Europe Embarks On $11-Billion A380 Gamble

Pierre Sparco/Toulouse, France

European governments’ involvement in the transport project’s funding could lead to a serious transatlantic trade dispute

The 555-seat A380 long-range transport, by far Europe’s biggest and most challenging aviation undertaking, is expected to curtail major airlines’ operating costs on high-density routes and give more credibility to Airbus Industries’ head-to-head showdown with Boeing in terms of market share, orders and revenues. However, Airbus’ archival dismisses the Europeans’ market predictions and asserted profitability as unattainable.

The double-deck A380, formerly known as the A3XX, which was launched on Dec. 19, is scheduled to make its maiden flight in the fourth quarter of 2004 and enter into service in March 2006. Airbus expects to achieve in the next few years a strong backlog comprising passenger A380-800s as well as all-cargo A380Fs and plans to produce an average 50 A380s per year by the end of the decade. According to the program’s schedule, the 250th aircraft will be delivered in 2011.

Boeing executives, however, reject the Airbus evaluated the merits of various concepts, including a single-deck aircraft, before freezing the A380’s configuration. Stretched-fuselage derivatives are planned for the next decade.

European consortium’s optimistic forecast for 500-seat plus long-range aircraft while the outgoing U.S. Administration has voiced serious concerns about the European governments’ involvement in A380’s funding.

Airbus shareholders, four governments and a dozen risk-sharing partners plan to jointly invest $10.7 billion to develop the mega transport and enlarge production facilities located in France, Germany, Spain and the U.K. About one-third of the program’s funding (exclusive of proposed derivatives such as the 656-seat A380-200) will be provided by the “Airbus countries” governments in the form of $3-4 billion low-interest, refundable loans while additional industrial risk-sharing partners, including Italy’s Finmeccanica, are expected to provide an estimated $1.9 billion.

According to European financial analysts, the weak euro is facilitating Airbus’ A380 funding plan and reinforces the consortium’s profitability targets. Airbus lists aircraft prices in U.S. dollars but its industrial partners’ developing, investment and production costs are specified in euros. The European single currency’s exchange rates against the U.S. dollar have the last two years gradually decreased to about $0.93, down from $1.16.

Late last month, the lame duck Clinton Administration warned European Union (EU) leaders that such state aid would distort competition, could lead to a serious trade dispute and possibly an international complaint with the World Trade Organization (WTO). In the last few weeks, U.S. Trade Representative Charlene Barshefsky repeatedly challenged Airbus’ funding plan which she believes could violate WTO rules. The explosive conflict has been defused on several occasions (AWE&ST July 26, 1999, p. 58).
In a three-class cabin configuration, the A380’s basic version (shown) will have 555 seats. Theoretically, the mega-transport could have more than 800 seats.

President Bill Clinton last month expressed strong concerns during a meeting held in Washington with French President Jacques Chirac and European Commission President Romano Prodi. According to national economic adviser Gene Sperling, Clinton sounded a warning about Airbus “loans on non-commercial terms.” The Airbus partners are being granted repayable loans, not subsidies, EU officials responded. “We are talking about refundable loans and [by] doing so, governments jointly share the [A380]’s risks. But such an arrangement strictly complies with the July 1992 EU-U.S. accord,” Airbus Chief Executive Noel Forgeard stressed. According to the 1992 pact, which covers 100-seat-plus commercial transports, governments are authorized to fund up to 33% of “commercially viable” aircraft programs in the form of fully reimbursable loans.

ALONG WITH FRANCE, GERMANY, the U.K. and Spain, the additional risk-sharing partners’ home countries are expected to significantly contribute to the A380’s development costs. The Italian government, for example, plans to grant low-interest loans to Finmeccanica to partly fund its 7% share in the program. Similarly, Belgium late last year ratified a multiyear plan to provide nearly 200 million euros ($180 million) to Flabe, an industrial consortium set to develop and produce wing components such as flaps and leading edge slats.

In the last few months, Airbus concluded conditional agreements with risk-sharing partners such as GKN Westland, Saab Aerospace, Stork Aerospace (Fokker Aviation’s parent company), Finavitec and Taiwan’s AIDC. Hurel-Dubois, a French engine nacelle/thrust reverser producer, also signed a memorandum of understanding in preparation to its participation in the program. However, Hurel-Dubois was recently acquired by Snecma and is expected to revise its aerostructure strategy and focus on its core businesses. In addition, Airbus failed to convince major U.S. or Pacific Rim industrial groups to join the program.

According to Boeing’s market analysis, the airline industry’s worldwide deregulation—and the resulting market fragmentation—as well as the traveling public’s marked preference for nonstop services are seriously narrowing the possible markets for the A380.

EADS’ and BAE Systems production facilities located in France, Germany, Spain and the U.K. will produce the A380’s main airframe subassemblies. In an innovative arrangement, fuselage barrels, wing boxes and horizontal tailplanes and vertical fins will be conveyed by sea to Bordeaux. Outsize trucks will then carry components to Toulouse, in southwest France, where the final assembly line will be located. In addition to a dozen risk-sharing contractors, Airbus Industrie partners are expected to be joined by Finmeccanica/Alenia Aerospazio. However, Italy’s work package has not yet been determined.
tential demand for ultra-high-capacity aircraft. Airbus forecasters nevertheless claim that major carriers in the next 20 years will order about 1,550 mega transports, including an estimated 300 freighters, valued at $343 billion. This market segment covers no more than 10% of aircraft units but 26% of the total market value, according to Airbus’ latest market survey. The A380’s catalog price is $216 million, at current economic conditions. “We will achieve superior profitability,” EADS Co-Chairman Jean-Luc Lagardere claimed. He stressed that the program’s development costs are realistic and will be met.

According to EADS Co-Chairman Manfred Bischoff, the potential market for A380-category aircraft is strong. “There is a market, a sufficient market [to achieve profitability] and this is why Boeing obviously seeks to launch the 747X Stretch,” he said.

Recently, Airbus also launched the 380-seat A340-600, scheduled to fly in the next few months, a move to complement the in-production 295-seat A340-300 and usurp the first-generation 747-200s. The A340-600 is expected to further exacerbate the Airbus-Boeing rivalry.

**AIRBUS’ OPTIMISTIC MARKET** assumptions about high-capacity aircraft played a decisive role in the supervisory board’s decision to authorize the A380’s go-ahead after reviewing commitments signed by six launch customers. Air France, Emirates, the International Lease Finance Corp., Qatar, Singapore Airlines and Virgin Atlantic Airways in the last six months signed commitments comprising 30 conditional orders and an additional 42 options.

In contrast with the 747’s launch—a formidable milestone in the airline industry’s growth that occurred in April 1969 with Pan American World Airways’ commitment to order 25 aircraft—the list of A380 launch customers does not include U.S. customers. However, FedEx and Atlas Air are believed to be considering the all-cargo A380Fs.

The Europeans’ launch base meets the criteria determined by Airbus’ shareholders when they authorized offers to potential customers in mid-2000, a consortium official pointed out.

Ironically, the supervisory board’s biggest difficulty last month was to forge a consensus on the aircraft’s name. A controversial proposal to retain the highly publicized A3XX designation was disregarded minutes before the formal launch announcement and replaced by the more conventional A380. According to an Airbus executive, the A380’s “8” symbolizes the aircraft’s double-deck cross section.

A cruise liner-like staircase is planned to facilitate the upper deck passengers’ boarding and deplaning. Airbus recently completed a full-scale mockup of the A380 to aid design of cabin interiors.

Airbus, which is jointly controlled by EADS and BAE Systems—they respectively own 80% and 20% of the Franco-based industrial grouping—is scheduled to evolve in the next few weeks into a long-overdue stock company temporarily dubbed Airbus Integrated Co. or AIC. During a political summit recently held in Nice, France, EU-member states agreed to jointly devise cross-border regulations paving the way for a long-awaited European stock company. Such a legal agreement, which is tentatively scheduled to be implemented in 2004, will provide a more efficient framework to multinational groups such as Airbus and EADS and facilitate streamlined company structures. In the absence of such a framework, EADS last year was incorporated in the Netherlands. The Amsterdam-headquartered holding company owns national units in France, Germany and Spain. AIC, however, is scheduled to be incorporated in France.

AIC’s revised shareholding arrangement is expected to reflect Finmeccanica/Alevia Spazio’s proposed decision to come closer to Airbus. According to EADS Co-CEO Philippe Camus, Finmeccanica executives have confirmed a plan to acquire a 5% stake in AIC in addition to becoming a risk-sharing partner in the A380.

The decision to launch the A380 also indicated BAE Systems’ plan to continue playing a major role in Airbus. “BAE Systems is committed to Airbus,” determined to continue to take an active role in its future—in which the A380 will play a major part—and benefit as a shareholder,” Mike Turner said. He is BAE Systems chief operating officer and a member of Airbus’ supervisory board.

Airbus’ growth has created a major impact on the participating countries’ economy and trade balance and it provides more than 50% of EADS’ turnover, workload and revenues. The A380 is expected to further strengthen such positive trends, consortium and BAE executives stressed. According to Forgeard, the newly launched aircraft will sustain up to 74,000 jobs in the European industry and an additional 22,000 jobs in the U.S. Today, an average of 30-33% of Airbus aircraft’s dollar value is provided by U.S. suppliers, vendors and engine manufacturers. Existing transatlantic links will be further strengthened by the A380, consortium executives pointed out.

Production facilities in France and Germany are scheduled to be significantly expanded to increase the current production rate by more than 400 aircraft per year and be ready for the A380. In northern Germany, EADS suffered from an unexpected setback when Hamburg’s court of justice approved environmentalists’ demand and vetoed a plan to construct new industrial buildings near a nature reserve near the Elbe. According to Bischoff, the ongoing legal battle and resulting delays will not affect the A380’s schedule.

In southern France, additional facilities are needed to install the final assembly line. The city of Toulouse and local authorities strongly support the aerospace industry (the region’s biggest employers) and recently agreed to significantly expand the airport’s industrial sites. The A380 will create 20,000 jobs in France, including more than 9,000 around Toulouse, Forgeard said.

**THE A380 WILL BE POWERED** by four 75,000-lb-thrust Rolls-Royce Trent 900 or IAE Engine Alliance GP7200 turbofans. Engine Alliance is a joint venture of General Electric and Pratt & Whitney and scheduled to be joined soon by Snecma and the French manufacturer in December agreed to invest “several hundred million” U.S. dollars” to become a 12.5%-risk-sharing partner in the GP7200, Sncema Chairman/CEO Jean-Paul Bechot said. Although the A380’s planned production rate will be “unimpressive,” the mega transport and envisioned derivatives are expected to remain in production for 30-50 years, Bechot noted.

Even though the A380 will lead airlines and airports into unchartered territory, Europe’s Joint Aviation Authorities and the FAA do not anticipate major difficulties during the certification process. In late 1998, both organic ultra-high-capacity would be based on regulations and will be regulations.

However, prior to the A380’s (as well 747X Stretch) many human factors—re extended flight management as many as 10% of airline space for a configuration—will affect flight attendants’ performances in physiological and mental.

Of historical note:

* Virgin Atl buy six A380

**JOHN D. MORROR**

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Virgin Atlantic's commitment to buy six A380s not only provided Airbus the numbers it needed to launch the program. It also is the first airline to endorse the consortium's vision of the mega-transport's potential to become a "cruise ship" in the sky.

Virgin's decision to order six A380s, plus options on a further six, gave Airbus commitments for 50 of the 555-seat aircraft that had been one of its launch target criteria. Virgin's A380s will be powered by Rolls-Royce Trent 900 engines, as will those ordered by Singapore Airlines, which owns a 49% stake in Virgin. Deliveries are set to begin in 2006.

The British carrier is the only A380 customer to date that has embraced Airbus' ideas for the aircraft's potential to revolutionize long-haul air travel. Virgin Chairman Sir Richard Branson has ideas of utilizing the additional space available on the A380's lower deck to create "a new flying experience for our passengers." Already known for innovations such as double sleeper seats and infill massages and manicures for first-class passengers, Sir Richard is considering a raft of amenities for the A380. Concepts under consideration include lounge spaces for economy passengers, including gyms, bars and games arcades; children's play areas; duty-free shops; and food outlets. For business and first-class passengers there would be conference rooms and private cabins.

Virgin has ambitious plans for amenities on its A380s beyond spacious first-class cabins (as depicted in this Airbus mockup), including gyms, bars and games arcades.

In addition to Virgin, three of the other A380 launch customers—Emirates, Singapore Airlines and Qantas—plan to employ the aircraft on routes to and from London Heathrow. Airport operator BAA estimates it will cost roughly $200 million to make necessary modifications, including possibly widening exits between taxiways and runways.

Airbus has been keen to secure a third European customer for the A380 in addition to Virgin and Air France. Consortium officials are understood to be in close touch with Lufthansa over a possible purchase agreement. Industry sources say that
World News & Analysis

while the German carrier is willing to commit to buying the A380 in principle, it is not ready to specify an exact number of aircraft.

Negotiators are looking for a solution in which Lufthansa would commit to the A380 in the very near future, still taking advantage of launch customer discounts, while specifying its requirements at a later stage, according to industry sources. Lufthansa Chairman and CEO Jurgen Weber has indicated the airline could already use an aircraft the size of the A380 on several routes from Frankfurt, including to New York and Singapore. In addition, the carrier is also interested in the freighter version for its Lufthansa Cargo subsidiary. So far, only Emirates has committed to the all-cargo version.

Airbus Chief Operating Officer Gustav Humbert said the manufacturer expects to have news on the freighter version soon.” Cargolux, FedEx and Atlas Air are known to be interested.

Wall Street on A380: Show Us The Money
Anthony L. Velocci, Jr./New York

Wall Street analysts reacted to Airbus Industrie’s launch of the A380 with skepticism, doubtful the program’s likely production costs or the market’s size will allow the project to generate a profit for the European consortium.

Financially, they believe sales will fall short of Airbus’ projections and put Airbus as well as its majority owner—EADS—under considerable strain. “Contrary to what Airbus would have us believe, the airport infrastructure simply is not in place to make the A380 a hot seller,” Wasserstein Perella Securities analyst Joseph D. San Pietro said. For example, he noted that the superjumbo jet would be unable to use Los Angeles International Airport.

Airbus expects to achieve an internal rate of return on the A380 program of 20% and predicts breakeven by 2009. Analysts question these forecasts.

JSA Research analyst Paul Nisbet also expressed skepticism. He thinks limited demand for the oversized commercial jet—partially satisfied by 747X aircraft—will leave years of slim pickings for the A380 and postpone “probably for decades,” recoupment of the initial investment in the superjumbo. He expects perhaps another 30 orders before the first delivery in 2006. “With this well-spread-out order book and probably slowly increasing demand, it could be 2009 before the annual production rate of the A380 will rise above 1 a year,” he said. “All the while, we expect that Boeing will concentrate on building market share in the 85-525 passenger market, leaving the 525-plus market to Airbus, at least for the time being.”

Nisbet thinks at least another $8 billion will be required for facilities, tooling and inventory buildup during the initial production phase. “Airbus contends the tooling costs are included in the R&D estimate, but I find this hard to believe,” Nisbet said. He noted that Boeing had tooling costs for the 777 program of around $3.5 billion. He suspects EADS will have to find financing for as much as $12 billion of the potential $20 billion to cover R&D and other program negative cash flow over the five-year gestation period.

By Airbus’ estimates, the project will break even after the sale of about 250 aircraft. “Assuming this includes repayment of government aid and amortization of other capitalized costs, each of the first 250 jets would have to carry in its price structure more than $60 million of amortized costs,” Nisbet said. “Considering this and normal 25-30% price discounts, the A380 manufacturing operation will have to be extremely efficient to provide the [financial] performances Airbus is forecasting for the program.”

Boeing Shuns Very Large Jets While Aiming for Longer Range
Bruce A. Smith/Los Angeles

Launch of the A380 program is not altering Boeing’s long-term view of where demand will be greatest in the commercial transport market over the next 20 years, or company plans to develop an aircraft series to serve that market segment, according to Boeing officials. Those plans involve a $4-billion program to develop a family of 747 derivatives that would include:

- A 747X that would be about the same size as the current 747-400, but have a modified wing and range of nearly 9,000 naut. mi.
- A 747X Stretch that would carry up to 522 passengers and have a range of more than 7,700 naut. mi. Also equipped with the new wing design, it would be the first overall fuselage stretch for the 747 program.
- A 747X Freighter. Versions of both 747X models. Boeing officials said the stretch freighter would have 23% more payload volume than the 747-400 freighter and be able to carry 320,000 lb. of cargo, but that there is also interest in the smaller 747X freighter because of its longer range, point-to-point capabilities.

- The Longer-Range 747-400, which will be the same size as the 747-400 but have improved payload-range capabilities. The program was launched in late November with orders from Qantas Airways for six aircraft, with initial deliveries in 2002.

Boeing officials were authorized to begin offering new 747 models to airlines last May, but, other than the sale to Qantas, no orders have been received to date. Company officials noted that with a significant market requirement for such large aircraft not expected to emerge before 2005, and with a shorter development cycle for derivatives compared with all-new aircraft, there is still time for airlines to monitor market developments before placing a 747X order.

They indicated that a reasonable timeframe for an initial 747X order, possibly a freighter, could be within the next 12 months.

The 747X series and the Longer-Range 747-400, formerly called the 747-400ER, would combine with Boeing’s expanded 777 series to provide long-range capabilities with payload capacities ranging from 300 to more than 500 passengers.

Chairman and CEO Phil Condit said there is a “high probability” Boeing will
develop the 747X model. He said the company is not surprised by Airbus Industrie's A380 launch because Boeing continues to look on a greater requirement for aircraft to support point-to-point service and higher frequencies.

As evidence of the trend, Condit cites record 777 sales last year, during which Boeing received 115 orders for the large twinjet to boost the program order total to 561 aircraft. "We remain convinced that fundamental growth in the market will be point-to-point," Condit said. "We think that's one of the reasons we had such a good year with the 777."

Gordon McHenry, Jr., director of market development for Boeing Commercial Airplanes Group (BCAG), said the company is focused primarily on the 300-400-seat size range within the upper end of the commercial transport market.

“We look at the analysis every day and nothing has really changed,” McHenry said. “The trend says that the strongest demand is in the longer range, large-intermediate sized airplane like the 777. The next strongest demand is the upper end of the market is in the 400-seater. That's where we're focused.”

Until the 777 became available, Condit said, about half of all 747s sold were primarily acquired for their long-range capabilities rather than their large size. He continues to see the market for very large commercial transports to serve major hubs as "relatively limited."

John Roundhill, vice president for product strategy and development for BCAG, said company work on a large new aircraft go back to late 1991, when Boeing formed a group to study an all-new double-deck transport that could carry 600 passengers. That effort included work with individual Airbus member companies.

In 1995 and 1996, Boeing began looking at a possible 747-500X and 550-passenger 747-600X, but those studies also were abandoned. “We needed to find a way in which we could produce a very efficient airplane family without going all the way to a brand-new airplane, and that's what the 747X is,” Roundhill said.

The standard 747X—with a slightly longer fuselage than the 747-400 because of the wing root design—would be able to fly for 18 hr. over a distance of up to 8,875 naut. mi. with 430 passengers in a three-class configuration.

The larger 747X model would have a stretch of 31.5 ft., hold up to 522 pas-

engers and have a 7,785-naut.-mi. range. A key to both models would be a highly modified 747 wing that would have nearly 1,000 sq. ft. more surface area and 8% greater span than the 747-400. Design speed would be Mach 0.86.

The new design takes the 747 wing and engine locations, and moves it outward 105 in. The wing section from the inboard engine to the fuselage would be completely recon-toured to reduce drag and would use advanced 777 materials.

The trailing edge will incorporate the wedge-type design used by Douglas Aircraft Co. on the MD-11, which alone can decrease drag by 1.3%, Roundhill said.

David Anderson, director of commercial airplane product development for Boeing, said the wedge design, which would go 80-100% across the trailing edge of the wing, has been flight tested on a 747-200, as have two wingtip designs.

**A BASELINE FOR** the 747X wingtip is a raked tip design identical in basic planform to the wingtip on the 767-400, but scaled up for the 747. Boeing also is continuing to study a large blended winglet. Anderson said both designs appear to provide about the same performance advantage, although each has its own particular advantages. The blended wing, for example, would enable the aircraft to have a little shorter wingspan.

The 747X wing also would have single-slot flaps inboard to help reduce approach noise and complexity of the overall design. Anderson said the larger wing provides ample area to achieve the required approach speeds. The aircraft would be powered by new engines from the General Electric/Pratt & Whitney Engine Alliance or Rolls-Royce, with initial thrust ratings in the 68,000-70,000-lb. class.

The new models also would have new main landing gear, strengthened fuselage sections and space in the overhead section of the aft cabin that could be used for crew rest, galley-carry storage or possibly passenger sleeping berths. Use of that overhead space would free the main-cabin floor for 10-20 more passenger seats.

The Longer-Range 747-400 is intended to provide increased range or payload-carrying capability. It has an additional 35,000 lb. of takeoff weight to bring that aircraft's maximum takeoff weight to 910,000 lb. The added capability translates into about 435 naut. mi. of additional range, or 15,000 lb. more payload.

The increase can be used for cargo or a full load of 416 passengers in wind conditions that would not allow a standard 747-400 to make a direct flight over the same route with a full passenger load.

The increase is made possible with use of the stronger 747-400 freighter wing and strengthening of the fuselage and landing gear. In addition, an auxiliary fuel tank is installed in the forward underdeck cargo area. The tank, and another optional fuel tank, can be removed to provide additional cargo space.

The cockpit of the derivative maintains the same pilot type rating as the 747-400, but has been upgraded with such systems as flat panel primary flight displays, flight management computers and a new vertical situation display. The cabin design uses 777 interior architecture.