decision, there are plenty of rival airports abroad ready to snatch the business away. This would lead to a loss of global hub status which would be disastrous for the UK economy.

The UK has many excellent airports of all shapes and sizes but just because some of them have ambitions to become a hub does not mean they have a realistic chance.

The acid test is not what some airports want but whether airlines would use them. Many have flocked to Heathrow like a honey pot despite its problems because they know they can fill more seats and for higher prices than elsewhere in the UK.

Experience shows that even other London airports would not be able to fill the gap. Many airlines have paid millions of pounds to get slots at Heathrow, while others have abandoned long-haul services at Gatwick and Stansted because the revenues have not stacked up. Some have avoided coming to the UK altogether in the absence of capacity at Heathrow.

Aircraft are highly mobile assets and dynamic long-haul airlines will deploy them in other global markets if the UK doesn't make the grade. Successful short-haul airlines such as easyJet and Ryanair move their fleets around Europe to get the best financial return. A laudable desire



Protest: runway block

to "rebalance the UK economy" will not be achieved just because some regional airports have the capacity and think that airlines should be obliged to use them. Airlines will go only where they see profitable market opportunity and sadly this is not generally the case in regions where traffic is more seasonal and there is not a consistent volume of lucrative, profitable business traffic to sustain most long-haul routes.

Those routes that are viable are being flown already and are serving powerful airline hubs in the USA or, increasingly, in the Middle East such as

I fear that the odds are stacked against the chances of success for the Davies commission

Dubai, the base of Emirates.

Nor can the UK support two complementary hubs. Some say "it works in New York" but the comparison is not valid. There are three main airports in New York. La Guardia is largely domestic and the other two are run as separate operations by three large airline groups: American and Delta at JFK and United at Newark. They do not work as a complementary airport system.

Furthermore, we do not have three large airlines in the UK to sustain the New York model. We have one – British Airways – with Virgin Atlantic in a more modest supporting role. They are both advocates of Heathrow. For a hub to work there needs to be a maximum opportunity to provide connections between flights and only Heathrow delivers this profitably for the airlines. If you do not consolidate

Heathrow's role as hub, it will wither and, while waiting for another hub to appear in the UK, the airlines will have taken their business elsewhere.

My experience as a former airline network planner (analysing and making decisions on route choices for airlines) tells me there can only be one hub in the UK. I believe expanding Heathrow is the right solution for the UK economy, for jobs, for business and for airlines that need a hub. Of course this presents enormous challenges in addressing environmental concerns and those of nearby residents, but are these reasons enough to make the wrong recommendations, to the detriment of the UK?

Sir Howard's commission will need to confront these realities. While we await its findings the clock continues to tick. Dubai will overtake Heathrow as the world's busiest international airport by 2015. It is a well-conceived hub airport with a home carrier, Emirates, tapping into the air travel needs of key growth economies. When the current airport is full, Emirates will move seamlessly to the new Dubai World Central Airport. No 20-year wait, no fragmented split hub operation.

Even in Europe there is spare capacity at rival hubs, not least Amsterdam. Having worked for the Dutch carrier KLM (half of Air France-KLM), I know what an effective job it does in tempting traffic from the UK market.

Aviation is a fundamental part of the 21st-century global economy. The Airports Commission must make recommendations that are supported by the global airlines that wish to serve the UK. The danger is that if the wrong decision is taken, then we will lose our global hub status leading to job losses rather than job increases and wealth creation for the country.

Even if the commission gets its recommendations right, the government may not have the courage to implement them. Sadly, I fear that the odds are stacked against the chances of success for the Davies commission.

I hope I am wrong as this would be a catastrophe for the UK.

The writer is director of JLS Consulting and previously held senior positions at British Airways and KLM

Aerospace

Concentration of carriers puts collapse on Europe agenda

Consolidation Lufthansa's decision to suspend its dividend illustrates just how tough the market has become, says *Andrew Parker*



For investors in US airlines, a near-decade of consolidation is starting to bring tangible benefits. Last month, Delta Air Lines, the second-largest carrier by revenue, announced plans to issue a dividend this year – the first such payout since 2003.

Contrast this with Europe where Lufthansa, the region's largest carrier by sales, in February proposed suspending its dividend. European airlines are struggling with a prolonged economic downturn in many of their home countries, but Lufthansa's move also underlined how cut-throat competition weighs heavily on the region's carriers.

In the US, consolidation that goes back to the merger of US Airways and America West in 2005 is set to culminate by the end of September with the expected tie-up between American Airlines and US Airways. The large eight airlines of 10 years ago are on course to become the big four, with reduced competition meaning that the remaining players have greater pricing power – the ability to raise fares

after years of slashing ticket prices during market share grabs.

This level of market concentration means that US airline consolidation is likely to be mainly done. In Europe, there is a case for more mergers because there are still far too many airlines, but it may well be that the region sees a series of carrier collapses rather than deals.

Willie Walsh, chief executive of International Airlines Group, which was created from the merger of British Airways and Iberia with the intent of becoming a leading industry consolidator, said last month that he saw no opportunities in the short to medium term.

"It's clear there are a lot of airlines in play," he said. "Most of these are peripheral airlines that we can't see adding any value to the IAG group – or, in all honesty, adding any value to pretty much anybody. So we don't have any proposals to do anything."

The big European airline deals have already happened. Before the creation of IAG in 2011, Air France merged with KLM of the Netherlands in 2004,

while Lufthansa combined with Swiss in 2005 and Austrian Airlines in 2009.

These three large flag carrier groups are now busy restructuring their short-haul operations, some of which are loss-making because of intense competition from low-cost airlines led by Ryanair and easyJet.

The budget airlines show no sign of letting up in their quest to increase market share at the expense of the flag carriers – Ryanair placed an order for 175 narrow-body aircraft worth \$15.6bn at catalogue prices from Boeing in March, and easyJet is expected to announce a large, single-aisle jet purchase soon.

Against this backdrop, where Air France-KLM, IAG and Lufthansa are preoccupied with cutting costs rather than doing deals, even smaller flag carriers with a potentially valuable niche have struggled to attract buyers.

The Portuguese government last December shelved the privatisation of Transportes Aéreos Portugueses, the country's flag carrier and one of Europe's leading airlines flying to

Brazil, after only attracting one bid.

IAG and Lufthansa decided against making binding offers, in spite of both having an interest in increasing their presence in the fast-growing Latin American market.

Lisbon is expected to try to revive the privatisation, but even if TAP is acquired, such a deal could well be outnumbered by carrier collapses.

Meanwhile, with many countries having foreign ownership rules that prevent airline consolidation at a global level, the most notable development over the past year has been the tie-up between Qantas and Emirates Airline.

This partnership – based on a code-share arrangement and announced last September – is providing the Australian flag carrier with the opportunity to try to restore its international operations to profit by scrapping loss-making flights. Qantas is flying to Emirates' Dubai hub, where passengers can transfer on to the Gulf carrier's wide range of flights to Europe, the Middle East and Africa.

This agreement also highlights how

Joint efforts: Iberia (left) merged with British Airways (centre) and American Airlines (right) is set to link up with US Airways

the relatively young, state-controlled Gulf carriers are no longer viewed as enemy number one by longer-established airlines. After years of intense competition, some Asian and European carriers are forging deals with the fast-expanding Gulf airlines.

Last October, Air France-KLM, which reported a €1.2bn net loss in 2012, unveiled a code-share agreement with Abu Dhabi-based Etihad Airways. Later that month, the oneworld global airline alliance – led by British Airways and American Airlines – announced that Doha-based Qatar Airways was joining. It is the first of the big Gulf carriers to join an alliance.

Lufthansa, the only large European flag carrier not to reach a deal with one of these Gulf carriers, has been considering the case for a partnership with Turkish Airlines, the fast-growing Istanbul-based carrier.

"The combination of our two strong markets and a strong cultural fit... could make co-operation attractive if both partners can participate," said Simone Menne, Lufthansa's finance director.

Gulf carriers are no longer viewed as enemy number one by longer-established airlines

JSF hopes rise at Lockheed as costs level off

F-35

Programme's success relies on US orders, writes *Carola Hoyos*

For years Lockheed Martin's programme to deliver the world's most modern jet fighter has struggled to keep its deadlines and its price promises. The total cost of the F-35 Joint Strike Fighter programme over its 50-year life is now estimated at \$1.5tn, making it the most expensive military procurement programme in US history.

But the JSF is at a "tipping point", says Steve O'Brien, Lockheed Martin's vice-president of business development for the F-35. Ever the optimist, Mr O'Brien may be right this time.

On May 31 the Pentagon promised Congress that by the end of 2015, F-35s would for the first time be ready to go to war. It is an important milestone that will first be met by the marines, when they take delivery of their aircraft, followed a year later by the air force and in 2019 the navy.

The path towards those dates has been far from smooth. Often the Pentagon did not see eye to eye with Lockheed Martin, criticising its development setbacks, disagreeing on price and clashing over which side should carry the cost increases. The Pentagon even put one of the three variants of the aircraft on probation when it failed to hit its technical targets.

After years of a difficult relationship, the rhetoric between the two is beginning to converge.

Christopher Bogdan, a lieutenant general in the air force and head of the F-35 programme for the Pentagon, recently noted that management changes at Lockheed Martin, which include the promotion of

Marilyn Hewson to chief executive, had resulted in "a different culture" at the company he had previously accused of putting short-term profit before the long-term future of the F-35 programme.

More importantly, the Pentagon last month was able to give Congress some good news on a programme so maligned that John McCain, Republican senator for Arizona, in 2011 had called it "a scandal and a tragedy".

In its annual report, the Pentagon for the first time showed a year-on-year drop in the forecast cost of F-35's development, which is expected to come in at \$391bn, down from the \$395bn expectation last year. The total cost of the 50-year programme was pegged at \$1.5tn, down from \$1.51tn, though it remains dependent on fuel costs.

With the drop, the F-35 managed to buck the general trend across the US's 78 main arms programmes whose costs rose \$40bn, or

So far, the JSF programme in the US has escaped any big cuts in numbers or delays

2.4 per cent, over the year.

But the cost of JSF not only hinges on Lockheed. Because the programme works on economies of scale, JSF's price depends on how many aircraft the US and other customers purchase and how quickly.

The US is by far the most important variable. To meet so-called initial operating capacity the marines and navy need only 10 aircraft and the air force 12 "with enough trained and equipped personnel to support the various missions prescribed by each service",



Production line: F-35s at Lockheed Martin's Texas factory

according to the Pentagon. But the success of the programme hinges on far greater numbers of aircraft being bought.

In total, the US has said it plans to buy 2,443 F-35 jets. Keeping that pledge is of crucial importance to both Lockheed Martin and its other customers: the UK, Australia, Italy, the Netherlands, Norway, Japan, Israel, and potential purchasers, such as Canada, South Korea and Singapore.

"There is nothing in the technical realm that keeps anyone up at night," Mr O'Brien says. But he and his colleagues are still having to work hard to keep politicians on board. Several countries are reconsidering the size and timing of their purchase, not least because the downturn in western economies has prompted a major retrenchment in the amount of money governments will spend on their militaries.

One of the most notable setbacks was Canada's decision this year to reconsider its purchase of 65 F-35s, announcing it was going back to the drawing board and demoting the JSF from primary choice to just one of several being considered. Though Australia has confirmed its commitment to the programme, Dutch politicians are wobbling, Italy, the UK and other countries are likely to buy far fewer aircraft and later

than they had initially indicated. While such reconsiderations may be bad for the programme's image, they are far outweighed by the importance of the US decision. So far, the JSF programme in the US has escaped any large cuts in numbers or costly delays in purchasing. This is despite the US defence budget having come under considerable pressure as lawmakers have attempted to reduce the gaping US deficit.

The effect of the most recent 10 per cent cut in the defence budget has not yet been felt and Lockheed has warned the Pentagon that costs of the F-35 could rise as a result.

The more the US cuts its purchase, the more Mr O'Brien and Lockheed will have to try to get other countries on board.

He has a strong selling point: one of the big attractions of the F-35 – beyond its radar-evading capabilities – is that it allows countries to join a powerful team captained by the mighty US. With the crucial date on which JSF will become useful in sight, and as long as the programme does not slip back into its troubled past, Mr O'Brien may be right that it has reached a tipping point and finally find that his positive outlook is rewarded by countries such as Singapore and South Korea signing up to the programme.

CSeries pitches for slice of narrow-body jet market

Bombardier

A lot is riding on a successful first flight, says *Robert Wright*

The moment when a Bombardier CSeries jet taxis out on to the runway for its first flight is unlikely to be widely televised live, as the maiden flights of Boeing's 787 and Airbus's A380 were. But, as the first aircraft heads into the skies above Quebec, probably later this month, it could mark a moment every bit as significant as those higher-profile maiden flights.

If the aircraft can meet expectations, it could transform competition in the narrow-body jet market – which accounts for far more aircraft sales annually than the higher-profile wide-body market in which the 787 and A380 compete. Success for the aircraft would disrupt the duopoly in narrow-body jets between Boeing's 737 family of aircraft and Airbus's A320. Bombardier of Canada, already the world's third-largest commercial aircraft maker by sales, would become a far more important force.

The manufacturer nevertheless has been struggling to persuade customers that the CSeries will meet their needs. It has so far won only 145 firm orders against a target of 300 by the time the aircraft enters service in mid-2014.

Since Bombardier first announced plans for the aircraft in 2004, Airbus and Boeing have announced new, more fuel-efficient versions of their narrow-body models – the A320neo and Boeing 737 Max – intended to satisfy some of the demand that the CSeries originally aimed at meeting.

Guy Hachey, chief operating officer of Bombardier Aerospace, insists, however, that the order levels are similar to those for other launches of new, unproven aircraft designs ahead of first flight. The maiden

flight will win over doubters, he says.

"People want to know if it's true," Mr Hachey says of the claims made for new types. "We're going to fly by the end of the month. Then we can prove to the world that Bombardier has done it, definitely."

Questions over the aircraft's performance – and whether it provides a sufficient edge over Boeing's and Airbus's rival aircraft – are likely to be far more significant for the programme's future than development delays, according to Mr Hachey. The company announced a six-month delay to the planned first flight in November last year.

"With a programme such as the CSeries, if you're going to be moving milestones by a few months, it's not really considered to be late," Mr Hachey says, adding that first flight for many other new commercial jet types in recent years has been years late.

The scale of the commercial problem facing the CSeries was clear in March when Michael O'Leary, chief executive of Ryanair, the Irish low-cost carrier that is one of the world's largest operators of narrow-body aircraft, came to New York.

Mr O'Leary was in the city to sign an order with Boeing for at least 175 of its 737-800 aircraft. When asked whether he would consider switching from the 737 to

Airbus's A320, he indicated that the 180 seats of the largest A320 were inadequate for Ryanair's needs and that the carrier much preferred operating the 189-seat capacity of the 737-800.

Mr O'Leary's stance illustrates how many operators of narrow-body aircraft want to pack in as many passengers as possible to cover the high costs of operating aircraft over relatively short distances.

"We've always held the view that we would like a slightly larger aircraft," Mr O'Leary said. "If Boeing had a way of getting another 10

Success for the aircraft would disrupt the duopoly between the 737 and A320

seats on to the Boeing 737-800, that would be the perfect sweet spot."

Mr O'Leary's stance illustrates the risk that customers could opt for the higher-capacity but new and more fuel-efficient 737 and A320 variants over the CSeries.

Nevertheless, Mr Hachey insists there is a market for aircraft of the CSeries size that has gone largely unaddressed. Most of the variants will carry between just over 100 passengers and 149.

"That was a market that was not served by our

competition," Mr Hachey says. "We feel comfortable that this market segment does exist."

He adds, however, that some customers have expressed interest in a potential larger CSeries aircraft seating up to 160 passengers.

"That gives even more economies of scale, with an aircraft that already has low operating costs," Mr Hachey says.

The immediate challenge, however, is to ensure that the CSeries avoids the technical problems that prolonged the flight-testing programmes of the 787 and A380.

There is significant potential for risk. Many of the aircraft's fuel savings come from its use of Pratt & Whitney's new geared turbofan engine – a jet engine that, unusually, has gears to keep the intake fan and internal turbines running at different speeds. Parts of the wing fairings will be made of light aluminium lithium alloys that have previously not been widely used for commercial aircraft.

Mr Hachey says, however, that there has been substantial testing of both the novel materials and the new engine to ensure that both work well when installed on the aircraft. The company considered but rejected the technology that has posed most problems for Boeing with its 787 – the lithium-ion batteries that twice suffered severe overheating and in one case a fire in aircraft in January, leading to the entire fleet's grounding.

Mr Hachey hopes that the cautious approach should ensure that, when engineers start examining data from this month's first flight, they will reveal results that help to boost the type's sales.

"The technology we're bringing to the market is proven technology, although we have some new technology," Mr Hachey says. "We're very comfortable with where we are."

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Aerospace

Frills airline reflects challenge to Chinese carriers

Passenger demand State intervention risks hampering the development of a market with huge scope for growth, writes *Simon Rabinovitch*

In China's state-dominated airlines sector, private carriers are saddled with the least attractive flight routes. So Spring Airlines, the country's biggest and pluckiest private carrier, came up with an idea to attract passengers.

In April it announced it would start to offer themed flights, in which flight attendants dress up as French maids and butlers. Lest anyone accuse Spring of resorting to sex to sell tickets, Zhang Wu'an, a spokesman, explains that it was really about putting the focus on what the airline offers. "We want to emphasise serving customers," he says.

Spring Airlines had previously tried other, more conventional tricks of the trade. Launched in 2005 as a small low-cost rival to the state-owned giants of the country's air, Spring once offered promotional tickets at Rmb1 each. But it halted that deal after regulators warned that it would face hefty fines for disrupting market order.

The challenge faced by Spring in carving out a niche for itself is indicative of a bigger tension in the country's airline industry. The strong hand of the government has been essential to building China's airlines into increasingly well-run, efficient, profitable companies. But the state's continued heavy-handed presence risks harming its future development.

It is clear that China has the foundations in place to be the world's fastest-growing aviation market for decades to come.

"The genie is out of the bottle as far as the demand side is concerned. More Chinese want to travel domestically and increasingly internationally. There is no reason for this to slow down," says Timothy Ross, head of Asian transport research with Credit Suisse.

The boom in passengers does not necessarily translate into a boon for the airlines. There were nearly 319m passenger flights in China last year, up 9 per cent, about the same rise as in 2011. That may sound impressive, but it is well down from the 20 per cent increases in passenger loads of the previous few years. What is more, Chinese airlines have aggressive fleet expansion plans that look set to outstrip passenger growth. Patrick Xu of



Private function: a Spring Airlines crew member, not part of the French maid publicity stunt, sells food to passengers on board one of the carrier's Airbus A320s

Reuters

Barclays forecasts that revenue passenger kilometres (RPK) – a key performance indicator for airlines – will slow to 8 per cent growth this year. Meanwhile, seat capacity will expand by about 9 per cent. "We believe 2013 will be another challenging year for the Chinese airlines, and it would be difficult for [them] to raise ticket prices," Mr Xu said.

A similar dynamic weighed on China's airlines last year. The country's top three state-owned carriers – China Southern, Air China and China Eastern – posted a combined net profit of Rmb10.2bn (\$1.6bn) in 2012, down 39 per cent from a year earlier.

The fact that Chinese airlines are profitable at all is a testament to the government-orchestrated consolidation of the sector a decade ago. In the 1990s, the gap between capacity expansion and passenger growth was even starker. Chinese airlines were left operating with load factors 10-15

percentage points lower than Asian averages.

Beijing pushed through a series of mergers starting in 2002 that eliminated five smaller regional airlines and left the country with the three large carriers that still dominate Chinese skies. Hefty capital injections from the government, including more than Rmb10bn since 2009, have shored up their balance sheets.

The consolidation and the cash infusions have steadied the profitability of China's airlines. Their service standards have steadily improved. Skytrax, the aviation research organisation, rates Air China and China Southern as four-star airlines, while giving China Eastern three stars.

Beijing has moved much more slowly in opening its airspace to civil aviation. Analysts estimate that as much as 70 per cent of the country's airspace is still controlled by the military. Although the government has

pledged to free up more, it has not kept pace with the increase in commercial planes.

The result has been a marked deterioration in punctuality. Last year 74.8 per cent of Chinese flights departed on time, down from a peak of 83 per cent in 2007, according to official data. Many observers reckon the real figure for on-time flights is even lower.

"They may be paying lip service to opening their airspace but I have yet to see any concrete examples of change," Mr Ross said.

"The government has to solve this, otherwise everyone's forecasts are wrong. You can't buy planes if you can't operate them." That is a major risk for global aircraft manufacturers, who are looking to China as the world's fastest-growing market for new aircraft. Boeing has forecast that China will need a jaw-dropping 5,260 new aeroplanes by 2031.

A slower opening of the Chinese market to private carriers is also a big risk. Although state-owned airlines are better-run than just a few years ago, the lesson from other countries is that competition from low-cost carriers has been essential to wringing out even more efficiency, and hence encouraging passenger growth.

The civil aviation administration of China briefly allowed greater participation from private carriers last decade, but pulled back because of safety and financial concerns.

In May, the regulator finally announced that it was lifting a six-year freeze on the establishment of private airlines.

If this opens the door for carriers like Spring Airlines to compete on the basis of price and service rather than the design of their flight attendants' uniforms, it will be a big step towards enabling China's aviation industry to realise its full potential.

'More Chinese want to travel... There is no reason for this to slow down'



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Aerospace

Le Bourget flies high as ever in grey new world

History

Despite the competition, the Paris air show still pulls in the crowds, writes *Paul Betts*

It is tempting these days to consider air shows – and especially the world's oldest and biggest, the Paris-Le Bourget Salon International de l'Aéronautique et de l'Espace (SIAE) – as an expensive networking exercise in corporate, political and public posturing.

As one veteran participant puts it: "Air shows are becoming less and less relevant." Flying, he says, has lost much of its mystique and cachet, with droves of travellers lured on board by low-cost no-frills carriers. As for the military machines that roar over the tents and exhibition halls after lunch during the show, they are fast being supplanted by drones. The *Top Gun* types who used to swagger around at Le Bourget or at Farnborough, its British rival, are a disappearing breed, replaced by geeks manning joysticks in far-off offices.

Much of the romance has certainly gone out of air shows. Those magnificent men who first displayed their flying machines in the great hall of the

Grand Palais in Paris in 1909 have been replaced by hordes of badge-carrying executives, commercial and military aircraft sales officials, PR experts, political and military lobbyists and spin-doctors, as Airbus and Boeing compete in an artificial media frenzy for the biggest new order announcements – deals that have, in fact, often been negotiated elsewhere and long before, but carefully saved up for the show.

Then there is the lack of new aircraft types, compared with the golden years of the 1950s, 1960s and 1970s, when each show saw many new aircraft make their public debuts. In past generations, air shows were chock-full of deals, new alliances and product introductions. This year, Airbus and the Paris show organisers are seeking to create some suspense and anticipation by suggesting that the new Airbus A350-900 – the European counterthrust to the Boeing 787 – might, after all, make a flight appearance to coincide with President François Hollande's official visit to the exhibition on Friday June 21.

But this hardly matches the 1953 show, when the salon was held for the first time at Le Bourget, and a Dassault Mystère IV jet broke the sound barrier, or the one in 1955, when the first Caravelle passenger jet was displayed. And it would be hard to compete with the 1969 salon, which fea-



Magnificent display: first show at the great hall of the Grand Palais in Paris 1909

tured the debut of the Concorde and the Boeing 747 jumbo jet.

To see why Le Bourget has become not only the venue for the world's biggest air show but one of the best-known aviation platforms in the world – in spite of being dwarfed today by nearby Charles de Gaulle

international airport – one only need go back to 1927. That was the year that Charles Lindbergh landed at Le Bourget to complete the first nonstop flight across the Atlantic between New York and Paris, which made the 1928 show all the more special. This will always be a hard act to follow, for all the show business extravaganza of contemporary air shows.

Yet puzzling as it may seem, the appeal of a big aerospace trade exhibition like Paris – and for that matter, Farnborough – does not appear to be waning.

Despite the fact that their dominance has been declining as the commercial aviation centre of gravity – at least in terms of market and new aircraft orders; despite the fact that the rest of the world economy is shifting east, and rival exhibitions in Dubai – home of Emirates airline – and Singapore are steadily gaining in strength; despite the fact that some manufacturers are now targeting these venues rather than Paris or Farnborough for their new product launches and displays; despite the steady rise of competing specialised trade shows in niche sectors such as business aviation and defence, all the evidence suggests that far from declining, the big Paris and Farnborough trade exhibitions are continuing to draw the industry and the public at large, breaking all previous records.

The astronomical cost of participating does not seem to be a deterrent – nor, in the case of Le Bourget, does the obstacle course to reach the exhibition site, beset by frightful traffic jams, invariable train and air traffic controllers' strikes and endless queues for helicopter landing slots for top VIPs and corporate chiefs.

Le Bourget this year is expected to attract more than 350,000 visitors, including more than 150,000 from the industry, and more than 200,000 from the general public.

A total of 2,215 exhibitors from 44 countries will be taking part in watching scores of commercial and military aircraft perform. The Russians will be making a comeback, and the space sector will feature prominently. Special emphasis will be put on smaller companies in the aerospace industry's supply chain.

And last but not least, European and French champions such as EADS and Safran will be actively recruiting young new engineers at the show, according to the organisers.

The pioneering days are in the past; the industry has changed greatly in character and become more concentrated, global and business-driven. But these are all good reasons for the show to go on. And for all the costs and inconveniences, if you have to do it, what better place than Paris to network and parade yourself?

Weapons makers focus on returns

Commentary

LOREN THOMPSON

Washington's budget debates are so complicated that even members of Congress have trouble keeping up with the state of play. But the fundamental reality for the defence industry is simply this: spending on military hardware and services is likely to continue falling, forcing some companies to leave the business or merge with competitors.

The last time the defence sector faced such a swoon in demand – after the collapse of the Soviet Union – the purchasing power of the Pentagon's procurement account fell by 60 per cent, while spending on personnel and operations declined much less. Despite all the talk of "across the board" cuts in defence spending, a similar pattern is likely this time.

Look at the evidence. Only months after it took office in 2009, the Obama administration moved to kill a dozen large weapons programmes, including the air force's F-22 fighter, the army's planned family of networked combat vehicles and a missile defence cruiser for the navy. As the end of its first term

Eventually, though, erosion at the top line will have consequences for the bottom line, too

neared, the administration conceded that most of the defence savings it had booked came from weapons accounts. No bases had been closed, no military benefits had been repealed.

Contrary to popular myth, when peace looms at the Pentagon it is the weapons accounts that get cut first and furthest, because they have the least political protection.

When Robert Gates, former defence secretary, proposed modest increases in the co-payments made by recipients of military healthcare, the whole political system was up in arms. When the centrepiece of army modernisation was killed, Congress barely noticed.

Thus, sequestration – across the board cuts – may be a better outcome for the industry than what the political system would do in the absence of legislative mandates. With no urgent threats to focus the collective mind on consequences, and support for the two parties evenly divided in the electorate, the political impulse is to slash weapons spending while protecting people (namely, voters).

The defence industry figured this out before Barack Obama took office,

and has spent the better part of a decade preparing for hard times. That has had the paradoxical effect of bolstering company results in the near term, because costs were pared even as contracts signed in better times continued to generate cash. So the shares of many companies are trading at multi-year highs despite the softening in Pentagon demand.

Big players such as Lockheed Martin and BAE Systems can probably sustain strong results for several more years by keeping programmes that remain on track and managing their finances. A favoured tactic is to buy back shares, which if done at a faster rate than revenues decline can raise earnings per share even in a weak-demand environment. Fifth-ranked Pentagon supplier Northrop Grumman plans to buy back a quarter of its shares over the next three years.

Eventually, erosion at the top line will affect the bottom line, too, especially as the Pentagon is tightening up on terms and conditions for new contracts. Unless demand revives in response to a new threat, the defence industry will go through a consolidation wave, as seen in previous downturns.

Consolidation has begun in the technical services segment, because contracts are renewed more often there. Therefore, the impact of softening demand is being felt sooner. Michael Lewis, analyst at the Virginia-based Silverline Group consultancy, believes big service players will first disassemble themselves, selectively spinning off properties, before consolidating in a handful of more resilient entities.

On the hardware side, the biggest players are under little immediate pressure to make strategic moves, given their recent financial performance and share price appreciation. If demand remains weak, though, they will begin exploring new combinations to strengthen financial results.

Warship and tank producer General Dynamics could prove to be an innovator in sector consolidation because the company has a history of making bold strategic moves. But in the near-term, the main weapons makers will focus on maintaining returns to shareholders. Lockheed Martin and Boeing believe there is plenty of untapped potential for overseas sales of their military aircraft, especially the fifth-generation F-35 fighter. *Loren Thompson is chief operating officer of the Lexington Institute think-tank and chief executive of the Source Associates consultancy. Both bodies receive money from major defence contractors.*

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