SPECIAL REPORT:
AIRCRAFT & ENGINES
2015
As production rates break all records, it’s been a busy 12 months for the metal bashers. New airliner models and advanced-technology powerplants have been coming on stream from manufacturers in Europe, North America and Asia. But as the market dynamics change, some key pieces of the jigsaw still need to slot into place.
BIG BUSINESS

Our annual survey of delivery trends, powered by Ascend Fleets, highlights where all the mainline airliners headed in 2014

DELIVERIES EXCEED 1,300 UNITS IN 2015

Between them, Airbus and Boeing produced a record 1,324 commercial airliners in 2014, an increase of 6% on the year before. The rise in output was powered by Boeing, which matched its rival in narrowbody production and delivered over 80 more widebodies. Asia-Pacific airlines dominated the delivery distribution of the mainline manufacturers, taking 455 single-aisles and 170 widebodies for a total of 625 units. This represents a slight decline on 2014, as the fall in the number of narrowbody units more than offset the increase in widebodies.

AIRLINER SHIPMENTS EDGE $100BN MARK

Across the globe, airlines spent $97.4 billion on new aircraft in 2014. Using Ascend full-life base values, Flightglobal Insight calculates that Asia-Pacific carriers accounted for around 45% of the total spend on new equipment last year. China’s mega-carriers and their Asian peers shelled out $44.2 billion on new Airbus and Boeing aircraft in 2014. European airlines were the second biggest investors in new fleets, spending $17.7 billion. North American carriers just piped the Middle East airlines for third place, investing $13.7 billion.
WIDEBODIES POWER SEATTLE’S VALUE LEAD

Higher production rates of widebodies have helped Boeing to lead its rival in value terms across all but one of the global markets. Boeing shipped over $55 billion worth of airliners in 2014, some $14 billion more than Airbus. This has manifested itself in significant leads in the Asia-Pacific, North American and African markets. Boeing also earned more from deliveries in Airbus’s home market – Europe – and also has the edge in the Middle East. Only in Latin America did Airbus hold the advantage, thanks largely to its strength in the narrowbody sector there.

BOEING DOMINANT IN NORTH AMERICA

In delivery unit terms, the market share between Airbus and Boeing was fairly even last year, with one notable exception – North America. Between them, the two manufacturers carved up the top two regions – Asia-Pacific and European markets – equally. But Boeing shipped almost twice as many airliners than Airbus (149 versus 81) to US and Canadian airlines, where big spenders included major Boeing customers United and Southwest. The US manufacturer held a slight lead in the Middle East and Africa, while Airbus had the advantage in Latin America.

HEAVY METAL BOOSTS BOEING’S ADVANTAGE

Boeing took a significant market share advantage over Airbus in the commercial aircraft delivery arena last year and is expected to maintain this through to at least 2017. Airbus commercial shipments rose by five aircraft to 621 aircraft, worth $41.6bn, whereas Boeing’s output grew 10% from 634 to 703 units, valued at $55.8bn. This put Boeing 82 units ahead of its rival, with its advantage powered by significantly greater widebody output. Boeing 787 production almost doubled last year to more than 110 units, taking its widebody deliveries to 234 aircraft. In comparison, Airbus delivered 136 widebodies to airlines.
AIRCRAFT & ENGINES MARKET ANALYSIS

DATA COMPILATION AND ANALYSIS BY ANTOINE FAFARD FLIGHTGLOBAL INSIGHT

AIRLINER DELIVERY RANKINGS

Over 1,320 new mainline airliners entered service with commercial operators last year, as Airbus and Boeing broke all their previous production records between them. In this number crunch of the data from Flightglobal’s Ascend Fleets and Values databases, we identify the big spenders and highlight the distribution by region across the globe.

### 2014 DELIVERIES: TOP 10 BY VALUE

<table>
<thead>
<tr>
<th>Rank</th>
<th>Airline</th>
<th>Value ($m)</th>
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<tr>
<td>1</td>
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<tr>
<td>10</td>
<td>Cathay Pacific</td>
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</tbody>
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TOTAL FOR ALL 2014 DELIVERIES = 597,416m

### NOTES:
- Data for deliveries to airlines. Values calculated using Ascend 2014 full-life base values. SOURCE: Flightglobal Insight analysis using Ascend Fleets database

### 2014 DELIVERIES: TOP 10 BY UNITS

<table>
<thead>
<tr>
<th>Rank</th>
<th>Airline</th>
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<tr>
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<tr>
<td>10</td>
<td>US Airways</td>
<td>21</td>
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TOTAL NO. OF 2014 DELIVERIES = 1,324

NOTE: Data for deliveries to airlines. SOURCE: Flightglobal Insight analysis using Ascend Fleets database

### 2014 DELIVERIES: TOP 5 AIRLINES BY MANUFACTURER

#### AIRBUS: BY VALUE

<table>
<thead>
<tr>
<th>Rank</th>
<th>Airline</th>
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AIRBUS TOTAL AIRLINE DELIVERIES = 621 ($41,581m)

#### BOEING: BY VALUE

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<tr>
<th>Rank</th>
<th>Airline</th>
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<td>5</td>
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BOEING TOTAL AIRLINE DELIVERIES = 703 ($55,836m)

NOTE: Values calculated using Ascend 2014 full-life base values. SOURCE: Flightglobal Insight analysis using Ascend Fleets database

### 2014 DELIVERIES: TOP 5 AIRLINES BY MANUFACTURER AND REGION

#### ASIA-PACIFIC ($44,167m/625)

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#### EUROPE ($17,743m/230)

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#### NORTH AMERICA ($13,691m/230)

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#### MIDDLE EAST ($12,431m/103)

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#### LATIN AMERICA ($5,997m/101)

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<td>Avianca</td>
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<td>5</td>
<td>TAM Linhas Aerneas</td>
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#### AFRICA ($3,386m/35)

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<td>5</td>
<td>TAAG Angola Airlines</td>
<td>167</td>
<td>1</td>
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NOTE: Values calculated using Ascend 2014 full-life base values. Total value/units delivered for each region in brackets. SOURCE: Flightglobal Insight analysis using Ascend Fleets database
Airbus added a dash of spice to the mid-range, mid-size market with last year’s launch of an updated version of its best-selling widebody, the A330. But in a sector where there are already several established types, is there enough room for another big twin to be dropped into the mix?

The numbers so far suggest there is. Building off the back of over 1,300 sales of the baseline A330ceo, Airbus has racked up 145 orders and commitments from seven customers for the re-engined, Rolls-Royce Trent 7000-powered A330neo since launching it at last year’s Farnborough air show. Not only does this tally put the aircraft well on its way to Airbus’s publicly-touted 1,000 aircraft sales target but it also includes several blue-chip customers, including Delta Air Lines and Steve Udvar-Hazy’s Air Lease.

The outline definition of the A330neo family is a fairly simple exercise: take today’s A330-200 and -300, add the new-generation Trent 7000 engines, some aerodynamic tweaks and a revised interior with “increased cabin efficiency enablers” (to create room for up to 10 more seats), and you end up with the A330-800 and -900, respectively. The latter is the lead variant, to enter service with an as-yet unnamed launch operator in late 2017.

But when scrutinising the details of this warmed-up A330, some could be forgiven for feeling a bit of déjà vu. As Boeing is quick to point out, the A350 started out over a decade ago as an A330-based airframe powered by 787-derived engines until Airbus regrouped and relaunched its assault on the Dreamliner with the all-new A350 XWB family.

In 2006, when today’s A350 XWB finally crystallised, things looked pretty bleak for Airbus in the widebody sector. The A340-600 was being trounced by the 777-300ER and the A330 was facing a huge threat from the 787 as Boeing rampaged across the globe signing up customers for its all-new twinjet. To make matters worse, Airbus’s eventual clean-sheet response, the XWB, was not due to deliver until at least four years after the Dreamliner.

Airbus took a pragmatic approach to its predicament, launching a counter-attack with the A330. The twinjet had at that time been in production for over a decade alongside its sister product, the A340, and between them they had accumulated an installed fleet of over 550 aircraft. So the twinjet had certain attractions of its own, not least of which were price, maturity and good availability.

Airbus’s aggressive sales strategy was already paying off when the 787 programme went into meltdown in 2007/08. This not only gave Airbus the breathing space it needed to get the A350 orderbook moving but also...
added impetus to A330’s renaissance as airlines sought capacity while the Dreamliner programme was effectively in limbo.

“[The 787 delays] made the A330 the only airplane available at that time,” says Boeing’s head of marketing, Randy Tinseth.

STRONG PEDIGREE
Airbus’s head of A330 product marketing, Crawford Hamilton, concedes that the twinjet benefited from the Dreamliner’s early woes, but is adamant that was only part of the reason for its success. “Undoubtedly, what’s gone on with the 787 has not been a hindrance to the A330’s success. What that leverages off is the fact that when you buy an A330 you get a product that is very reliable, you know what you are buying and you know when you’re going to get it, which is important if you’re trying to work out a schedule for next year and then you find out your aircraft might not be coming.”

And even with the 787 programme now over its crisis and production ramping up, Hamilton says the current A330 has still been giving a good account of itself.

“The market is split about 50:50 at the moment. The current A330 is around 900-920 aircraft sold against the 787-8 and -9, which has sold 950 to 1,000 aircraft,” he says.

But Tinseth, unsurprisingly, is not convinced that the A330 is all that Airbus claims it is cracked up to be: “Look at all the things Airbus has done to try to keep the A330 viable. First they went to a freighter configuration, then they tried to increase the take-off weight, then they tried to sell it as a domestic or regional airplane,” he says.

“No one of those things were taking hold in the market so I don’t think we’re surprised they went forward to re-engine the aircraft and make other improvements.”

And Tinseth cannot resist reminding us that Airbus first tried to counter the 787 with a re-engined A330 proposition when Boeing launched the Dreamliner.

“This is the airplane they brought to the market 10 years ago when oil was $40 a barrel,” he says. “And the fact is it didn’t do well. When the fuel price was even lower than it is today, airlines looked at the value proposition of the 787 and they chose it. And we think they’ll do the same today.”

Hamilton is quick to dispel the Boeing history lesson, pointing out that today’s re-engined A330 is very different to the original A350 proposal.

“Our Neo recipe is keeping everything that’s good and changing the things where you get the biggest benefits,” he says. “It’s not an A350 Mk1. That was marked by lots of compromises everywhere. It was restricted by being based on another airplane. It was a good exercise in how not to do it, and we’ve learnt from that.”

Airbus says the changes it is introducing on the A330neo reduce fuel consumption by 14% per seat over the equivalent current A330, as well as providing a range increase of up to 400nm (740km). And the revisions will deliver significant reductions in operating costs.

“Per trip, the A330neo’s cash operating costs are 8% lower than the A330ceo and per seat 11% lower; because we have the seat gain [through the cabin reorganisation],” Hamilton says.

SIGNIFICANT COST ADVANTAGE
Airbus claims a significant per-seat cost advantage for the improved models over the 787. Hamilton says the 310-seat A330-900 has cash operating costs 1% lower than a 304-seat (two-class), General Electric GEnx-powered 787-9 on a 4,000nm sector and this advantage increases to 7% when all operating expenses are included such as capital or lease charges.

Interestingly, Airbus’s 2014 list price for the A330-900 of $275 million was some $18 million more than the 787-9, but for the purposes of its operating-cost comparison it as-

### MEDIUM-CAPACITY WIDEBODY COMPARISON

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<td>242</td>
<td>248</td>
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<td>269.5</td>
<td>304.8</td>
<td>218.3</td>
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*2-class layout for Airbus/3-class for Boeing (Airbus quotes comparative 2-class counts for 787-8 and -9 as 246 and 304) **2015 list price for Airbus, 2014 for Boeing. SOURCE: Manufacturers
A small but important component of the A330neo’s value proposition is Airbus’s project to squeeze up to 10 more passenger seats into the cabin, compared with its current generation equivalents. With its so-called “increased cabin efficiency enablers”, Airbus aims to “maximise the revenue space between door one and door four by getting more seats without compromising any comfort for the passengers”, says Airbus’s head of A330 product marketing, Crawford Hamilton. This project borrows ideas from a similar effort to boost the seating capacity of the A320 family, using items such as the “smart lav” and “space-flex” toilet concepts. The former is a more optimised lavatory design which occupies less area and therefore provides more space in the cabin.

“This creates a snowball effect of gaining inches here and there to get another row of seats in,” says Hamilton. The space-flex concept involves the relocation of lavatories from the revenue space between door one and four to behind door four, which will in turn help create room for additional seating.

A330neo will inevitably come from the A350 market. “An economically optimised medium-range aircraft could potentially be attractive to some airlines that do not have the need for the longer range offered by the A350 XWB and 787. But there was also probably a greater risk that the 787-9 could have captured some sales that may now go to the A330neo.”

Hamilton says Airbus broadly sees the two widebody families as appealing to different markets, and emphasises the A350’s size and range advantage over the A330.

“This is a better airplane than the A350-800, there’s no question about it,” he says. “That airplane was a simple shrink and didn’t have anything going for it.” But this could be a problem for Airbus too, adds Tinseth. “That A330-900 is a bigger airplane than the A350-800. So it not only competes with our airplanes but frankly it’s going to steal share from the A350-900 if they price aggressively.”

Morris says that some element of the 500 A330neo sales that Ascend forecasts for the

THE A330-800/900 is quite competitive with the 787-8, particularly in terms of capital cost”

STEVE UDVAR-HAZY
Chief executive, Air Lease

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A330NEO KEY FEATURES

Commonality
- A330-800/900neo based on existing A330-200/300
- 95% spares commonality with A330ceo
- Same type rating as A330ceo
- Common type rating as A350 XWB

Aerodynamic improvements
- New A330 sharklets
- 4% aerodynamic gain from re-optimisation
- Span extension to 64m

New generation engine – Trent 7000
- Increased fan size (from 97.5 to 112in)
- 11% lower fuel burn at powerplant level
- Latest engine performance improvements

Cabin developments
- Up to 10 more seats
- Cabin modernisation

SOURCE: Air Lease
role in launching the A330neo and has orders for 25 -900s, concurs that existing operators are leading candidates: “For an A330/A340 operator, the A330-800/900 is an economical replacement alternative.”

He adds that for an existing Airbus operator, “the A330-800/900 is an effective next step and quite competitive with the 787-8, particularly in terms of capital cost advantage”.

Hamilton says Airbus is also targeting – for both the current version and the Neo – the 777-200 and 767 replacement markets, “and where the competition maybe hasn’t come up to scratch and there’s opportunity. Consistently we’ve been outselling the opposition and therefore we’ll just try and keep that up.”

But one inevitable challenge that Airbus faces before it completes the transition of production to the A330neo is to sell the remaining delivery slots for current-generation models in the production cycle. “They’ve got to figure out a way to fill the A330 line, which looks pretty bleak,” says Tinseth.

Morris believes Airbus still has a “significant number” of A330ceo slots to sell, despite the recent announcement that production will be reduced from the current nine aircraft a month to six in the first quarter of next year. He estimates this move has reduced the target by around 100 units.

“Assuming transition to full Neo production by the end of 2019, then there would appear to be around 300 A330ceo slots remaining to be produced from the beginning of this year,” says Morris.

HURDLES REMAIN

Ascend estimates that the A330ceo’s true backlog (adjusted for customers such as Kingfisher that will not take their aircraft) is around 166 units.

“Fourteen aircraft have been delivered to date this year, indicating that 180 of those 300 estimated slots have firm customers. So that still leaves up to 120 aircraft to be sold under this scenario, 2016, 2017 and 2018 look particularly challenging, with an estimated 34, 42 and 36 slots open, respectively,” says Morris.

“In the face of this challenge, Airbus may be forced to offer some serious ‘last-off-the-line’ discounts to encourage customers to purchase these aircraft,” he adds.

So Airbus still has some hurdles to clear as it brings the A330neo to market, but just under a year into the programme will be relatively pleased with its progress so far. What remains to be seen is whether the market really is as big as it predicts.

Additional reporting by Laura Mueller
Mitsubishi and Comac are making progress with new jets, but their impact on the market depends on overcoming some tough challenges, not least convincing airlines to shun the established players.

Asia’s commercial aircraft manufacturing scene has seen a flurry of activity in recent years. For the first time in history, three commercial aircraft types are being built there. One is on the brink of entering service, while the other two are gearing towards a first-flight milestone.

The programme showing the most promise is Mitsubishi Aircraft’s MRJ regional jet. Over the past 12 months it has made steady progress toward its Q2 2015 first-flight target, after three rounds of schedule delays over the years.

The Japanese manufacturer rolled out a sleek first flight-test prototype (MSN10001) last October, and has performed a first engine run on the Pratt & Whitney PW1200G-powered jet. Its static strength test aircraft (MSN90001) has undergone a wing up-bending test.

Mitsubishi is determined to keep the confidence level in its programme high, releasing pictures of its flight-test fleet in various stages of final assembly. Wing to body join of the second and third aircraft has been completed, while the fuselage sections of the fourth have also been joined. Sub-assembly of the fifth flight-test aircraft is ongoing.

Mitsubishi Aircraft says tests so far have verified the operations of the aircraft’s various systems, producing “anticipated results”, and that the programme is “progressing steadily” towards first flight. MSN10001 has also moved forward with functional and engineering tests.

Comac, meanwhile, surprised many when in early March it released to Flightglobal a series of pictures showing a first prototype C919 airframe in an almost complete state. The pictures show an airframe joined from nose through to the tail. Wing to body join has also been completed, with the vertical and horizontal stabilisers already attached.

The Chinese aircraft manufacturer is confident of rolling out its first test prototype in the second half of the year, but acknowledges that the bigger challenge is in helping the jet take to the skies. The aircraft’s avionics, flight con-
The Mitsubishi MRJ is being prepared for its first flight, which is due soon.

Comac’s first C919 test prototype is slated to be rolled out later this year.
trol and hydraulics systems have yet to be installed, and the systems also have to be integrated and tested.

Publicly, the first flight target for the CFM International Leap-1C-powered narrowbody remains unchanged as end-2015, but this seems highly unlikely, with programme engineers expecting system integration to be a challenge.

Meanwhile, Comac’s long-running ARJ21 programme finally received type certification from the Civil Aviation Administration of China in December, although the type’s journey appears to be some distance from the finish line. The aircraft has begun route-proving trials but needs a production licence before deliveries can start to launch customer Chengdu Airlines.

The European Aviation Safety Agency has at least approved the scheduled maintenance requirements for the ARJ21, affirming that Comac has set in place comprehensive procedures for the type’s maintenance needs according to international standards.

Comac maintains that it will continue to pursue certification from the US Federal Aviation Administration for the regional jet, but it appears that Western certification for the dated aircraft is no longer a priority. It does not technically require Western affirmation, since the overwhelming majority of the ARJ21 orders are from local airlines and leasing companies. The ambitious manufacturer understands, however, that Western certification is necessary for it to be a recognised player on the international stage, and at it attempts to win sales from the lucrative Western markets.

**PROMISING SUPPORT**

Analysts say Comac’s and Mitsubishi’s overseas sales are largely dependent on their establishing credible global support networks. The Japanese airframer perhaps understands this better than its Chinese peer, since it does not have a large domestic home base to fall back on.

Early on in 2011, it signed a 10-year collaboration with long-time partner Boeing for round-the-clock customer support for MRJ operators, covering spare parts provision, service operations and field services.

Comac, meanwhile, has remained cool towards Bombardier, despite the Canadian manufacturer’s attempts to cosy up. The two signed an agreement in 2012 to find commonality between the C919 and CSeries in areas of supply chain services, electrical systems, human interface and cockpit, but little appears to have been achieved. The second phase of collaboration moved on to areas such as supply chain services, flight training, flight-test support and sales and marketing.

An engineer on the C919 programme went as far as to say that “basically in the development of the C919, Bombardier is not involved”.

Forecast International’s senior aerospace analyst Ray Jaworowski says airlines and, even more so, leasing companies, tend to be conservative when it comes to choosing which aircraft to buy.

“The airlines like to stick with the established manufacturers whose products have reliable track records, predictable performance, and predictable operating costs. Plus, the airlines know that they can get these aircraft serviced once they have entered their fleets,” he says, stressing that product support is often a “key consideration”.

But before an airline even evaluates a manufacturer’s after sale support, those wanting to enter the market must first bring something new to the table, offering a worthy competitive alternative. “New entrants must innovate to succeed,” says Rob Morris, head of Flightglobal’s Ascend consultancy. “And then the entrant must also execute flawlessly on the innovative promise/programme offered to the market.”

He says that while the MRJ appears to bring economic improvements to the market which could leverage sales, the ARJ21 offers little in the way of innovation, and Comac has clearly failed to deliver on the programme schedule. The ARJ21 programme was launched in 2002, made its first flight in 2008, and was finally certificated by China in 2014.

The ARJ21’s performance to date could reflect on how the market sees the C919. It is critical that Comac ensures no similar delays reflect on how the market sees the C919. It is critical that Comac ensures no similar delays.
between 2014 and 2033. Embraer is expected to remain the market leader, capturing 61% of the market share with its current E-Jet (12%) and the re-engined E-Jet E2 family (49%), which is due to enter service in 2018. The MRJ is predicted to gain around 22% of the market, with the remaining market being shared by the Sukhoi Superjet (9%), the ARJ21 (5%) and the Bombardier CRJ700/900/1000 (4%).

The forecast predicts delivery of over 900 MRJs in the 20-year period, including 678 of the baseline MRJ90, 137 of the MRJ100X and 98 MRJ70s. Although Mitsubishi has not committed to a stretch, the forecast says a 105-seat version is necessary to provide the Japanese manufacturer with “a true regional jet family” since the 92-seat MRJ90 is significantly smaller than the E190 and E195.

For the ARJ21, Flightglobal forecasts deliveries of 174 with more than 95% in the Chinese market, since the aircraft’s performance and economics are expected to match those of similar sized jets in the market today. Comac, however, tells Airline Business that it intends to introduce an improved variant of the jet. The project will seek to reduce the aircraft’s structural weight, enhance the manufacturing of the jet’s surfaces to reduce drag, and improve its avionics and power systems. It has no near-term plans to re-engine the General Electric CF34-10A-powered jet, partly because of limitations imposed by an agreement with GE to be the sole powerplant supplier for the ARJ21.

The Flightglobal Fleet Forecast meanwhile predicts 923 deliveries of the C919 over the next 20 years, accounting for just 4% of total narrowbody deliveries. Some 580 of these will be for the baseline variant, and 343 for a stretched 190-seater. The majority (80%) of deliveries will be in China, while Africa and Asia-Pacific will take in the rest. Flightglobal says there is also potential for Airbus and Boeing to develop all-new single-aisle products towards the end of the forecast period, which would force Comac to develop the C919 further, or launch its own all-new product.

Much interest will be on Asia as its aircraft manufacturing scene continues to develop, especially in 2015 when the MRJ and the C919 could both mark milestones with first flights. The odds are, however, that the road ahead for Comac and Mitsubishi will continue to be turbulent, rather than smooth sailing, as they battle with the countless challenges involved in building a modern jet – not to mention fierce market resistance from entrenched rivals.

“We must bear in mind that it took Airbus more than 40 years to reach the position it shares with Boeing today.”

ROB MORRIS
Head of consultancy, Ascend

”It took Airbus 40 years to reach the position it shares with Boeing today”

KEEPING TO SCHEDULE
As Comac and Mitsubishi move from concept, design and assembly to the flight-testing phase, it is also crucial that they demonstrate that the aircraft can achieve, or at least come close to achieving, the payload-range and economic performance that have been promised.

The two also need to guard against further schedule delays to ensure competitiveness in a market where even the established manufacturers are launching upgraded products. “While a certain amount of delay is the norm for new aircraft development programmes, and indeed is anticipated by the market to some extent, nevertheless the advent of new products from the established OEMs makes the avoidance of additional schedule delay that much more critical,” says Jaworowski.

On this aspect, Mitsubishi, well aware of its inexperience in the complicated business of certification, has again opted to work with a partner. It will co-operate in flight-test work with a Seattle-based company that provides flight testing, data analysis and FAA certification services for manufacturers. Test modules such as envelope expansion, system tests, performance tests and icing tests will be conducted at Grant County International airport in the US state of Washington.

SALUTARY LESSON
Comac will likely lean more on Bombardier in this area, having already sent teams to Quebec to learn from Bombardier in its certification for the CSeries. Its long certification journey for the ARJ21 will also serve as a reminder of its inexperience and how costly delays can be.

The Flightglobal Fleet Forecast predicts deliveries of around 4,100 regional jets
George Dimitroff, who is head of valuations at Flightglobal’s Ascend consultancy arm, examines how market developments are influencing what airliners are worth.

Aircraft and racehorses have one thing in common: they all turn a year older on 1 January, regardless of when in the year they were born or built. Ageing is a fact of life and as a result, Ascend reviews market values and lease rates for all aircraft types in the first couple of weeks of the new year.

The changes are primarily (but not exclusively) made due to depreciation; each aircraft depreciates with age, and this percentage can range from 4% to over 12% depending on the aircraft type, its position in the production cycle, its market liquidity and expected useful economic life. The normal depreciation expected from an aircraft in a balanced market is essentially the drop along the base-value curve from one year to the next. Market forces can then increase or reduce this percentage depreciation depending on supply and demand.

For most of the popular in-production aircraft types this year, the drops in their current market values were along the lines of 6%, compared with January 2014. The Boeing 737 NG and Airbus A320 families on average saw current-market-value decreases of 6%, which was quite uniformly applicable across the different variants. A330s saw 5-7% drops although the older -300 low gross weight versions only saw 0-3% decreases as they are already close to part-out value.

The 777 family on the other hand saw slightly steeper depreciation averaging 8% across all variants, some outperforming others. The -200ER was particularly hard hit with 9-11% value drops compared with a year ago while the -300ER was closer to 6%, after adjustments were already made in late 2014. The steeper drop for the -200ER is due to increasing aircraft availability as more airlines replace them with 787-9s, A350-900s, or even A330-300s.

NEW GENERATION

On the other hand, new aircraft values for 2015-build aircraft of the latest generation saw increases, buoyed by manufacturer escalation and a long lead time between order and delivery. New-build 787 values rose by 2% for the -8 and 3% for the -9 as the programme continues to mature and launch-customer discounts start to erode. Ascend has also introduced market values for the A320neo, which is expected to enter service late this year, placing the estimated current market value in the $48-49 million range. We expect new current market values to rise over time as the programme matures.
Lease rates, meanwhile, saw significant improvement, not just on a constant-age basis but in absolute terms as well. The biggest beneficiaries have been mid-life and older A320s and 737 family aircraft, although even the less popular A319 saw improvements in rentals. An older A320 that used to be leased for $165,000 a month 18 months ago is difficult to source for less than $220,000 today. Even the oldest 737-800s cannot be leased for less than $200,000 a month, while new ones are now in the region of $370,000-380,000.

New A320s have also improved from the $300,000 level that they were stuck at for several years, with most new examples with sharklets now being leased in the region of $340,000-350,000 a month (assuming a single aircraft leased to a lessee of average creditworthiness). Sale-and-leaseback pricing still varies considerably.

As regards widebodies, lease rates have not seen the downward adjustments that values have; they have remained fairly stable. This is because lessors recognise that they have a faster-depreciating asset and need to charge more rent to cover lower residual values at lease-end. Middle-aged current production widebodies have also seen some improvements in rental through 2014, although we believe these are fragile and susceptible to being reduced again at the first spike in availability.

In the 70- to 115-seat segment, we have had to make some small downward adjustments to new-build values, as we believe the Embraer E-Jets programme is past the mid-point of its production life and the Bombardier CRJ family is close to the end of its production life. As discounting kicks in for last-off-the-line units, new values are put under pressure, especially with the next generation E-Jet E2 and Mitsubishi MRJ programmes now on the horizon. E-Jets saw around 6-7% value decreases year-on-year of which 2-3% was market driven, the remainder being due to ageing.

Finally, market values for production turboprops, namely the Bombardier Q400 and ATR -600 series aircraft, remained very stable despite ageing, which in constant-age terms translates to value improvement. The older, out-of-production Dash 8 Q100/300 and ATR 72-200 and ATR 42-300 series were not as fortunate and still depreciated as they are now being replaced by the new stream of deliveries. Lease rates on turboprops also remained steady, with new 2015 deliveries seeing increases – rentals for a 2015 Q400 and ATR 72-600 are now in the region of $195,000 monthly, on average.

Overall, the market is strengthening and our January 2015 revisions in values bode well for most of the investor-friendly aircraft types. Lessors are the real winners with serious improvements in rentals and supply drying up – not just of new but also of five to 15-year-old aircraft. Values have not yet followed the upward movement that lease rates have shown (with a few exceptions) but this is because buyers are wary of the longer term residual value risk for end-of-the-line aircraft and do not want to overpay for assets, however good the rent may be.
ENGINES OF CHANGE

Two new powerplants make their debuts in 2015, and both are on Airbus aircraft: the Rolls-Royce Trent XWB on the A350 XWB and the Pratt & Whitney PW1000G geared turbofan on the A320neo. P&W is vying for supremacy in the single-aisle market against powerful incumbent CFM International, which is the alternative choice on the A320neo and the exclusive supplier on Boeing’s 737 Max family. In the regional arena Pratt’s high exposure across the product offerings results in an expanding market share. The widebody sector is now effectively a two-horse race, with a range of R-R-powered twinjets competing against an increasingly General Electric-centric Boeing product suite. Just the 787 and A380 remain as big jets in large-scale production where there is a choice of powerplant. We analyse the latest market trends using Flightglobal’s Ascend Fleets database.
AIRBUS/BOEING FLEET BY ENGINE MANUFACTURER

Note: In service & parked fleet at 31 December 2014. Boeing includes former MDC types. Excludes corporate and military operators.

Source: Flightglobal Insight analysis using Ascend Fleets database.

REGIONAL AIRCRAFT ENGINE MANUFACTURER MARKET SHARE


Data for firm orders for ATR, Bombardier (including CSeries), Comac, Embraer, Mitsubishi and Sukhoi.

Source: Flightglobal Insight analysis using Ascend Fleets database.
Airbus is dithering about whether to extend the life of the A380 with a re-engining, and analysts are divided in their views. But a window of opportunity may present itself at the end of the decade, in line with Rolls-Royce plans for technology advancement.

In a lightly attended press conference at the 2013 Dubai air show, then-Engine Alliance president Dean Athans delivered an unexpected message. The joint venture between GE Aviation and Pratt & Whitney was evaluating upgrades for the GP7200, including an all-new engine to power the Airbus A380.

“I wouldn’t take anything off the table,” Athans said, opening a contentious public debate on whether Airbus should add the A380 to a long list of re-engined models in development.

How Airbus answers that thorny question could shape its product strategy for decades and figure large in Rolls-Royce’s plans for a new generation of widebody engine technology.

It would also provide a clear response to a request from by far the A380’s biggest customer – Emirates – which is ready to open its cheque book for an updated variant with new engines.

“We’re in the market for another 60-70 A380s on top of the 140, if they do what I think [they should] with the aeroplane,” airline boss Tim Clark said at World Routes last September.

With strong interest from Emirates and R-R – Engine Alliance’s competitor on the A380 – Airbus faces a clear choice. In December 2014, Airbus chief executive Fabrice Bregier vowed that it would re-engine the A380 eventually, but his comments only came after his finance chief sowed doubts about the A380’s future.

Some prominent analysts, however, remain bewildered that Airbus is even considering the idea of re-engining the A380. Teal Group’s Richard Aboulafia believes Airbus’s corporate leadership will ultimately reject the project.

“This is one of the great ironical moments of my career. I say it doesn’t happen because I have faith in Airbus,” says Aboulafia. “If you think that they are run by, shall we say, less-than-gifted professionals, then you’d say: ‘Oh yeah, they’ll do it anyway.’”

Aboulafia’s opposition to a re-engining programme runs deeper than his long-held opinion that the A380 is destined to be a commercial flop. If the A380’s largest customer is excluded, Airbus’s backlog dwindles to 35 aircraft, representing about 14 months of production at current rates. To Aboulafia, that represents a “complete absence of commercial activity”.

**SALES RECORD**

Compounding the sales inactivity is the lack of a confirmed secondary market for the aircraft, with the first A380s delivered to Emirates due for disposal in a few years.

Simon Pickup, strategic marketing director for Airbus, defends the A380, noting that Aboulafia excludes its most important customer.

“I don’t know why he does that because we did sell 140 A380s to Emirates. They’re in the orderbook. By excluding them it gives a slightly skewed picture, I think,” Pickup says.

Unsurprisingly, Airbus believes the A380 is still slightly ahead of its time but demand will pick up as traffic grows. Aboulafia has noted that aircraft sizes have declined as passenger traffic has risen, with the Boeing 747-400 often replaced on routes by the 777-300ER. Pickup, however, points to the rise of mega-hubs that serve at least 11,000 passengers per day. That will rise from 41 to over 90 in the next 20 years, Airbus says, driving demand for superjumbos.

Moreover, it may be unwise to exclude Emirates’ input from the strategic equation. As the single-largest A380 buyer, Clark still carries much sway in Airbus’s boardroom – although even he isn’t convinced Airbus will do it.

“We’re in the market for another 60-70 A380s on top of the 140, if they do what I think they should with the aeroplane”

**TIM CLARK**

President, Emirates Airline
Emirates is the only airline so far to have shown interest in a re-engined A380

“With more than half of the final backlog invested in Emirates, their influence here is clearly key,” says Rob Morris, head of Flightglobal’s Ascend consultancy. “I suspect they will be the ultimate drivers of the re-engine decision. That could also stimulate some potential replacement demand with other existing operators.”

Boeing plans to start delivering the 777-9X to Emirates in 2020 powered by the latest widebody aircraft propulsion system officially in development. The GE9X will enter the market two generations of engine technology ahead of the GP7200s powering Emirates’ fleet of A380s, which have played a critical role in the Middle Eastern carrier’s strategy of tapping slot-controlled airports in Europe.

“Part of what’s going on is Emirates: they believe they have a seat-kilometre cost advantage with the A380,” says George Hamlin, president of Hamlin Transportation Consulting. “When the 777X arrives, they are going to lose that.”

Despite the economic incentive, Hamlin counts himself among those opposing the project. Among widebodies, the A380’s operating economics will suffer even with new engines, as the A350, 787 and 777X also have the benefit of lighter-weight, composite structures.

“There is some risk [the A380] becomes the last metal albatross if you want to keep it in production for so many years,” he says.

For months, Airbus has been preaching patience on the timing for a final decision. Its focus is now on testing the A320neo family and developing the A350-1000 and re-engined A330neo. Any move to similarly upgrade the A380 would fall at the back of that queue, which extends through the end of the decade. That is also around the time that Emirates’ performance requirements, R-R’s engine roadmap and Airbus’s product strategy could converge.

“If one looks at the early 2020s, there may be a confluence of available engineering resources, better engine technology, falling A380 sales and increased 777X competition, which may well lead to an A380neo,” says Chris Seymour, Ascend’s head of market analysis.

Although Engine Alliance opened the re-engining debate 15 months ago, the joint venture is no longer willing to launch a new clean-sheet engine project. GE is already consumed delivering its half of the CFM International Leap engine family and the GE9X for the Boeing 777X. “I would be really remiss if I led you to believe we were interested in [an A380 re-engining programme],” GE Aviation chief executive David Joyce said in March 2014.

R-R, indeed, has a different view. The manufacturer has outlined a design concept for an UltraFan engine that could be available by 2025, possibly featuring carbon/titanium (CTi) composite fan blades, a low-pressure section reduction gear and a variable-area fan nozzle. That engine could help R-R achieve a level of fuel efficiency beyond even the GE9X.

However, an intermediary step would help R-R bridge from the Trent XWB programme to the UltraFan. The manufacturer’s internal R&D programme – dubbed Advance – formed the basis of its proposal to power the 777X, but that was rejected by Boeing. Re-engining the A380 would offer an ideal half-step, allowing R-R, for example, to introduce CTi fan blades on the Advance engine and then insert more efficient variable pitch blades on the UltraFan.

Emirates’ desire for more fuel-efficient aircraft and R-R’s need for an application for the Advance projects has persuaded some analysts that A380 re-engining is inevitable. Kevin Michaels, senior consultant for ICF, argues that R-R is likely to pay most of the estimated $2.5 billion development cost for such a programme, which lowers the overall economic risk to Airbus.

It does not, however, remove the overall concerns over the concept. If A380 orders do not pick up, Airbus faces the possibility of A380 production shutting down before a re-engined version is available. “If not launched this year, [service entry] probably wouldn’t be until 2021. With no orders except Middle Eastern carriers, production might end before then,” says Ascend senior consultant Richard Evans.