A veteran of big air shows looking at the displays at Le Bourget last week might have concluded this was something less than a landmark event. But just because there was relatively little new hardware does not mean it was dull. Coming as the Paris air show did soon after the two big civil airplane builders set out on radically different paths for the 21st century, there were some startling contrasts and significant debates.

The nine-day event began with a bang when GE Chairman-elect Jeffrey Immelt stated that GE in trying to acquire Honeywell had made its "best offer" to the European Commission. It was still far short of what the commission required. Immelt said EC competition czar Mario Monti was paying more attention to the competition than to what is best for customers.

Never afraid to speak his mind, Boeing Vice Chairman Harry Stonecipher told Le Monde that Airbus opposed the GE merger with Honeywell. M'ai non, responded Airbus Chairman Noel Forgeard and EADS Co-CEO Philippe Camus in separate press conferences. Both said they had no objections to the merger. While he apologized to Forgeard, Stonecipher told me later that his comments had prompted Airbus to publicly declare its support. Whether provoking Airbus' public response had been his clever intent may be known only to Stonecipher.

Later in the week, Boeing and Airbus again took center stage, but this time it was to joust over their commercial aircraft offerings. Boeing took the opportunity at Le Bourget to show a scale-model of its Sonic Cruiser. But Boeing Commercial Airplanes chief Alan Mulally said the company has yet to decide on the fuselage diameter. And for competitive reasons he said, the engine and wing configuration shown on the model was not exactly correct.

Meanwhile, Airbus officials were routing the newly launched A380 mega-transport. As the show neared its midpoint, Airbus made its biggest coup. While Boeing had little to say about new orders, Airbus announced plenty—including an order from ILFC for 111 Airbus aircraft (including 10 A380s) worth some $8.7 billion.

Details of United Airlines' foray into corporate aviation began to unfold, as Stuart Oran, president of the airline's business jet division, bought 35 Gulfstream IV and Vs worth $1.25 billion and placed a letter of intent for twice that amount with Dassault Aerospace for 100 Falcon Jets. While United initially will offer fractional ownership, the airline will eventually offer point-to-point travel and a corporate shuttle with 400 aircraft.

Two top Bush Administration officials—Transportation Secretary Norman Y. Mineta and Commerce Secretary Donald L. Evans—attended this year's show. Mineta came to talk about reducing airline delays and congestion and Evans to hear complaints about export licensing. After discussions with Evans in Paris, Aerospace Industries Assn. President John Douglass said he sees the Administration tackling the export licensing reform issue fairly soon. Douglass also said the European aerospace industry has established "Star 21," a panel to parallel his Presidential Commission on Aerospace, now being formed to address challenges facing the industry.

As with recent Farnborough and Paris shows, it appears the regional jet and business aircraft makers had the most good news to report about the health of their industry. Bombardier, Embraer and Fairchild Dornier all reported dramatic sales increases. And Raytheon Aircraft, Gulfstream, Dassault, Bombardier and Cessna reported big bizjet orders.

On the defense side, except for Israel's follow-on buy of Lockheed Martin F-16 fighters, the military aircraft builders were quiet at the show, reflecting the downward spiral in budgets. The extended plans to build the Airbus A400M military transport did advance when a memorandum of understanding was signed by some European countries to develop and acquire 212 of the turboprops.

It was in the space realm where perhaps the most interesting new hardware could be seen. Khrunichev showed off its Baikal, a 93-ft.-long, winged, reusable booster.

This year's Paris air show provided the aerospace industry with a perfect venue to exhibit commercial, military and space technology, and to discuss—and trade barbs—about this global business. May the 45th Paris air show, coming in the airplane's 100th anniversary year, be as interesting and productive.

David M. North
Editor-In-Chief

www.AviationNow.com/aws
Airbus and Boeing Snipe Over Speed Versus Size

PIERRE SPARACO/LE BOURGET

Airbus announces $14 billion in orders for 175 aircraft. Boeing says deliveries, not orders, determine leadership.

They are notorious for bickering at air shows, and this year’s gathering in Paris was no exception. But there was one thing on which Airbus and Boeing and the three big engine manufacturers were found to agree with startling unanimity. The airline industry, they insist, is not entering a downturn.

Is it worthwhile thinking about bailing out a sagging market with happy talk? As the manufacturers profess confidence, the major U.S. airlines are in a no-great year: May be turning into a poor one, financially (see p. 50). And airlines around the world are letting some orders on new aircraft projects go unsold as carriers remain uncertain about the softening global economy.

Fair, Airbus and Boeing forecasters share confidence that airline traffic will continue to grow at around 5% annually over the next 20 years. And, as far as Airbus, there is news here that would support a glass-half-full view of the world.

"Airline earnings remain strong, although there are some difficulties in the U.S., capacity imbalances are minimal and the [airline] industry can be expected to remain healthy in the next two years," Gerard Laviotte noted. He is the outgoing president of CFIU, an international association of General Electric and SNCMA. Laviotte added that airline and engine manufacturers have not posted order cancellations. Similarly, Airbus and Boeing forecasters share confidence in a 5% per year traffic growth in the next 20 years.

Although the rival European and American trans- port manufacturers remain optimistic about future sales, their divergence regarding the long-term need was illustrated in the last few days. The Europeans are more than ever convinced that the growth of traffic and the attendant con- gestion at main hubs signal the need for ultra-high-capacity transports. In contrast, Boeing maintains that the public’s preference for nonstop services will strengthen the need for mid-sized aircraft.

The International Lease Finance Corp. (ILFC) top executives last week will continue to express uncompromised faith in the market’s sustained robustness: They signed a contract covering Airbus’ A340-600s at $87 billion, at “a catalog price.” ILFC’s order includes 10 A340 megasports, 80 A320-series and 21 A330-series twinjacks. The A380 contract comprises five previously committed 353-seat aircraft and five more aircraft in all-configuration. ILFC also acquired an A340-300 previously scheduled to be delivered to troubled Sabena Belgian World Airlines. Among others are French firm, ILFC President/CEO Steven J. Udvar-Hazy pointed out. Chief Operating Officer John L. Plueger reinforced: “We view this order as critical because it takes ILFC up to 2009.”

New York-based aviation carrier JetBlue signed an order for an additional 30 162-seat A320s, Brazil’s TAM announced a commitment to buy 20 117-seat A318s, Royal Air Maroc acquired four 185-seat A321s and Air France inked a contract covering 10 previously committed Engine-powered A380s and optioned four more aircraft.

BOEING ONLY UNVEILED A JAPANESE AIRLINES ORDER FOR THREE MORE 777-200ER TWINJACKS.

This disparity in orders left the U.S. aircraft manufacturer unconfident. "Although orders are a great start, deliveries are the most important measure: They represent completed transactions and determine market leadership." said Didier Belymani, Boeing Commercial Airplanes executive vice president for sales, pointed out. In 2006, Boeing delivered 489 commercial transports, well ahead of Airbus’ 311 deliveries, he noted.

Nevertheless, according to Airbus CEO Christophe Noël Fregard, the Europeans are now on par with their U.S. competitor. “Over the past three years, we have consistently obtained roughly half the market,” he pointed out. Airbus’ combined production rate is increasing and is scheduled to achieve about 430 aircraft per year by 2003.

In an innovative assessment of rival product ranges set to further exacerbate the competition, Belymani claimed that Boeing offers superior coverage in the long-range aircraft market with the complement of 500-seat 777-747/748. "Airbus has a 200-

"It would be hard to accept a higher fuel consumption than that of the aircraft you are replacing. The airlines' expectations are economics and environment-friendly aircraft—thus the Sonic Cruiser is more public relations than engineering," John Leahy reported. He is Airbus executive vice president for customer affairs.

According to Roundhill, the Sonic Cruiser will not stop the demand of new conventional aircraft but will "reshape the market" in a significant way. Today, he said, Boeing is working with all airlines interested in participating in the ongoing exploratory phase and does not plan to form a team of a limited number of leading carriers. "Beyond ongoing one-on-one dialogues, after determining the Sonic Cruiser's basic geometry, fewer airlines will be invited to participate in the detailed design, Roundhill said. Theoretically, the basic Sonic Cruiser configuration will be delivered to a family of aircraft. Belymani characterized the proposed Sonic Cruiser as "the ultimate fragmenter." Other developments in the commercial transport market last week included:

- A330 risk-sharing partners. Saab confirmed an agreement with Airbus to develop and produce 31-ft-long wing subassemblies and the outer wing's leading edge. France’s Latécoère signed a risk-sharing contract covering a nose section of the mega-transport.

- New type rates. According to Michelin executives, aircraft manufacturers, airlines and aviation authorities jointly roll a unified strategy to accelerate the replacement of in-service bias tires by radial tires. This could significantly increase flight safety, Pierre Desmares, chief executive of Michelin airline tire division, said.

Vought Quantifies Sonic Cruiser Potential

ANTHONY L. VECCOLA, JR./LE BOURGET

The potential market for a high-speed civil transport like Boeing Co.’s proposed Sonic Cruiser probably exceeds 500 aircraft in the next 10-15 years, according to a market assessment by Vought Aircraft Industries Inc.

Its projection is based on input from a variety of sources, including airlines and independent aviation market forecasters within the last 60 days. Prior to that time, Vought—the world’s largest independent producer of aerostructures—had only a "gut feeling," which it set out to validate or disprove. As a final check, the supplier turned to Boeing itself, which basically agreed with the assessment Vought developed.

The 500-plus forecasts generally is in line with loosely based projections that some industry analysts have developed on their own. "The state of commercial air transportation today is ripe for a point-to-point aircraft like the Sonic Cruiser," Vought President and CEO Gordon Williams said.

Other major suppliers and several major airlines attending the Paris air show here agree—assuming Boeing can produce a product that meets the performance characteristics it thinks it can deliver. "Airline customers are telling us Boeing could sell all the Sonic Cruisers the company could make if it met their specifications," said an indus-
try official whose company supplies major subsystems to global carriers.

"Anytime you can shave off time to travel long distances, that is a definite competitive advantage and the reason we are very interested in Sonic Cruiser," said Yap Kim Wah, senior vice president of marketing services for Singapore Airlines. "If Boeing could produce a new airplane that saved 1–2 hr. on a transpacific, point-to-point route, that would be very significant, especially for business travelers. But on the operational side, clearly the economics have got to be right. Airlines could charge some premium for seats on an aircraft like the Sonic Cruiser, but how much of a premium is still an unanswered question."

Messier-Dowty, which is seeking to land its first contract on a Boeing commercial airplane program, is in preliminary market studies with the airframe manufacturer. "If they can deliver the economics, we're confident the market is there," said Group Vice President Kenneth G. Laver.

A senior executive of a major European-based carrier indicated his airline would be interested in purchasing the equivalent of the entire production run for the first several years if the Sonic Cruiser is launched. "Long-distance travelers would prefer traveling point-to-point, which is ideal for a high-speed civil transport," he said. "For that reason, we think it has the potential to revolutionize commercial air transportation worldwide."

LIKE MANY OTHER FIRST-TIER suppliers, Vought is trying to position itself to be a player on the Sonic Cruiser, which many industry observers expect will be launched next year. "If we thought the production rates would remain solid for 5–10 years, we would hock our souls to be part of that program," Williams said.

The company plans to invest $40 million in each of the next several years in manufacturing and other technologies to reduce its costs, improve cycle times and raise quality levels. Much of the investment will focus on knowledge-based engineering, including converting all product development and engineering to 3D from 2D and going all-digital within two years. Chief Operating Officer Tom Risley said this would enable Vought to build parts in more repeatable processes and produce more high-quality parts from the same material stock. Other areas where Vought plans to invest heavily are automation and materials.

Privately-held Vought is owned by The Carlyle Group, which purchased the operation from Northrop Grumman in July 2000. Northrop Grumman owned it since 1994. Vought already is a major supplier to Boeing Commercial Aircraft Co. and a risk-sharing partner with Gulfstream Aerospace Co.; it designed and builds the wings for the GV ultra-long-range business jet.

"We slipped in the last few years—we're not the best in every area, but we have a plan on how to get there," Risley said. That plan is an outgrowth of an eight-month study to identify Vought's technical strengths and weaknesses.

GULFSTREAM'S VICE PRESIDENT OF MATERIAL, Vincent J. Hrenak, said one of those weaknesses was their processes. "They weren't repeatable," he said. In addition, Gulfstream thinks Vought "has a lot of room for improvement in its supplier relationships. That's critical because Gulfstream requires 91% of the work it outsources to be delivered on a just-in-time basis."

Still, Hrenak said Vought has made a lot of progress in the last 18–24 months and is considered a valuable partner, in large part because of its implementation of lean principles. Vought is probably as far along on lean as any aerostuctures supplier, he said. "They've become very process-oriented."

Observed Risley, "We produce a lot better quality than we did two years ago, but it's still not good enough."

Gulfstream, Dassault Launch United Bizjet

MICHAEL A. TAVERNA/LE BOURGET

The FNX will feature 26% more range, shorter field length and a lower Vref speed than the 900EX. Its new wing will yield a double-digit improvement in lift-to-drag ratio compared to existing Falcons.

UAL disclosed initial orders from Gulfstream and Dassault Aviation for its new fractional ownership program and fleshed-out its ambitions for the venture, as Dassault unveiled a new top-of-the-line bizjet model.

As revealed last week in A\&ST, UAL said it would purchase 58 Gulfstream GIV-SPs, GV-Ss and GV-SPS worth $1.25 billion, including options, to fill the top end of its new business aircraft fleet. Deliveries, which include 35 firm units, will begin in the first quarter of 2002 and extend through 2006 (A\&ST June 18, p. 94).

UAL also concluded a preliminary agreement with Dassault for 100 Falcon Jets worth up to $2.5 billion to meet the medium- and transcontinental-range requirements of the fleet. Delivery of these aircraft, which include 30 firm and 50 option Falcon 2000 EXs and 10 firm and 10 option Falcon 900 EXs, are to start at the end of next year and extend into 2007. The agreement is expected to be completed "in the next few weeks," said Stuart Oran, who heads up the new operation, dubbed United Bizjet Holdings for now.

Oran said he expected to sign off shortly on arrangements for one or two other purchases to round out the fleet, which is to cover the full range of capability from $6–7 million light jets to ultra-long-range GV class models. About 20 aircraft are set to be in operation by the end of next year; 200 by 2006. About one-third will be Falcons. BBJ- or ABJ-sized jets could be added for a pending corporate shuttle service. Charter, fleet management and business-aviation/airline linkage services are also planned.

Meanwhile, Dassault took the wraps off a very-long-range, high-speed model that
PARIS 2001 REPORT

will allow the manufacturer to fly long intercontinental routes like New York-Honolulu, Paris-Tokyo or San Francisco-Buenos Aires presently served by the GV and Bombardier Global Express.

The new model, code-named FNX, will combine the three-engine design and cabin of the Falcon 900, lengthened by 8 ft. for added capacity, along with a highly swept advanced wing, new powerplant, fly-by-wire flight controls and the Easy PC-like flight deck being developed with Honeywell (AWEST May 7, p. 77). It is expected to make its maiden flight in late 2004. The FNX will have a range of 5,700 naut. mi. and a speed of Mach 0.9, the highest in its category, but a relatively “classic” shape not significantly different from existing aircraft. Charles Edelstenne, Dassault’s Chairman/CEO, said the company had received over 20 deposits for the new model in the first week after it was unveiled.

Dassault COO Bruno Revellin-Falcoz said engineers had studied other options, including transonic or low supersonic speeds and forward canards, but decided that by staying with a conventional approach they could obtain the best tradeoff between cost and performance. Revellin-Falcoz said the new wing, which makes significant use of composites, will offer an aerodynamic performance improvement of about 30% compared to existing aircraft. Engines for the new aircraft have yet to be selected. The choice will be between Honeywell’s AS905 and the Pratt & Whitney Canada PW 306.

UAL will operate its fractional ownership program along roughly the same lines as established players like NetJets, although initially the service will be available only in the U.S. About 10% of the aircraft operated will belong to a core fleet to handle peak travel requirements, in conjunction with charter agreements.

According to Oran, the business jet unit was set up to take advantage of growing demand for bizjet services among its bread-and-butter corporate travel customers. Three-quarters of corporate flight departments surveyed by UAL preferred to establish business aviation links through a scheduled carrier, because of the operational/training and maintenance/support capabilities airlines can offer. Moreover, the survey found, one-third of corporations who did not express an interest in fractional ownership programs said they would be interested if there were an airline connection.

To avoid union and quality problems that have beset UAL’s United Airlines unit, United Bizjet Holdings will be entirely separate from the airline, with a dedicated staff primarily from the business aviation and fractional ownership sectors. The operation is expected to require about 1,000 pilots and 300-400 management and support personnel by 2006. Oran said UAL had concluded scope clause waivers with the carrier’s three major unions, and determined that none were necessary for two others.

GULFSTREAM PRESIDENT/CEO WILLIAM BOISTURE said that combined with the acquisition of Galaxy Aerospace, concluded on June 5, the UAL contract would increase the company’s backlog of unfilled orders to $8 billion. Gulfstream last week signed a strategic revenue-sharing agreement with former Galaxy parent company Israeli Aircraft Industries under which the two firms will share profits and risks from its new Astra XP and Galaxy model, now redesignated the G100 and 200. Results are “not expected to be material” this year, but are to be significant in 2002, Boisture said.

IAI will continue to build the two aircraft and provide engineering support for future Gulfstream designs. Gulfstream will be responsible for completions and product support, including older Westwind and Astra models. Boisture also indicated Gulfstream planned to set up a support facility and to take other measures in Arab countries to prevent a “backlash” against its products related to the Israeli connection.

In other Paris news, TAG Aeronautics placed an order for five additional Bombardier Continental business jets, bringing its total on order to 10. The aircraft will be marketed in the Middle East and Arab region, which TAG represents. The Canadian company also announced it would jointly set up a two-bay factory service facility in the United Arab Emirates with Execujet Aviation Group and Alpha 55 of Dubai to serve the Middle East market (AWEST Nov. 22, 1999, p. 25). The firm also said it would undertake a feasibility study to test the viability of an Asian charter network.

David M. North contributed to this article from Le Bourget.
Europe Nears Contracts For A400M Transport, Meteor

PARIS 2001 REPORT

An A400M contract is expected to be signed before the end of the year as European defense ministers reaffirmed their commitment to the program, pledging to acquire 212 of the military transports.

French Defense Minister Alain Richard said the governments agreed to firm procurement numbers and "provisional maximum price" for the aircraft, which he declined to reveal. Industry has advertised an $80-million price tag for a basic A400M. The ministers also stated their desire to sign a contract by September with Airbus Military Co. (AMC) for development and production of the transports. But there were question marks still hanging over the program, following the signing ceremony at the Paris air show last week. The agreement underlined the problems associated with Europe's largest joint military procurement to date.

The recently appointed Italian defense minister was unable to sign pending parliamentary approval. But Italy, which recently elected a new government, reaffirmed its plan to acquire 16 A400Ms of the 212 total. Portugal, which rejoined the project early this year, will not formally sign until September and also faces a parliamentary approval process. Portugal intends to buy three A400Ms.

France Committed to 50 Aircraft

Spain for 27, the U.K. for 25, Turkey for 10 and Belgium for eight, of which one is destined for Luxembourg. Germany has signed up for the largest single order, 73. But it has yet to figure out how it will pay for all of them given the German budget situation. And the total number it will actually buy is still in doubt. Germany is looking at deferred options. AMC officials say they have offered financing terms to potential customers who wish to defer payments, but this would ultimately be more costly and may result in a smaller acquisition. Furthermore, such a financed procurement may not be possible under German law.

Price and payment terms still have to be negotiated with AMC. Industry officials believe that September is the earliest possible date a contract could be signed given the political processes which still have to be completed in several nations. But they do not expect that it will slip beyond year-end. Nonetheless, AMC officials welcomed the agreement as a sign of the willingness of the partner nations to find a common solution that would allow them to close the deal and launch the program.

Defense ministers from France, the U.K. and Sweden also signed an agreement for the development of the Meteor beyond-visual-range missile. But Spain, Italy and Germany still have to complete internal approval processes before they can sign. British Defense Minister Geoff Hoon said he expected the three nations would be ready to sign in the next few weeks. The U.K.'s Defense Procurement Agency has the lead for the project, and Hoon said a contract would be signed with prime contractor MBDA "towards the end of the year."

Hoon said the contract will include four "tightly defined" break points, or key milestones, tied to specific technical achievements. These milestones will be subject to an independent external evaluation, he said, and if they are not met, the partner nations can terminate the contract and recover monies paid. Alan Garwood, co-chief operating officer of MBDA, said contract negotiations are at a "very advanced" stage.

The missile is intended to equip the French Rafale, Swedish Gripen and four-nation Eurofighter. Garwood said this meant the missile would be integrated onto more than 1,000 aircraft, which would give MBDA the kind of mass its U.S. competitors have. MBDA views Meteor as one of its core products along with the Storm Shadow/Scalp stand-off cruise missile which is on track to enter service next year. In addition to the air-launched version, MBDA is developing a land attack variant of the missile, dubbed the Scalp Navale, to meet a French Navy requirement. MBDA is looking for a project definition contract for Scalp Navale, which could be launched from surface ships and submarines, in mid-2002. Garwood said the missile could be ready for service by the end of the decade.

Meanwhile, Portugal formally joined the NH-90 program with a commitment to buy 10 of the helicopters. Portugal joins France, Germany, Italy and the Netherlands in the program.

On the transatlantic front, Northrop Grumman and EADS advanced their partnership with two agreements signed at the air show: The companies agreed to work together on finding a common solution to NATO's Airborne Ground Surveillance (AGS) program. The move is intended to promote early convergence of

ON THE WEB

To read more about the A400M, visit www.aviationnow.com/military
two parallel efforts underway—the U.S.-led NATO Advanced Transatlantic Radar (Natar) and the French-German-Italian Stand-Off Surveillance and Target Acquisition Radar (Sostar) projects. Northrop Grumman is a major player in the Natar effort, which is based on the U.S. Joint STARS programs, while EADS has a 28% share of the Sostar project as does Thales.

The two companies have formed a working group to jointly study a common systems level architecture for NATO AGS, which is one of the alliance's most pressing requirements. Thomas Enders, head of EADS' Defense and Civil Systems Div., said the cooperative effort was open to other companies involved in AGS work, including Thales and Raytheon.

EADS and Northrop Grumman also agreed to collaborate in the sensitive field of electronic warfare systems. Ralph Crosby, president of Northrop Grumman's Integrated Systems Sector, said there have been strong statements of support within governments for cooperative efforts "in this difficult medium." The agreement, which focuses on joint marketing of existing and new electronic warfare products, will act as a test of this political willingness to cooperate and help define the boundaries in practice.

Enders said the two new agreements represented real test case scenarios for allied governments. Rather than have governments tell industry what it can't do, "let's tell governments what we can do and what savings transatlantic defense cooperation can bring." He noted that there have been lots of "principled after-dinner speeches on sharing technology, but nothing is done. You need concrete programs."

"It's a test of the American Administration, for sure," Enders said. "But it will be a test for European governments, as well."

There was little progress, however, on tying up several loose ends as a result of the recent wave of consolidation within the European defense sector. The merger of Alenia Marconi Systems and Aerospatiale Matra Missiles with Matra BAe Dynamics into what is now called MBDA was in clear evidence at the show. Although the deal is still awaiting formal governmental clearances, they are expected shortly. MBDA had hoped to include both major German missile-makers—LFK and BGT. But while LFK will be merged into MBDA within the year, negotiations to add BGT, the missile subsidiary of Diehl, to the group have been suspended. "Sometimes you can't find a common denominator, and that was the case with Diehl," said an EADS executive.

One of BGT's main products is the IRIS-T, a direct competitor to MBDA's Asraam in the short-range, air-to-air missile market. A fourth series of flight evaluations of the IRIS-T was completed this past April, involving separate tests of the missile from an F-4. BGT officials said live, guided firing tests of the missile, equipped with an imaging IR seeker, could begin by the end of the year.

Canada, Germany, Greece, Italy, Norway and Sweden intend to purchase the missile for their Eurofighter, Tornado, AMX, Gripen, F-16 and F/A-18 aircraft. BGT officials said IRIS-T could also be despatched to the internal weapons bay of the Joint Strike Fighter. A production agreement is expected to be signed by the six nations in early 2002 with first missile deliveries set for the end of 2003. BGT is also pursuing sales in Spain, Switzerland, Finland and South Africa.

MBDA's Asraam appears to be back on track in the U.K. following British Defense Ministry concerns over the missile's performance in clouds. A company official said the missile was successfully tested in "severe cloud clutter" on May 22 at the U.S. Air Force's test range at Eglin AFB, Fla. The production standard missile scored a direct hit on a target drone performing a high G maneuver at Mach 0.9. "The test demonstrated the flexibility of a software-based system and how we can make changes quickly to adapt to problems," the official said.

ASRAAM FIRING TRIALS ARE EXPECTED to be completed by 2003, and the missile is scheduled to enter service later that year. The British Royal Air Force and the Royal Australian Air Force are acquiring it.

Meanwhile, the merger of the aerostructures and military aircraft activities of EADS and Finmeccanica's Alenia Aeronautica is also still to be completed. Alberto de Benedictis, senior vice president for business development at Finmeccanica, said discussions are "going on intensely" with EADS on completing the merger, and he did not see any reason why it would not work. He noted there are some issues relating to products, but they are not significant.

Officials at both companies made it clear they have agreed on one point. The new entity will not be called the European Military Aircraft Co., or EMAC, the working name in discussions to date. In addition to their military aircraft product lines, some 30% of the new entity will involve civil aerostructures work at both companies.

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X-32 in Stovl Tests, With X-35 To Follow

**David A. Fulghum/Le Bourget**

L

luck and showmanship are playing roles in the short takeoff and vertical landing portion of Joint Strike Fighter flight tests. Both Boeing and Lockheed Martin had hoped to avoid bad weather and technology glitches to conduct fast-paced Stovl flight tests and grab bragging rights, at least, in this phase of the competition.

But Boeing's first flight day, June 7, was scrubbed because of thunderstorms at Patuxent River Naval Air Test Center, Md. The next day, ground test anomalies convinced Boeing's test team to make an engine change in its X-32B, which delayed first flight

Boeing's JSF demonstrator was in the air first to begin short takeoff and vertical landings, but Lockheed Martin's entry in the competition was close behind.
in the new series of demonstration flights to June 18, but then the aircraft made four flights in a single day.

Meanwhile, Lockheed Martin had hoped to air video of the X-35's first vertical flight at the Paris air show (June 16-22). But late in the air show came news that it had slipped to early this week, said Tom Burbage, Lockheed Martin's executive vice president for JSF. Even so, it appears that the two Stovol designs could fly within a week of each other, barring the discovery of something unexpected or a period of bad flying weather.

**LOCKHEED MARTIN** will try to make up for being second by starting out with a series of vertical "press ups" that involve vertical flight up to 50 ft. but no conversion to horizontal flight.

Officially, Boeing managers say they are looking at completing the Stovol test program by mid-to-late July. That includes a series of a dozen or more flights in June that will take the JSF down to a hover and vertical landing. The whole X-32B program will involve 52 flights and 44 flight hours, said Paul Martin, Boeing's deputy flight test manager. "The reason for that big number is that as we get into the slower speeds, the duration of flights tend to be short," he said.

But reading between the lines, with clear skies and no mechanical glitches, Boeing could whip through its flight test program within a week of first flight.

"Our plan is to fly every day we can," Martin said, "seven days a week." That could be as many as three flights per day. "The things that will pace that are analysis [and weather]," he said. "We want to get that data as soon as we can." The only possible add-on to the Boeing test schedule would be a single test flight that involved a short takeoff and quick acceleration to supersonic speed.

**BOEING'S FIRST DAY OF FLIGHTS** took the aircraft down to 150 kt. and 1,000 ft. in the Stovol mode. The aircraft made another four flights on June 19, reducing the speed to 90 kt. The aircraft also landed while in the Stovol mode at 100 kt. The third day produced four more flights which lowered the altitude to about 700 ft. Once Boeing sustains a hover, it will move on to some Boeing-unique tests, including a vertical takeoff which is not required by the government.

While there is no obvious benefit to getting through the tests early, Lockheed Martin is pressing hard to get on with its flight program and demonstrate it has made up the month's delay between Boeing's first conventional flight in September and Lockheed Martin's in October. Moreover, Lockheed Martin plans to begin its test program with a series of "press ups" that aren't required, but would clearly demonstrate early the effectiveness of the unique lift fan/engine combination.

The initial Lockheed Martin flights would begin with lifting just the nose wheel off the runway and progress to a full hover at 30-50 ft. altitude. There would be no transition to forward flight. Following that demonstration, Lockheed Martin would return to a more traditional test program of working through progressively slower speeds from forward flight through transitioning to a hover and, finally, a vertical landing.

Boeing's test flight program started from transition of engine thrust from horizontal to the vertical and forward flight at speeds as low as 140 kt. (where testing ended at Edwards AFB, Calif.). That involved the conversion from conventional to Stovol control laws and transition from wing-borne flight to jet-borne flight.

**THEY WILL MOVE INCREMENTALLY** to pure jet-borne flight, a hover at 30 ft. and finally to a vertical landing. An altitude of 30 ft. is considered the point of no return, at which the aircraft is committed to a landing. Boeing engineers say that at more than 30 ft., the aircraft has enough power to push it back into flight or the pilot has time to eject if something goes wrong. At 30 ft. or less, the airflow has enough resilience that it could drop onto the runway, and the pilot should survive. Above that altitude, it would use a combination of engine thrust margin and variable nozzle angle to accelerate away.

The final JSF request for proposals will be issued on Aug. 10 with a response required from the contractors by Aug. 31. Aug. 15 is the last date for contractors to submit flight test data for consideration. The short time frame is a goal for Lockheed Martin to get into the air as soon as possible. Selection of a winning contractor is to follow on Oct. 5. Following down select, the winning contractor will build 14 aircraft for the engineering and manufacturing development phase of the program. The contract can stipulate how many of each type of aircraft to build. Contractors say they are considering asking the Air Force to let them use the demonstrator aircraft for further risk-reduction testing early in EMD.

British officials here say that while British aircraft carriers may be jeopardized by future Labour Party defense cuts, the JSF appears to have enough momentum to carry it into production. In fact, they contend that support is arguably greater in Britain than in the U.S. "We're committed to the platform," said a British official. "JSF was head and shoulders above the other candidates."

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**Israeli Companies Offer F-16 Avionics Upgrade**

**Le Bourget**

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Flight testing has begun on the Avionics Capabilities Enhancement (ACE) F-16 being developed by a consortium of Israeli defense companies.

The upgraded aircraft conducted several flight tests before being flown to France where it was on display at the Paris air show. Under the program, led by Israel Aircraft Industries Lahav Div. and Elbit Systems, the F-16's original avionics have been replaced with a number of Israeli-developed systems such as:

- IAI Elta's EL/M-2032 fire control radar with SAR modes.
- A wide-angle HUD developed by El-Op.
- Elbit's helmet-mounted display.
- Three 5 X 7-in. multifunction color displays, plus a digital moving map.
- A more powerful mission computer.

In addition, the upgrade package includes Rafale's Litenig navigation/targeting pod, as well as its Python 4 air-to-air missile and Popeye stand-off weapon.

Lockheed Martin cooperated in the development, which was funded by Israeli industry and government. The consortium, which sees the Israeli air force as a "primary candidate" for the upgrade, said production could begin early next year.
PARIS 2001 REPORT

U.S. Defense Budget Plans Gain Industry Backing

DAVID A. FULGHUM/LE BOURGET

Just where $6 billion in a supplemental to the 2002 defense budget will actually be added to Pentagon programs is still being hammered out in Washington, but military and aerospace officials here are encouraged by the areas of the Administration's interest—intelligence gathering, reconnaissance, precision strike and unmanned aircraft.

Space-based radar also is on the list, as is a string of improvements for the B-2, speed-up of the Global Hawk program and funding for additional tests and development for both Navy and Air Force unmanned combat air vehicles (UCAVs).

As the U.S. Air Force endeavors to plan its "kick down the door" force of stealthy, long-range F-22 fighters and B-2 bombers, "the piece that is missing" is a robust intelligence-gathering, surveillance and reconnaissance (ISR) force that can operate and survive over the battlefield, said Maj. Gen. (ret.) Kenneth Israel, former commander of the Defense Airborne Reconnaissance Office and now a proponent for improving ISR capabilities. Many of the proposed new funding recommendations from Defense Secretary Donald Rumsfeld's study groups also appear to reflect a desire to address the shortfall. Rumsfeld has told service officials that his priorities are stealth, ISR, precision strike and mobility. The Air Force has been given the mandate to have one-third of its interdiction targets hit by UCAVs by 2010.

THE COMBINATION of space-based radar (SBR), Global Hawk and Predator unmanned reconnaissance aircraft, space-based infrared satellites and a new, manned combination multisensor and command and control aircraft would be able to look deep into denied areas and monitor "anything that fires," Israel said. During the Kosovo campaign, U.S. planners found the Yugoslavs' mobile SA-6 antiaircraft weapons hardest to find and strike. The Air Force wants "continuous tracking of broad areas with fine resolution," he said.

SBR would put a constellation of satellites into orbit that could watch the movement of vehicles around the clock even in bad weather. It would go far toward solving the problem of camouflaged and hidden targets—which confused NATO war fighters in Kosovo—by watching movement from the time vehicles or missile launchers left garrisons until they reached their hiding sites. SBR appears to be one of the few programs with a hard number attached to it. Advocates say Congress has agreed to approve $50 million of the requested $100 million needed to reinvigorate a program that died last year with cancellation of the Discoverer II demonstration. Discoverer II was envisioned in its mature form as a constellation of 42 low-Earth-orbit satellites carrying radars that could watch the movement of ground vehicles on the Earth's surface.

SBR, as now envisioned, would use X-band radar technology developed for the Joint Strike Fighter. Very large versions of the modular system would be put into space. However, there is interest in looking at a medium-Earth-orbit constellation that operates at about 1,000-mi. altitude. That would allow planners to reduce the number of satellites needed to as few as 10-12 for $150 million each, instead of 24-42 at $100 million each, the Air Force official said. The $50 million would be applied to maturing some necessary technology such as large antenna arrays and processing technology to deal with background clutter and movement of the satellite.

With a medium-Earth-orbit system, "there are different processing issues. A different angular look [at the Earth's surface] and different clutter and doppler issues," he said. "That's why the concept studies are important." Industry researchers also are developing techniques to pull data from the massive geographical area being covered, determine changes since the last observation, automatically identify critical targets and then pass the refined information to human analysts for detailed identifications. With sustained funding, two demonstration satellites could be launched by 2003-04, a senior aerospace industry official said.

Northrop Grumman had offered the Pentagon the opportunity to buy 40 additional B-2Cs (for "conventional," which means without a nuclear bomb-carrying capability). However, there is still debate about whether to upgrade the existing fleet of 21 bombers with C-model capabilities or start a program to build all-new aircraft. The Administration generally supports the more expensive option of buying new bombers, while the Air Force would rather pursue upgrades of the existing fleet. Some Air Force officials say restarting the production line could cost as much as $4 billion, money that would be better spent on upgrades. Aerospace officials said the cost would be less and a large fleet would give the service more flexibility in operations and increase firepower from the heavy bomber fleet dramatically.

Northrop Grumman offered to sell the Air Force 40 B-2Cs at $545 million each. Additional government costs would put the total at about $770 million each.

The C-model improvements include a better radar, small bomb-carrying capability, broadband data links such as JTIDS, and improved accuracy through GPS/INS navigation improvements that could increase bombing accuracy to about 3 ft. Also added to the aircraft would be a JSF-type agile electronically scanned array radar that can jam, track and communicate simultaneously or operate passively for more stealthy operations. Current plans would increase the bomber's payload to 80 weapons. A plan to adopt the small-diameter bomb could further increase the payload to 140-300 weapons.
Global Hawk production is to be accelerated from two aircraft to at least four per year. Also to be pushed forward are air traffic control, mission planning and communications improvements and development of a signals intelligence payload.

UCAVs, in addition to supplemental funding, will be included in the Air Force's 2003-06 budget planning, a crucial step for long-term survival. USAF will demonstrate a weapons-carrying UCAV, while the Navy will tackle a reconnaissance aircraft capable of operating from an aircraft carrier deck.

Some analysts here contend the Navy won't develop a bomb-carrying UCAV until the F/A-18E/F aircraft fleet has been delivered. Others say the service is simply responding to its highest priorities, which is to improve its reconnaissance capabilities. Moreover, the Navy may consider accelerating UCAV so it can get a stealthy platform on aircraft carrier decks to carry out the deep strike mission.

Currently, the Navy has no stealth aircraft in an era of improving air defense weaponry, so there will be pressure to have an operational UCAV by 2006. Boeing has already received funding to build a third X-45 demonstration UCAV for the Air Force. This first X-45B will be more like a real operational aircraft, said Marc Pitarsky, the UCAV mission control lead at the Air Force Research Lab's information directorate. In particular, it will be "a full-up aircraft with some stealth treatments," an aerospace official said.

Another program to be pushed forward is Northrop Grumman/Raytheon's Radar Technology Improvement Program (RTIP). An additional $700 million will shorten the current program to five years from nine. Moreover, it appears the Air Force has decided to increase its buy of Joint-STARs ground surveillance aircraft to 19 and purchase them on an accelerated schedule, according to a senior Northrop Grumman official.

In a related development, aerospace officials are faulting Rumsfeld-committee recommendations that the carrier version of the JSF be accelerated. The CV version could carry a heavier payload and give the Navy a stealthy deep-strike capability. But industry officials point out that development of the small-diameter bomb increases the striking power of the short takeoff/vertical landing version. The Stovil JSF is lighter and cheaper and could operate from small-deck aircraft carriers that are far less costly to build than full-size carriers. Others say the Navy simply doesn't have the money.

A senior Lockheed Martin official said the Air Force had expressed interest in accelerating its version of the JSF. Planners want to bring forward its initial operational capability and then do block upgrades to the design. Company officials said the requirements of the design process would limit how much the program could be advanced.

Roche Tackles USAF Priorities

David A. Fulghum/LE BOURGET

Priorities for the U.S. Air Force under the Bush Administration will be deeply buried targets, improved sensor technology, even more precise aerial weaponry and a reinvigoration of the service's intelligence-gathering, surveillance and reconnaissance (ISR) capabilities, say the service’s new top civilian chief.

James G. Roche, the 20th Air Force secretary, is a Democrat, former Navy officer and non-aviator. However, he brings to the table a high-technology background with Northrop Grumman's electronic sensors and systems sector. The company is involved in some of the Air Force’s most critical programs, such as space-based radar, radar technology improvement, Joint-STARs ground surveillance, modular X-band radars, Global Hawk, unmanned combat air vehicles and Joint Strike Fighter.

While there will be small amounts for starting new research and development in the 2002 supplemental budget, most of the new money will be for "putting out fires," Roche said. "Can we begin cleaning house a little bit" by canceling some programs, selling facilities, privatizing base housing and establishing new energy plans? "There will be some investment in areas like that," he said. The Fiscal 2002 $6-billion supplemental will be a "businessman's budget, not a programmer’s. All new program investments will be pushed back to 2003, he said.

The new Administration is determined to stop managing by supplemental. "You’re always defending something short of what was needed," Roche said. There will be an end to that "appalling practice" that "ends up driving everything else.”

ISR will be at the top of Roche's reform list. The planning model has been for two major theater conflicts, but in reality reconnaissance forces are constantly spread thinly around the world. The Air Force should build a force that is big enough that it doesn’t "put unbelievable stress" on the crews. One way to do that is to place more reliance on remoted systems such as unmanned aircraft and satellites. He indicated support for space-based radar by saying "I don't know why the [Discoverer II] demonstration program didn't last. Somehow it got into trouble. I’m not sure why DarkStar [the stealthy UAV] was canceled," but Roche is planning to look anew at these technologies to "broaden the portfolio of ISR," he said.

Stealth remains a priority. "We have a comfortable lead," he said. "Signature [reduction] is a good thing, but we must make sure that stealth doesn’t overburden the cost" of such systems.

The problem of air-to-ground attack also will receive attention. Targets under the sea are complicated, but "what's under the surface of the ground is even worse," Roche said. He would not address the subject, but senior Pentagon officials say there are at least five Air Force programs—primarily involved with high power microwave technology—that are working on the problem of electronic attack on deeply buried communications and command and control facilities.

"Garbage air defenses," primarily those without telltale electronic signatures, also will become a target of new ground attack technologies, he said. "I think we have to look at recapring [the airspace over the battlefield below 20,000 ft]."

Another big priority is more precise weapons. Roche also suggested that Air Force emphasis may shift from crude jamming tactics to information warfare. "We want them looking east when the danger is coming from the west."
Regional Aircraft Makers Strengthen Market Niche

Regional jet manufacturing's good health was evident here last week, with most jet aircraft makers reporting positive results in terms of orders, new projects and market projections. This does not signal the death of the turboprop, however, which meets certain operators' requirements in supplying short-haul, point-to-point service.

Regional aircraft activity included:
- Embraer and Airbus jointly announced orders from Brazil's TAM Linhas Aereas. TAM signed a memorandum of understanding with Embraer for acquisition of 100 108-seat ERJ-190-200s; in a deal valued at $0.75-3 billion. Twenty-five are firm orders, and the remaining aircraft may be converted to other members of the ERJ-170/190 family. President/CEO Mauricio Botelho says Embraer has 120 firm orders and 205 options for the aircraft on the logbooks. Rollout is scheduled for the fourth quarter, with deliveries to begin in the second half of next year.

- TAM also confirmed its intention to acquire 20 120-seat Airbus A318s. The airline is Airbus' largest customer in Latin America, operating seven A330-200s on international routes out of Brazil and six A319s on shuttle services, as well as 12 A320s in domestic service. Rolim Adolfo Amaro, president and chairman of the TAM Group, said the mix was chosen because of the carrier's range of operations. Embraer also said final assembly of the first ERJ-170, a 70-seat jet, is to begin this month, and the first prototype of the ERJ-145XR, a long-range (2,000-nautical) version of the 50-seat ERJ-145, is near completion.

- Embraer's first-quarter results show an order backlog of $23.7 billion ($10.9 billion in firm orders, $12.8 billion in options) and a net income of $108.5 million, which Embraer says is 124.2% higher than net income compared with the same period the previous year. The current monthly production rate of 17 aircraft is expected to reach 20 by December.

- Bombardier Aerospace signed a memorandum of understanding with Deutsche Structured Finance (DSF), in association with Deutsche Operating Leasing AG (DOL), for 50 firm orders for 70-seat Bombardier CRJ700 and 20 86-seat CRJ900 aircraft valued at $1.5 billion, plus 30 options valued at $1 billion. Deliveries are to begin in the first quarter of 2003 and continue through the second-quarter 2009.


- The manufacturer reports that launch customer Brit Air of France has taken delivery of three of 12 CRJ700s it has on order. Horizon Air has so far ordered 30 CRJ700s. Two of 20 aircraft ordered by Lufthansa CityLine of Cologne have been delivered. The aircraft for both airlines will be equipped with Flight Dynamics' Head-up Guidance System for Category 3A operations.

- The new 44-seat CRJ-140 jet received its airworthiness certification from Brazilian aviation authorities. Embraer expects FAA certification early next month, which would clear it for service in the U.S. Bombardier reports 500 aircraft deliveries since the first CRJ entered revenue service in 1992. The firm-order backlog for the regional jet family is 600 aircraft. The company has more than 3,000 orders and options for its CRJ series and Q series aircraft.

- Tyrolean Airways, which operates five Q400 aircraft, last week placed a follow-on order, subject to board approval, for two 72-seat Q400 turboprops. The 68-78-passenger Q400 is undergoing certification by the European Joint Aviation Authorities for steep-approach operations at London City Airport.

- Fairchild Dornier announced orders for 13 regional aircraft worth more than $297 million, the most significant of which came from CSA Czech Airlines. The Czech national carrier ordered eight 728JETS in a deal worth $230 million, and is the first airline that plans to use the aircraft in its mainline fleet.

- CSA President/CEO Miroslav Kula said the carrier was aiming to build up Prague as a regional hub in cooperation with the SkyTeam alliance. The 728JETS will be used on new routes and are expected to replace some ATR 72s now in service.

- CSA is to take delivery of three 728JETS in 2003, another three the following year, one in 2005 and another in 2006. The last two aircraft orders may be converted to the 928JET, a larger version of the 728JET.

- Four of CSAs eight aircraft are to be leased from GE Capital Aviation Services (Gecas), which had placed a major order at last year's Berlin air show. The CSA deal is a small but significant boost for the program, which until last week had only one airline customer, Lufthansa CityLine.

- The company also announced an Air Namibia order for two 328JETS that are scheduled for delivery in the second half of this year. Grupo InvestBlue of Spain ordered...
one 328JET for corporate use; two additional corporate aircraft are going to undisclosed customers.

Fairchild Dornier Chairman Charles Pieper expressed optimism about his company's market outlook. In his view, this year will see "a little dampening," but overall growth in the regional airline industry would continue to be "in the high single-digit" range. He said he considers scope clauses and the current economic downturn as issues that "will be overcome."

Fairchild Dornier predicts a market of around 4,000 regional jets in the 70-100-seat category in the next 20 years. The company "has made better progress than expected" since Clayton, Dubilier & Rice as well as Allianz Capital Partners took it over in early 2000, Pieper said. He expects sales of around $900 million this year, while he sees the numbers increasing to $2 billion within a couple of years and to $4-5 billion in the medium term.

The first fuselage and wings of the 728JET will be mated at the end of August, while the manufacturer has accumulated 100 hr. of wind-tunnel testing with a 928JET model. The first 728JET is scheduled for delivery to Lufthansa CityLine in July 2003, with the first 90-110-passenger 928JET due to enter service in the first quarter of 2005.

According to Chief Operating Officer John Wolf, the in-service fleet of 67 328JETs has achieved a dispatch reliability of 99.5%. The aircraft has been certified to fly at 35,000 ft.; certification for London City operation is expected by May 2002. The company is developing modifications to fly the airport's 5.5-deg. approach angle.

- Alliance Aircraft's proposed StarLiner family of 35-50 seat regional twinjets is evolving into a U.S.-China industrial partnership. The newly established manufacturer and Harbin Aviation Industries Group signed an agreement to jointly fund the program and share the StarLiner's development cost, production and sales.

Harbin will have final assembly responsibility for the 35-seat StarLiner 100-50, while the 40-seat Dash 40 and 50-seat Dash 5 will be produced by Alliance Aircraft's facilities to be built soon at Martinsburg, W.Va. In addition, 40-50-seat versions acquired by Chinese carriers will also be assembled by Harbin.

Delivery of the first U.S.-assembled aircraft is scheduled for the fourth quarter of 2004, Alliance Aircraft CEO Earl J. Robinson stated. He added that a critical design review is scheduled for the next few weeks, and an engine type is to be selected soon. Pratt & Whitney Canada recently indicated that it will compete for the StarLiner propulsion system.

According to Robinson, the StarLiner program's funding is now secured. Risk-sharing partners are expected to provide up to 58% of the twinjet series' unspecified development cost. Partners include Lockheed Martin Aircraft Argentina, Spain's Castle Aero and ShinMaywa in Japan. Vought Industries will provide testing and certification facilities. Robinson said the three-abreast 30-seat aircraft's price tag is $10.5 million; the 40-seat version is being marketed at $13.5 million and the 50-seat model, at $15.5 million.

- Turboprop manufacturer ATR has no plans at present to venture far out of its turboprop regional aircraft market niche. CEO Jean Michel Leonard said the recently reorganized company expects a stable turboprop outlook over the next decade, with 60 aircraft in the 40-70-seat category to be sold per year. "We do not intend to compete for the time being. Our strategy is to develop our current line." The manufacturer said it has received 51 aircraft orders in 2001, 17 for new ATR 42/72-500s and 14 for used aircraft. The company reports a total of 654 ATR aircraft orders. The 44-50-seat ATR 42 and 64-72-seat ATR 72 are powered by the Pratt & Whitney PW127.

ATR also expects to clinch more than half the market. The demand, said Leonard, comes from airlines that require a balance of jet and turboprops in their fleet. In addition, interest derives from emerging world markets such as Indonesia, India, Pakistan, and from those carriers that are replacing older generation turboprops. India's private airline, Jet Airways, ordered five ATR 72-500s, and Algeria's Khálifa Airways ordered 10 of the same aircraft type in March.

Leonard said ATR's recent joint venture with Embraer in AeroChain, an e-marketplace for regional airlines support, doesn't mean it is entertaining regional jet thoughts. Any further developments with Embraer will occur, Leonard says, "when it will make immediate business sense."

- BAE Systems' first of three Avro RJX-85s in flight test had as of last week logged 75 hr. and cleared the entire flight envelope. The aircraft, powered by four Honeywell AS977 engines, reached 360 KIAS, Mach 0.8 and 36,000 ft. It will be certified to 35,000 ft. According to a company official, BAE Systems has received 14 firm orders for the aircraft. The RJX-85's range of 1,290 naut. mi. would provide an operator at London City Airport the capability of flying nonstop to all European destinations.

Embraer displayed a full-length mockup of the ERJ-190-200 cabin. The mockup was configured in three classes with four-abreast seating also common to the ERJ-170 and ERJ-190-100.

Pierre Sparaco and Jens Flottau contributed to this report from Le Bourget.
GE, Honeywell Chart Post-Merger Courses

MICHAEL A. TAVERNA/LE BOURGET

General Electric and Honeywell expect to go their separate ways as better companies after the long and apparently fruitless ordeal for European approval of a proposed merger.

Top executives acknowledged that a last-ditch proposal to divest $2.2 billion worth of engine and avionics businesses and to ring-fence GE's aircraft financing and leasing arm, GE Capital Aviation Services, fell far short of the demands of the European Commission, which was reviewing the merger in parallel with the U.S. Justice Dept.

The EC had requested $3.4-4.5 billion worth of divestitures and a complete spin-off of Gecas to obtain approval (AW&ST June 18, p. 89). GE Chairman-elect Jeffrey Immelt and Honeywell Chief Operating Officer Robert Johnson declared they "remained committed" to the merger, but said the proposal submitted would be their "final offer," virtually ensuring EC rejection when the ruling is issued on July 12. However, European Competition Commissioner Mario Monti appeared to leave the door open a crack late last week when he issued a statement saying the EC might accept an offer short of a sale of Gecas. Monti reiterated earlier demands for "structural changes" that would ensure that the unit operates separately from GE, but "without calling into question control by GE."

"We will negotiate no further," Immelt said in Paris last week. "There is a point where to give up more is not good for the company in either the short or long term. [Chairman Jack] Welch made his mark by always doing what was best for GE, and he will not try to get this deal through just to save his pride."

Unlike in the U.S., there is virtually no means of appeal to an EC decision. The only avenue of redress is the European Court of Justice, which is widely seen as an EC ally.

"We are planning our future without Honeywell," Immelt said. "We have the opportunity to make [other] investments."

He declined to specify which companies he was looking at, or in what area. But he noted that the sale of its key avionics and auxiliary power unit businesses was as much of a deal-breaker as Gecas—one indication of where GE sees future growth opportunities.

Instead of avionics, GE might favor horizontal integration strategies. For instance, GE has expressed an interest in taking a share in CFM partner Sncma, as soon as the partial privatization plan now in preparation is completed (AW&ST May 28, p. 22). Sncma's Turbomeca has shown interest in buying GE's helicopter engine business.

For his part, Johnson said he had already asked managers to refocus Honeywell's development as an independent company. "GE was a wonderful learning experience," he said. "We generated $600 million in savings and are now a stronger, more competitive company, with a more solid balance sheet." He noted that Honeywell had not initiated the merger, and that it was the quality of the company that attracted GE—and before that, United Technologies—in the first place. "It was a very good company that still generated lots of cash and profit—beachfront property."

Johnson declined to specify how the United Technologies offer would be received if it were renewed. However, he insisted he had a fallback plan, and that he still believed in strong synergies between engines and avionics. "We see equally exciting opportunities ahead of us."

Johnson also said that divestitures announced either in response to the EC investigation or that in the U.S.—which was approved in April—would become moot, although some could be reconsidered on their merits.

Although the two principals appear ready to move on, not everyone is convinced that the GE-Honeywell deal will go away. For one thing, it pointed up wide divergence on mergers between Europe and the U.S. "In the U.S., regulators are primarily swayed by arguments showing price benefits for the consumer, and complaints by competitors are considerably discounted," said Johnson. "In Europe, more credence is given to competitors."

Observers suggested that these differing views could affect future merger strategies by encouraging competitors to take their case to Europe rather than the U.S., as Pratt & Whitney and Rockwell Collins did in the GE-Honeywell case.

John Weston, chief executive of BAE Systems, called the divergence in philosophy between the U.S. and the EC "concerning" and suggested that uncertainty would "loom large in companies' consciousness." Tom Culligan, Raytheon's vice president for business development, said he did not think the EC's action would affect moves toward transatlantic joint ventures and partnerships, but cautioned that "it gives opponents of cooperative efforts some ammunition."

Political fallout was not excluded either, even though the presence of American firms in the Brussels hearings showed that lines were not drawn on a purely geographical basis. Boeing CEO Harry Stonecipher claimed here that rival Airbus had exerted strong influence on the decision—a charge that the European airframer vigorously denied. "Airbus had no objections to this to the EC," said Airbus chief Noel Forgaard. U.S. President George Bush, speaking in Warsaw during his European tour, also expressed "concern" about the EC move.

David M. North and John D. Morrocco contributed to this report from Le Bourget.
UAV Appetite Grows, Questions Linger

DAVID A. FULGHUM/PARIS

The U.S. and Israel may be nearing a confrontation over who should get U.S. funding to build a missile-carrying unmanned aerial vehicle (UAV) that can locate and destroy mobile ballistic or air-defense missile launchers.

Israel's future defense plans include both missile-carrying and reconnaissance versions of unmanned aircraft as key contributors to the country's defense. To that end, Israel Aircraft Industries has been developing longer-endurance and larger-load UAV designs for the role.

While Israel's defense budget is static, the nation must build large, new UAVs because "necessity is more of a driver than expense," said Moshe Keret, IAI's CEO. "The [ballistic] missile threat has grown," he said, pointing to recent Iranian tests.

Senior officials in the Israeli aerospace industry and government confirm they are working on stealth technologies, and at least one, David Ivry, Israel's ambassador to the U.S. and a former Air Force commander, said the technology is being applied to UAVs. The application on UAVs is designed to allow them to avoid being shot down over enemy territory as they orbit, looking for targets.

HOWEVER, RALPH CROSBY, who heads Northrop Grumman's Integrated Systems Sector, contends that U.S. spending targeted for building UAVs to destroy missile launchers should go to U.S. companies and not IAI. He "firmly disagrees" with directing money toward Israel for development of a new UAV. He contends that a combination of modifications to Global Hawk—plugs to lengthen the fuselage, wing extensions and a new propulsion system—would suit it to the task.

Crosby also is promoting Global Hawk as a contributor in the U.S. Navy's effort to replace the P-3 maritime patrol aircraft. The Navy is considering adding an unmanned aircraft element to any future multimission maritime aircraft. For the broad-area maritime surveillance mission, the Global Hawk would be equipped with the inverse synthetic aperture radar sensor to detect movement of ships.

Global Hawk also has attracted the attention of the German air force and defense ministry. Bonn has a requirement for a long endurance, unmanned reconnaissance aircraft. Global Hawk is scheduled to participate at next year's Berlin air show and remain in Germany for demonstration purposes. German officials are particularly interested in the aircraft as a platform for an indigenously-developed signals intelligence payload.

A German version of Global Hawk, being referred to as both EuroHawk and NATOHawk, would be marketed by Northrop Grumman in conjunction with EADS. EADS officials want to market the aircraft to NATO for ground surveillance. However, other analysts suggested that NATO's goal is to operate a manned, airborne ground-surveillance aircraft that would work in conjunction with Germany's unmanned aircraft. This would parallel the U.S. architecture mix of manned and unmanned surveillance platforms.

French officials have confirmed that they will buy the Israeli-built Eagle medium-altitude, long-endurance UAV. France chose Eagle over the U.S.-built Predator almost entirely on the basis of lower cost, they said. "Current UAV prices are killing the buyers [and] will reshape UAV programs," said Catherine Fargen, who heads the French acquisition organization's drone architecture office. "Companies are looking for profit margins rather than best value to the government." She challenged UAV builders to cut costs and leave payloads open for competition by subcontractors.

British forces, for example, will have "fewer ships, guns and tanks, but more UAVs," said Brigadier Jonathan Bailey, director of the Royal Artillery and the British Army's designated proponent for unmanned aircraft. He believes the expansion of missions for the UAV parallels the changes of 1914, when aircraft used exclusively for reconnaissance began taking on a large number of other roles. Among future British needs will be a reconnaissance UAV with extremely long dwell time. For instance, one concept calls for a system capable of flying "90 days above 60,000 ft.," which is well beyond what Global Hawk can achieve.

The U.S. will lead the charge into diversification, largely because of the Bush Administration's avowed desire to spend more on "long-range bombers and unmanned vehicles," said Kevin Meiners, who oversees these programs at the Pentagon. "U.S. military unmanned systems are set for a dramatic expansion in numbers, missions and capabilities." Among them are a "strong combat role," said David Whelan, Boeing's vice president and chief technology officer for its space and communications group.

However, a warning came from Tim Willbond, chairman of Britain's aerial vehicle systems association, who cautioned that the next major conflict would require a quick shift to "next-generation survivable systems" to allow operations against lethal new air defenses.

ANOTHER CAME FROM Maj. Gen. Peter Gilchrist, executive director of Britain's defense procurement agency. He argued that despite the enthusiasm for operational use of UAVs, the system had to be affordable and capable of regular, inexpensive upgrading.

"The acquisition of UAVs can't be like buying new computers that in a few years are useless," he said. The next generation of UAVs cannot be tied to a single technology route, but instead must be endlessly capable of accepting modifications. Moreover, the aircraft must be capable of keeping up with the "permanence of military action" in future conflicts, that involve "day and night [operations] in all weather," said Col. Jacques Levet, the French Army's deputy chief strike architect.

Additionally, budget and manpower shortages will force developers to simplify their UAV designs so they can be operated and maintained by fewer, relatively unskilled people, said Jacques Chemla, deputy director of engineering for IAI's Malat UAV division. That trend can be seen in the Eagle UAV which integrates automatic take-off and landing and slave sensor guidance. The goal is to "remove or greatly reduce human involvement in system operation." Analysis has linked human error to almost a quarter of UAV accidents.

Global Hawk UAVs will play a key role in defense improvements, and may provide a new source of foreign sales for the U.S.