

Aerospace & Aviation 2005



At the last Paris air show, in June 2003, the world's aerospace executives, airline and military customers and tens of thousands of spectators stopped in their tracks and stepped out of hospitality chalets and turned their eyes to the south, as an Air France Concorde rumbled overhead and landed – for the last time, its destination France's national air and space museum.

It was a bittersweet moment. As contemporary and beautiful as Concorde looked in flight, it also symbolized an era in which a can't-shoot-straight European industry sucked in billions of taxpayer pounds, francs and Deutschmarks and pumped out technically fascinating fighters and airliners that nobody wanted to buy. As Concorde struggled through its final tests in 1974, Boeing marketing executive Jim Austin gave his verdict on another European airliner, also just entering service. "A typical government airplane," he said. "They'll build a couple of dozen and then go out of business,"

That was the Airbus A300, and Austin couldn't have been more wrong. And this year, instead of the dart-like Concorde, all eyes will be on the vast, whale-like shape of the A300's mighty descendant, the 535-seat A380 super-jumbo, which made its maiden flight on April 27. The world's largest airplane, the A380 is also a symbol: of an Airbus that challenges Boeing face-to-face for dominance of the commercial airplane business, and of Airbus

shareholders BAE Systems and European Aeronautic and Defense Systems (EADS), comparable in size to the US giants, and both making moves into what was once the US industry's private preserve – the Pentagon market.

Another change this year: the US is back at the show in force, after the US administration pulled its own representation back to almost nothing in 2003, and hinted strongly and successfully that industry should follow suit, in retaliation for the French government's attitude to the Iraq war.

If the great white broad-tailed shape of the A380 is Moby Dick, then Boeing's inexhaustible vice-president of marketing, Randy Baseler, has for the past few years been cast as Ahab, voyaging the world over and wielding a PowerPoint for a harpoon. His job, over and over: the A380 is not the future of air travel, and Airbus won't sell more than an unprofitable 350-400 airplanes in the next 20 years. It's a hard case to make, given that Airbus already holds 139 firm orders – plus almost 100 options – and that a phalanx of airline leaders turned up at the A380's unveiling, saying in unison that the airplane is a key to their future (Dubai alone, home of Emirates, is building a new terminal with more than 30 gates designed for the two-deck A380). Defying cynics, too, the airline bosses also said that they plan to use the A380's generously sized cabin – with 50 per cent more floor space than the 747 – to offer new luxuries and amenities to passengers. >>

Airbus threw down its own challenge just before Paris. Smarting from the loss of campaigns at Northwest and Air Canada, Airbus chief salesman John Leahy unveiled a series of improvements to the A350 design and said that the consortium expects to launch the new airplane with "triple-digit" orders at Paris. Airbus is also working to sign up Hong Kong-based Cathay Pacific Airways as a new A380 customer. That might be the end of Boeing's hopes to sell an improved version of the 747. Cathay is one of the last leading airlines to have resisted the A380 so far, and had been pushing Boeing to produce a new 747 version – but Boeing, believing that there is only a small market for big jets, has not wanted to invest in a major redesign and offered only a modest body stretch and new engines.



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But Boeing comes to Paris, for the first time in years, with some evidence in its favor. Baseler’s Pequod is Boeing’s all-new 787 Dreamliner, a 220-seat shrimp next to the European giant. Under development since late 2003, it should fly in 2007 and enter service in 2008. It is the embodiment of Boeing’s vision of air transport, in which relatively small but still highly efficient jets link mid-size cities direct – Seattle to Lisbon, or Bangalore to Manchester – bypassing crowded megahubs. It looks like today’s jets, but is all-new inside: most importantly, it is made from carbonfiber composite material to save weight, extend the airplane’s life and permit a more comfortable cabin. It is also designed to make the best use of new engines from General Electric and Rolls-Royce, contributing most of the 20 per cent improvement in fuel burn that Boeing claims over today’s mid-sized Airbus A330.

A year ago, Boeing promised 200 orders for the 787 by the end of 2004 – a campaign that stalled under a counterattack from Airbus. The Europeans are offering the airlines the new A350, with carbonfiber wings but the same metal fuselage as the A330. Boeing has regained momentum this year, winning customers like Korean Air Lines, Northwest and Air India; and, at the show, it will be Airbus that is expected to face questions about its plans for the A350, which had no orders as of early May.

Boeing, though, has to dominate in order to succeed with the 787, planning to build as many as 120 airplanes a year in order to pay off the massive investment in new production systems and design technology. It’s an investment that Boeing will share with a consortium of Japanese “heavies” that will build the wing, and the US-Italian Alenia/Vought team that will build the body; Boeing 787 program boss Mike

Bair calls the contracts the largest ever in commercial aviation.

The commercial war has pushed the US-Europe aviation trade dispute – centered on European governments’ financial support for Airbus, and support to Boeing from the Pentagon, Japan and Washington state – into the background, but it continues to simmer. Airbus has applied for government “launch aid” – a cash advance, to be repaid by a levy on each aircraft sold – for the A350. Under a 1992 agreement between the US and European Union, this is legal, but the US argues that the intent was for all subsidies to disappear in time. Boeing maintains that the Washington state and the Japanese

money don’t constitute a subsidy for the 787, and that the EADS partners make as much or more from defense as Boeing does. The two sides have been fencing since late 2004, neither one of them wanting to unleash the nuclear option of a World Trade Organization dispute.

But Boeing may not be sad to see the dispute continue to simmer: as long as it does, EADS and Airbus probably don’t have a chance of competing for a lucrative contract to build new inflight refuelling tanker airplanes for the US Air Force, even though Boeing is still in the Pentagon’s doghouse after an influence-peddling case sent both Boeing’s CFO and a former senior Pentagon buyer to jail. The tanker

	A380	787
Seating capacity (typical three-class)	535	223
Range	15000 km	15700 km
Wingspan	79.8 m	60 m
Length	73 m	56 m
Cargo variant	Yes	No
Take-off weight	560 t	218 t
Engines	Four Rolls-Royce Trent or GE/PW GP7200	Two GE GENx or RR Trent 1000
In service date	Second half 2006	2008
Price	\$275 million	\$120 million
Firm orders	139	64



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contract has been put on hold, but the fact remains that the US Air Force depends critically on a large tanker force and that its 500-plus KC-135s are all candidates for the local Red Hat Society, coming up fast on their 50th birthdays. EADS was reported in April to be talking with Northrop Grumman about a partnership to help sell and build the refueller version of the Airbus A330 in the US.

Nonetheless, Europe's inroads into the Pentagon market continue. BAE Systems provides anti-radar equipment for the F/A-22 Raptor and F-35 stealth fighters. Eurocopter is busily selling helicopters to the Department of Homeland Security. EADS' CN-235 light transport is being adapted into a patrol airplane for the US Coast Guard and is being offered (in a joint venture with Raytheon) to meet a USAF requirement for a light cargo airplane. And, in a blow to the heart of US industry, AgustaWestland and its US partners beat Sikorsky in January to provide the next Presidential helicopter, callign Marine One, to be based on the Italian-British company's three-engine Merlin.

Another battleground is in Singapore, where the small but well equipped air force is close to a choice between two new long-range, precision-weapon-armed fighters: Boeing's veteran F-15 Eagle and France's Dassault Rafale. The two fighters last squared off in Korea, a contest that went to Boeing amid cries of foul from France.

A win for Rafale would boost the credibility of the formidable French fighter, and perhaps give Europe hope of saving a position in the very-high-dollar combat airplane business: because in that sector, the US is on the march. Sheer mass of numbers makes the new Lockheed Martin F-35 Joint Strike Fighter (JSF) very difficult to stop: the US Air Force, Navy and Marines

alone plan to buy 2,600 JSFs, which is nearly ten times France's planned Rafale fleet and more than four times the number of Eurofighter Typhoons to be bought by sponsors Britain, Germany, Spain and Italy.

Lockheed Martin and its JSF teammates and suppliers, looking at production rates as high as 200 airplanes

Lockheed Martin and the US government plan to conclude near-definitive agreements with those customers.

But Rafale is flying at the show, and in service with the French Navy; JSF is behind schedule and won't be in service until at the earliest, and then only with the US Marine Corps (who are running low

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a year, can move into commercial-style production and are promising a fully-equipped airplane – stealthy to boot – for \$10-\$20 million less than any rival. Most of the world's potential fighter customers – Australia, the Netherlands and Norway among them – have signed provisional agreements to take part in the JSF project, pointing the way to a virtual monopoly. Between now and December 2006,

on their accident-prone Harrier jump-jets). Export versions of JSF almost certainly won't be as stealthy as the aircraft flown by US services; and unless the customer wants to pay a lot of extra money, the airplanes will be tied into a computer-driven global support network run by Lockheed Martin, and will automatically be transmitting all kinds of data on the customer's operations back to the home

	F-15	Rafale
Date in service	1978	2003
Wingspan	13.05 m	10.8 m
Length	19.43 m	15.27 m
Empty weight	16.55 t	9.6 t
Maximum weight	36.75 t	24.5 t
Typical weapon load	Two 900 kg bombs, eight air-to-air missiles and three 2200 l fuel tanks	AGM-84K SLAM-ER missiles with 225 kg warheads
Standoff weapons	Six 350 kg guided bombs, six air-to-air MICA missiles and three 2000-litre fuel tanks	SCALP missiles with 300 km range and 450kg warheads
Stealthy characteristics	None	Classified "active cancellation" anti-radar technology
Equipment	APG-63(V)3 radar with new "active, electronically scanned array"	Built-in infra-red system to detect aircraft at long range

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The Falcon 7X, which made its first flight in May, is a typically untypical Dassault design. It's the first business jet with fly-by-wire flight controls



base. It's a bit like the GPS-equipped rental cars that rat you out to Avis if you exceed the speed limit. The last card in the fighter game has not been played.

Europe's also coming on strongly in the small but vital market for military transport airplanes. After spending decades in political limbo, waiting for six or seven (the number varied) European governments to sign the same contract at the same time, the 130-ton Airbus A400M, powered by four 10000 horsepower turbines spinning huge six-blade propellers, is well under way and due to enter service at the end of the decade. It's the Goldilocks solution: it can carry a much bigger load than Lockheed Martin's 50-year-old C-130 (and, importantly for armies, carries bulky things like armored vehicles and helicopters) but is barely half the size and cost of Boeing's C-17, which only the US can afford in any numbers. With the C-130's future threatened by US defense cutbacks, the A400M could suddenly find itself without a rival.

Next-generation unmanned vehicles will feature prominently at Paris, particularly since the US government's 2003 embargo on Paris participation has been reversed. Dassault is showcasing the Neuron stealthy unmanned combat air vehicle (UCAV) demonstrator, also sponsored by Sweden and indicative of Europe's desire to move into this new market. BAE Systems is quietly talking to Northrop Grumman about teaming on the latter's X-47B UCAV project, now that Britain has joined the US program at a government level. Northrop Grumman is also teamed with EADS to propose the big (and expensive) Global Hawk reconnaissance UAV for Germany and other European customers, while Dassault and EADS are leading a team to develop

the slightly smaller EuroMALE medium-altitude UAV.

Another new challenger from Europe is Dassault's Falcon 7X business jet, representing the French company's move into the top-level market for business jets – until now, the preserve of Gulfstream and Canada's Bombardier. The Falcon 7X,

Whether in large or small aircraft, manned or unmanned, military or civil, the stakes in aerospace have seldom been higher – and this year, the world's industry leaders will all be there to see it in person.

which made its first flight in May, is a typically untypical Dassault design. It's the first business jet with fly-by-wire flight controls (standard on modern airline jets) and its slender swept wing, exploiting the latest in computer-aided aerodynamic technology, not only looks fast but provides unmatched efficiency at high speeds: most of its rivals have to slow

down to attain their maximum range, resulting in long trip times.

At the other end of the scale, a certain topic of conversation will be the decision by Brazil's Embraer to build a new family of very small jets, both for private use and for emerging computer-controlled, on-demand air-taxi operations.

Believers in the idea of very small jet aircraft include industry giants General Electric and Honda. GE, which dominates the market for big airplane engines but has been relatively little represented at the small end of the business, teamed with the carmaker in 2004 to develop and market a jet engine that Honda researchers had been tinkering with since the 1990s. The two companies have just run their first jointly developed demonstrator engine, although so far no aircraft manufacturer has selected it.

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Written by Bill Sweetman
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	C-130J	A400M	C-17
Maximum weight	74.4 t	130 t	265 t
Maximum payload	21.7 t	31.5 t	77.3 t
Cruising speed	Mach 0.6	Mach 0.72	Mach 0.77
Cabin width	3.12 m	4 m	5.49 m
Can carry...	Blackhawk helicopter, M113 armored personnel carrier	UK Warrior fighting vehicle	An M1 tank
Can't carry...	Larger helicopters	A tank	Not much

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