

2009 New Business Jets

by Mark Huber



Embraer Phenom 300

Composites, winglets and clean sheets

Despite the recession, a significant number of new aircraft programs remain largely on track. OEMs such as Cessna, Dassault Falcon Jet, Embraer and Gulfstream all appear to be staying close to their development schedules while Hawker Beechcraft has pushed back the Premier II until 2012 (from 2010). Newcomers Honda and Spectrum appear to have suffered some minor slippage, sending the earliest deliveries of those aircraft into 2011. Boeing delivered its first BBJ3, based on the 737-900ER, last year, but the interior was not installed until this year. The same can be said for the Embraer Lineage 1000, the Brazilian company's entry into the bizliner market. Therefore these two aircraft have been eliminated from this year's update as they have been completed.

The significant new programs can be divided into two camps: modification of an existing design and more ambitious, true "clean sheet" new aircraft programs. Dassault and Hawker Beechcraft are engaged in the former while everyone else is pursuing the latter.

LIGHT JETS

Cessna Citation CJ4

The \$7.995 million (2006 \$) CJ4 made its first flight in May 2008. Cessna plans on finishing development, test and certification late this year and beginning aircraft deliveries early next year. Three aircraft are currently in flight test, and Cessna has orders for more than 70 of the aircraft.

While Cessna wanted to introduce a wide variety of new design features and technology on the CJ4, it also wanted to mitigate risk, so it applied items successfully incorporated in several of its other new airplanes. It borrowed the slicker wing geometry from the larger Citation Sovereign and the bigger passenger door from the Citation Mustang. The more powerful Williams FJ44-4A engines, derivatives of those already on the CJ3, and moderately swept wing allow the CJ4 to cruise along at 435 knots and climb directly to 43,000 feet. Range has been increased to 1,840 nm, and full-fuel payload has grown to 1,000 pounds (maximum payload is 2,100 pounds). The avionics are Collins Pro Line 21. Like all CJs, the CJ4 can be flown single-pilot.

Up front, the pilots' seats have two inches more legroom and the instrument panel has a more logical, ergonomic layout. The fuselage was stretched 21 inches, yielding more passenger legroom. Passenger capacity has grown to nine (copilot seat, belted aft lavatory seat and side-

facing divan opposite the cabin entry door plus six standard single executive seats). The cabin floor was lowered to provide a wider surface and more ergonomic eye reference points for window placement.

Controls for the Rockwell Collins Venue cabin management and entertainment system are fitted into the automotive-style side ledge. There are switch panels at each seat position and electrical power outlets at seat positions five and six and at both pilots' seats. The Venue system controls all on-board in-flight entertainment, including iPod connectivity, Blu-ray player, moving maps and a 100-GB hard-drive storage for personal media. A single XM satellite receiver and two plug-in, arm-mounted 10.6-inch monitors are included in the standard package. Venue also controls all indirect cabin lighting and the ATG electronic window shades. It provides full diagnostic monitoring of every line-replaceable unit in the CMS, allowing for components to be changed in

the field, and records a fault history that can be downloaded from the aircraft via cockpit USB port.

Hawker 450XP

Hawker Beechcraft announced this refreshed version of the Beechjet last October but since then has been quiet about the program and does not plan on making any follow-up announcements before this month's NBAA Convention. First flight was scheduled for the second quarter, but that deadline came and went, so it is likely this program's development schedule, at the very least, is moving to the right. Deliveries were expected to begin next year. The 450XP features new, more efficient engines, new avionics and a refreshed cabin. A 350-pound increase in mtow allows for additional fuel at maximum payload that yields a range increase of up to 600 nm when departing from airports at more than 5,000 feet msl. The new engines also give the aircraft a seven-knot speed increase.



Citation CJ4



HondaJet

Honda is blaming supplier problems for what could be another one-year delay for the long-awaited HondaJet. A single non-conforming prototype has been flying since 2003. It has amassed 450 hours and validated Honda's performance claims of a 420-knot top cruise speed (30,000 feet), IFR range of 1,180 nm, payload of 664 pounds and a ceiling of 43,000 feet. A conforming prototype is expected to make its first flight early next year; however, it is unlikely deliveries of the \$3.9 million six- to seven-passenger

light twinjet could begin much before 2012. Honda is being coy about orders, having said for several years that it has orders for "more than 100" copies of the airplane and that its new 500,000-sq-ft, 83-acre green-field Greensboro, N.C. plant, when completed, will be able to produce 70 to 100 aircraft per year.

Flight training and customer delivery will also be incorporated into this facility.

Plans call for the aircraft to be certified under Part 23 for single-pilot operations. Honda has selected all key vendors, including Garmin for the avionics.

The HondaJet uses a composite fuselage mated to metal wings. However, its unique wing-pylon-mounted engine design allows for a wider fuselage and more aft luggage space (57 cu ft and another 9 cu ft in the nose).

Hawker Beechcraft Premier II

The crunch at Hawker Beechcraft has moved this program two full years to the right, with deliveries into service not expected now until the end of 2012 or early 2013. The \$7.116 million Premier II will feature a redesigned ventral fin, more powerful engines and winglets that will shorten time to climb and increase speed, payload and range. Cruise speed will increase by 15 knots, to 465

knots, range will jump 20 percent to 1,500 nm, and payload at that range increases by 530 pounds. Hawker Beechcraft recently flew a Premier I with the uprated Williams FJ44-3AP engines. It remains committed to flying a prototype with the winglets before year-end. The first Premier II fuselage came onto the assembly line in August. After the Premier II is certified, production of the Premier I will cease. Like the Premier I, the Premier II will be certified for single-pilot operations.

Aside from the engines and the winglets, the company plans no other changes at this time and has yet to make a decision about whether to offer the Premier II engine/winglet upgrades to existing Premier I owners in the future.



Embraer Phenom 300

Development of the \$6.85 million six- to nine-passenger, PW535-powered Phenom 300 is progressing toward certification and customer deliveries later this year with four aircraft currently in the flight-test program. The light twinjet has a range of 1,800 nm with six passengers, a maximum operating speed of Mach 0.78 and a ceiling of 45,000 feet. While the 300 has the same fuselage diameter as the smaller Phenom 100 (61 inches on the interior), its cabin is five feet longer and it has three more inches of legroom between the seats compared with the Model 100. The cabin also offers a few more options for galley and lavatory layouts. Customers can choose either a full wardrobe or a sink in the lavatory and the galley can be equipped with a wine rack.

The 18-inch-wide cabin seats in both aircraft have a common appearance but are not interchangeable. In addition to their unusual offset headrests, they feature longitudinal tracking, adjustable recline from eight to 20 degrees, integral three-point seatbelts, breakover backs and inboard armrests. Maximum seat pitch in the 100 is 35 inches,

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NEW BUSINESS JETS 2009 (Specifications and Performance)

Manufacturer	Model	Category	Launch	First Flight	Est. Certification	Est. First Delivery	Price (Millions)	Max Range (nm)	Max Cruise Speed	Payload w/full fuel (lbs)	Max Pax Capacity	Mtow (lbs)	Engines (number)	Avionics
Aerion	SSBJ	Supersonic	2004 ⁽¹⁾	(3)	2014	2015	\$80	4,000	Mach 1.6	N/A	12	90,000	P&W JT8D-219 (2)	N/A
Bombardier	Learjet 85	Super-midsize Cabin	2007	(3)	2012	2013	\$17.2	3,000	Mach 0.82	N/A	8	N/A	P&WC PW307B (2)	Rockwell Collins Pro Line Fusion
Cessna	Citation CJ4	Midsize Cabin	2006	5/5/08	2009	2009	\$7.995	1,825	435 kts	1,000	7,8	16,630	Williams FJ44-4A (2)	Rockwell Collins Pro Line 21
Cirrus	SJ50	Personal Very Light	2007	7/3/08	2008	2012	\$1.39-1.7	1,000	300 kts	N/A	6	N/A	Williams FJ33-5A (1)	Garmin
Dassault	Falcon 900LX	Large Cabin	2008	N/A	2010	2010	\$41	4,800	Mach 0.87	N/A	N/A	48,300	Honeywell TFE731-60 (3)	Honeywell Primus Epic EASY II
Diamond	D-Jet	Personal Very Light	2003	4/18/06	2010	2010	\$1.89	1,350	315 kts	N/A	4	5,690	Williams FJ33-5A (1)	Garmin
Embraer	Phenom 300	Small-cabin Light	2005	4/29/08	2009	2009	\$6.85	1,800	Mach 0.78	N/A	7	19,500	P&WC PW535E (2)	Garmin
Embraer	Legacy 450	Super-midsize Cabin	2008	(3)	2013	2013	\$15.25	2,300	Mach 0.82	1,600	8	N/A	Honeywell HTF7500E (2)	Rockwell Collins Pro Line Fusion
Embraer	Legacy 500	Large Cabin	2008	(3)	2012	2012	\$18.4	2,800	Mach 0.82	1,600	10	N/A	Honeywell HTF7500-E (2)	Rockwell Collins Pro Line Fusion
Gulfstream	G250	Super-midsize Cabin	2008	2H/09 ⁽²⁾	2011	2011	\$24.2	3,400	Mach 0.85	N/A	10	N/A	Honeywell HTF7250-G (2)	Gulfstream (Honeywell) PlaneView II
Gulfstream	G650	Large-cabin Heavy	2008	2H/09 ⁽²⁾	2011	2011	\$58.5	7,000	Mach 0.925	N/A	12	99,600	Rolls-Royce BR725A1-12 (2)	Gulfstream (Honeywell) PlaneView II
Hawker Beechcraft	450XP	Small-cabin Light	2008	(3)	2010	2010	\$7.65	1,600	421 kts	638	8	16,650	P&WC PW535D (2)	Rockwell Collins Pro Line 21
Hawker Beechcraft	Premier II	Small-cabin Light	2008	12/09 ⁽²⁾	2012	2012	\$7.36	1,500	465 kts	900	7	13,800	Williams FJ44-3AP (2)	Rockwell Collins Pro Line 21
Honda	HondaJet	Small-cabin Light	2006	1/10 ⁽²⁾	2011	2011	\$3.9	1,180	420 kts	664	7	9,963	GE-Honda HF120 (2)	Garmin
Piper	PiperJet	Personal Very Light	2006	7/30/08	N/A	N/A	\$2.2	1,300	360 kts	N/A	6	NA	Williams FJ44-3AP (1)	Garmin
Spectrum	S.40	Midsize Cabin	2006	(3)	2011	2011	\$6.795	2,030	440 kts	N/A	7	9,550	GE-Honda HF120 (2)	Honeywell Primus Apex

(1) Program announcement, i.e. not yet officially launched. (2) Estimated flight date. (3) First flight date not yet announced.

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while in the 300 it is 42 inches. Phenom 300 customers have more choices of colors, fabrics and plating than 100 owners, with 14 colors available for the seats alone.

While Embraer would not reveal the order book for the aircraft, it is believed to be hovering around 300 and the aircraft is sold out through 2013. Fractional provider Flight Options has ordered 100 of these. Embraer executives have repeatedly called this aircraft a "category killer," with the implied intended prey being the Cessna Citation CJ4.

MIDSIZE JETS

Spectrum Aeronautical S.40 Freedom

It appears that the company has considerable fabrication work to do to achieve its stated goal of a first flight next year. This past June the company revealed it had produced its first "fuselage manufacturing demonstrator" test article for use in validating its production process.

The S.40 uses a proprietary lightweight, co-cured composite process that gives the aircraft a structural weight that is virtually half that of a comparable metal aircraft, which bestows on it the operating economics of a light jet with medium jet capabilities: cruise speed 440 knots, IFR range 2,250 nm, seating for seven to nine passengers, but an mtow of 9,550 pounds.

Spectrum says its co-curing process significantly reduces the amount of adhesive bonding required and enables the aircraft to be assembled quickly from large, monolithic structures.



Embraer Legacy 450 and 500

Embraer's formal entry into the midsize market came last year when it announced development of a pair of fly-by-wire aircraft that share the same wings, empennage, cabin cross-section, Honeywell HTF7000 engines and avionics. However, the 500's fuselage will be approximately six feet longer than that of the shorter-legged 450. Embraer says both aircraft will have a six-foot stand-up cabin with a flat floor, a fully equipped galley and an externally serviced aft lavatory.

The 500 is being designed to have a range of 2,800 nm with eight passengers, at Mach 0.80 and NBAA IFR reserves. The 450 is being designed to have a range of 2,300 nm with four passengers at long-range cruise and NBAA IFR reserves. The \$18.4 million (2008 \$) 500 is expected to enter service in 2012, with the \$15.25 million 450 following in 2013.

The joint definition phase on the aircraft was completed in April and the critical design review should occur sometime in the fourth quarter. Changes have been made to the cabin design since the company unveiled a preliminary cabin mock-up at NBAA



Bombardier Learjet 85

2007. The seat and table designs were changed after feedback from customers, with a new-style armrest for the seats and a different folding mechanism for the sidewall tables.

Bombardier Learjet 85

A metal airplane maker's first foray into an all-composite aircraft structure is always dangerous ground. Nevertheless, Bombardier is confident it can bring its all-composite, \$17.2 million Learjet 85 to market by 2012. Bombardier is relying on its composites plant in Queretaro, Mexico, to fabricate the structure. Final assembly will take place in Wichita. The 85 is likely to be the first all-composite aircraft certified under Part 25.

Bombardier claims the 85 will have 19 percent more cabin volume than its closest competitor. Indeed, for a midsize, the 85's cabin is already capacious: 24 feet, 9 inches long; 6 feet, one inch wide; and six feet tall, yielding 665 cu ft of passenger space and 130 cu ft of luggage stowage, including three large cabin closets with a combined 30 cu ft of storage.

Several different configurations will be available, including eight single executive seats in a double-club layout or single seats and a three-place divan. The single seats are pitched at 30 inches and recline into full-berthing positions. (A maximum of four can be berthed at any one time.)

The divan and the berthing seats reflect the 85's 3,000-nm transcontinental/transatlantic design range. This longer-legged Learjet also features a full galley and an aft cabin lavatory. Like several other contemporary cabin designs, the 85 will feature larger passenger cabin windows, 12 by 16 inches each, and more monolithic, streamlined headliners and sidewalls.

SUPER-MIDSIZE JETS

Dassault Falcon 5X

Details remain sketchy on the aircraft program formerly known as SMS. The aircraft is expected to be comparable in size to a Challenger 300, incorporate fly-by-wire controls and until June was to be powered by a pair of 10,000-pound-thrust Rolls-Royce RB282 engines. At that time Dassault made it clear that all design choices for the aircraft had been reopened, including the engine, and that the design phase had been extended to the end of this year. First flight is not expected until 2014.

Gulfstream G250

Three years ago Gulfstream began working on a successor aircraft to its super-midsize G200. The \$24 million (2008 \$) G250 was unveiled in October 2008. First flight is scheduled for later this year and certification in 2011. The G250 retains the G200's positives and discards the rest. As expected, the engines, wings and avionics are all new and are predicted to enhance the aircraft's performance.

The new engines are Honeywell HTF7250G high-efficiency turbopfans, rated at 7,445 pounds of thrust each. They will power the G250 up to 41,000 feet in 20 minutes and reduce cabin noise. The redesigned transonic wing

considerably shortens the G250's required takeoff distance under full load. The aircraft will now be able comfortably to use 5,000-foot-long runways. Up front, the G250 will be guided by a PlaneView cockpit built around the Rockwell Collins Pro Line Fusion system outfitted with synthetic and enhanced vision. The electrical system also promises to be more robust on the G250, incorporating large-aircraft features that include independent generators on each engine and a quieter auxiliary power unit.

The fuselage is unchanged from the G200, but optimizing it and moving all the fuel into the wings created more usable cabin space as well as in-flight access to the 120-cu-ft baggage compartment. Overall cabin length is now 25 feet, 10 inches from the forward edge of the lavatory to the aft edge of the galley. More cabin room translates into noticeably larger lavatory space as well. The lavatory on the G250 will be a full 48 inches wide compared with the 26 inches on the G200. The G250 lav will have a wardrobe closet, two large cabin windows, a sink with raised ledge and a vacuum toilet system, a unique feature in a super-midsize jet.

LARGE-CABIN JETS

Dassault Falcon 900LX

More than 400 Falcon 900 tri-jets have entered service since 1986 and next year Dassault Falcon Jet will begin deliveries of the latest iteration in this series, the \$41 million (2008 \$) Falcon 900LX, featuring improved range and modernized avionics. The Honeywell Primus Epic-based EASy Phase II system will offer not only synthetic vision but also a runway

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awareness system, XM weather, and digital datalink, electronic approach and en route charts.

The 900LX will have an extra 300 nm of range—a boost to 4,800 nm—compared with its predecessor, the 900EX, courtesy of performance improvements derived from a pair of Aviation Partners composite blended winglets.

BIG IRON

Gulfstream G650

Gulfstream announced the \$58.5 million widebody G650 in March 2008. First flight could occur before the end of this year and customer deliveries are scheduled to begin in 2012. The new airplane will offer the longest range, fastest speed and largest cabin in



Dassault Falcon 900LX

the Gulfstream fleet. It will have a range of 7,000 nm at Mach 0.85, 5,000 nm at Mach 0.90, and a maximum operating speed of Mach 0.925—making it the fastest civil aircraft flying.

Power will come from a pair of new 16,100-pound-thrust Rolls-Royce BR725 engines controlled by Goodrich Fadecs. The engines

are more efficient, have lower exhaust emissions and are 33 percent quieter than their predecessor, the Model BR710. Noise level is 17 decibels below Stage 4 standards.

Gulfstream has dramatically enlarged the dimensions of key interior components. The cabin entry door is almost 75 inches tall (as opposed to 59.25 inches on the



Gulfstream G650

G550). The baggage area provides 195 cu ft of space and is accessible in flight at all altitudes through the aft lavatory. The external baggage door has been enlarged by 8 percent compared with the G550 and lowered four inches to provide for easier loading. The G650 will have both forward and aft lavatories equipped with IWG-A6 ultraviolet

water treatment and purification systems. The wider floor allows for larger seats, wider aisles and three-across seating options in conference and dining groupings. The G650's 16 cabin windows each measure 28 inches by 20.5 inches and will be the industry's largest, 16 percent larger than on the G550. □

Recession raises the jet singles bar

Citing a combination of specific business challenges, market conditions and capital scarcity, the three leading single-engine VLJ contenders—Cirrus, Diamond and Piper—have either implicitly or explicitly moved their development and delivery schedules decidedly to the right. Almost 27 years after bizjet legend Allen Paulson announced the single-engine jet Gulfstream Peregrine and after the \$120 million failure of VisionAire in 2002, the single-engine bizjet remains a market illusion. Here is what is going on with the top three single-engine VLJ programs:

Cirrus SJ50

Despite assurances this summer from CEO Brent Wouters that the Cirrus SJ50 “personal jet” program “is moving forward and we are making very good progress,” public cracks began to emerge earlier this year and even Wouters conceded, “The schedule today brings the product to market in 2012. Without external capital that is going to be extremely difficult to do.” And it appears, at least for now, that Cirrus's parent, Arcapita, is done pumping money into the program.

Meanwhile, cash from Cirrus's current ongoing operations, badly hit by a dramatic drop in sales of its piston aircraft, will be insufficient to finish development and begin production on the \$150 million program. Cirrus cofounder Dale Klapmeier acknowledged, “We are taking the approach that we have to do it ourselves.” Without a dramatic uptick in the company's piston aircraft sales, that could be a task with an extremely long timeline.

Indeed, until the financial collapse of last year, Arcapita was actively shopping the company, although Klapmeier insists

that the investment firm, funded largely by Middle Eastern oil money, “is under no pressure to sell.”

Demonstrable signs of strain appeared earlier this year when the Duluth (Minn.) Economic Development Corp. acknowledged that Cirrus was more than \$200,000 in arrears for rent on the hangar where the jet is being developed and where the 125 people assigned to the program work. Cirrus's first avionics supplier for the SJ50, L3, then sued the airplane maker for \$21 million for breach of contract after Cirrus opted to use Garmin as the avionics supplier.

Then Cirrus went public with a plan by company cofounder Alan Klapmeier to independently raise the development budget for the jet and perhaps develop it under a separate corporate umbrella. That effort failed late this summer when Alan Klapmeier and Cirrus could not come to terms on price. Cirrus's board subsequently declined to renew Alan Klapmeier's contract as co-chairman, and he left the company.

For now, Cirrus intends to continue with the program and hold onto it. “We're not going to let it go to Wichita,” said Dale Klapmeier.

The program's single non-conforming prototype has accumulated more than 200 hours in the air since its first flight on July

3, 2008. Numerous and significant changes have been made to the aircraft. They include lighter and simpler flaps, changing the V tail's sweep and mounting enlarged dorsal fins beneath it to create an “X” tail. The thrust vector of the engine nozzle has also been changed “to make it feel more like a piston airplane,” Dale Klapmeier said. Several other initiatives to reduce weight and cost are also under way.

Cirrus has not released an estimate of when a conforming prototype is likely to fly, but Wouters said the company is preparing to start the program's “detailed design phase” and that most of the jet's 400 depositors have stayed loyal to the program. “We are absolutely executing the jet program,” said Wouters. “We have to get it done.”

Diamond D-Jet

The five-seat Diamond D-Jet is now in its seventh year of development and has an order book hovering around 300. Price for the aircraft recently increased by 25 percent, to \$1.89 million. A company spokesman told AIN that certification and initial deliveries will occur in the second half of next year. That might be overly ambitious as only one of the company's three test aircraft is conforming and two

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Cirrus SJ50



Diamond D-Jet

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more, scheduled to join the test program, have yet to fly but are expected to do so by year-end. Only S/N 3 is fitted with a production Williams International FJ33-5A engine (1,900 pounds of thrust). More than 200 people are working on the \$95 million program, which has been almost one-third funded by the Canadian and Ontario governments. Another \$100 million will be required to place the aircraft into production.

Diamond's Mark Lee, director of sales and marketing for the D-Jet, said the aircraft will be the first single-engine VLJ to reach the market. Performance is "right where we want it to be," he said. Flight testing to date has shown a ceiling of 25,000 feet, a fuel burn of 66 gallons per hour at 315 knots and 50 gph at 270 knots, and a range of 1,350 nm.

Lee said that the program's schedule has moved "a bit to the right," in large part because of

the insolvency of diesel aircraft engine maker Thielert. That crippled the production line for Diamond's DA42 twin-engine trainer and forced the company to expend resources developing its own proprietary replacement Austro diesel engines. Larger economic factors also retarded the D-Jet's progress.

Lee said that several large fleet orders have bolstered the program. Flight school ATP has ordered 20 airplanes; European fractional provider Smart Air, eight; and Canada's Chartright Air Group, 10. ATP is Diamond's designated training provider for the D-Jet and will offer a nine-day transition course in the D-Jet for piston-rated pilots and a six-day course for those who are already qualified in turbine aircraft.

PiperJet

Piper is expected to announce a new development schedule for the seven-seat PiperJet this



JIM LUFKON

PiperJet

month. The \$2.2 million (2006 \$) jet was announced in 2006 and was originally scheduled to enter into service next year. However, that fell into abeyance as Piper's then-parent American Capital shopped the company and piston aircraft sales dropped dramatically.

The new schedule is widely expected to be revised by at least two and possibly three years. This summer Piper's new CEO, Kevin Gould, announced that the program would be hiring 50 new engineers over the next nine

months and key design and vendor decisions remain to be made.

Piper was acquired in May by Imprimis, a Singapore-based investment company backed by the Brunei Ministry of Finance. The Imprimis investment is widely seen as recharging the PiperJet program. Piper had previously received \$32 million in guarantees from state and local governments to keep the PiperJet program in Florida.

A non-conforming prototype of the PiperJet first flew in July 2008 and has accumulated more

than 200 hours at speeds up to 250 knots. Based on preliminary data, Piper is confident that the Williams FJ44-3AP-powered (derated to 2,450 pounds of thrust) PiperJet will achieve its goals of 360-knot cruise at 35,000 and a range of 1,300 nm. Climb time to 35,000 feet is 22 minutes. Concerns about unusual pitch changes due to the tail-mounted engine's high centerline appear to have been ameliorated thanks to a new variable thrust nozzle Williams developed for Piper's application. Using the Coanda effect, the nozzle automatically changes direction of thrust with engine power setting, preventing the nose from significantly pitching down during high power settings. The nozzle is expected to allow the PiperJet to have a fixed horizontal tail and no yaw damper.

Piper currently holds orders for 200 PiperJets, most of them from dealers. □

Spiraling down: Goodbye Columbus & Epic meltdown

The recession has put the spike to some major new jet development programs, delayed others and shuttered some undercapitalized aircraft companies altogether.

Supersonic Proceeds at a Snail's Pace

Fuel prices and a distressed global economy are clouding the immediate future for supersonic business jets. Neither company involved in the Mach race—Aerion or Supersonic Aerospace International—has plans to build a prototype. So the question remains: If they don't build it, will risk-sharing partners and customers still come?

Aerion, the more visible of the two programs, seems to think so. The program was first announced in 2004 and the company currently claims an order backlog of \$4 billion, or roughly 50 aircraft, backed by refundable deposits.

In June Aerion said it was close to formalizing a relationship with an OEM that could build the aircraft after a joint feasibility study phase, likely to be completed near the end of next year. Optimistically, that would lead to certification sometime in 2015. SAI said its competing QSST could be certified by 2016; however, like Aerion, SAI is a long way from a final design and does not have a way to build the airplane.

Meanwhile, research on Aerion's natural laminar flow wing design will continue through this year. The new batch of tests—in both university and government

wind tunnels and on NASA's F-15B supersonic test bed—are designed to set baseline configuration details and validate the design of key components such as strakes, flaps, elevator and rudder. Aerion intends to perform these tests later this year. Scale models of the JT8D engine nozzles are also being tested for thrust performance and noise characteristics.

Aerion is putting a positive spin on research to date. "Test results continue to validate computer modeling conducted over many years to refine the supersonic laminar flow concept," said chief technology officer Richard Tracy. "These positive results confirm our confidence in our cutting-edge analytical tools, and the Aerion design concept. The reintroduction of civil supersonic flight is a big task, but it is now well within our technological understanding and capability."

The science may be within reach, but the funds remain over the horizon.

Goodbye Columbus

Given the enormous financial pressure on its beleaguered corporate parent, Textron, it came as no surprise when Cessna pulled the plug on its \$775 million development program for the wide-cabin, \$28 million Citation 850 Columbus. Officially launched on Feb. 6, 2008, the 4,000-nm-range Columbus had been under development, in one



Cessna Citation Columbus

form or another, since the mid-1990s. At the 2006 NBAA Convention, Cessna revealed a conceptual mock-up of the aircraft's cabin it dubbed the LCC—large cabin concept.

The futuristic, curved cabin sported a look that was a dramatic departure for Cessna. The 10-passenger aircraft was designed to have a maximum cruise speed of Mach 0.85 and was to be powered by Pratt & Whitney Canada's new, fuel-efficient, low-noise and low-emission PW810 turbofans. The cockpit was slated to incorporate the new Rockwell Collins Pro Line Fusion avionics system and the cabin would have the latest in-flight entertainment options, including airborne Internet.

Cessna's decision not to recruit risk-sharing partners for the project may have made it impossible to keep in the current environment. Initial customer deliveries were scheduled for 2014 and, by the project's official launch, Cessna claimed it had

already received letters of intent for 70 aircraft. For Cessna, the Columbus was more than a new aircraft; it was an experiment in remaking the company, to make it more efficient by acting as more of an integrator and assembler on the Columbus and by farming out major exterior and interior components to suppliers.

But late last year, when Textron CEO Lewis Campbell announced that the company might have to sell either Cessna or Bell Helicopter to raise cash, the die for the Columbus was cast. An expensive, cash-hungry \$800 million development program would significantly decrease Cessna's attractiveness to any potential buyer, especially one that had a product that competed directly with the Columbus. On April 29 Cessna announced it was suspending the program and laying off the 700 employees working on it. On July 10, the airframer formally canceled the program in a

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Aerion SSBJ

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filing with the Securities and Exchange Commission. Pratt & Whitney Canada immediately pulled the plug on the PW810 engine program. Cessna walked away from \$43 million already sunk into the Columbus and another \$10 million in government incentives to keep it in Kansas. The company's entry into the wide-cabin bizjet market was brief, exciting and over.

No Chinese Grob

For decades Germany's Grob Aerospace survived building gliders, piston-powered trainers and specialty turboprop research aircraft. Those close to the company claimed it was never a money-making proposition. Rather it survived due to the largesse of its owner, Burkhardt Grob, an aviation enthusiast whose family also owns one of the largest machine tool companies in the world. When Grob Aerospace was sold in September 2006 it was in the middle of developing the \$7.1 million SPn "utility jet," an all-composite, eight-passenger, 1,800-nm single-pilot aircraft that could land on unimproved airstrips and quickly be converted to cargo missions. Just two months later the second prototype aircraft crashed, killing the test pilot and prompting a redesign that moved the program substantially to the right.

It was too much for the company to absorb and less than two years later, in August 2008, Grob Aerospace filed for insolvency. Bombardier then terminated its contract with Grob to develop the composite structure of the new Learjet 85. That program had been a major source of company revenue. The training aircraft part of the company was sold to new owners earlier this year for \$4.5 million, but Grob's largest creditor blocked the sale of the SPn program to China's Guizhou Aircraft for \$3.5 million, a tiny fraction of its actual development cost. No other buyers have come forward to date.

Adam A700 Resurrection Fails

After 10 years, Adam Aircraft filed Chapter 7 liquidation bankruptcy on Feb. 20, 2008, after plans to morph its \$1.2 million A500 push-pull piston twin into a \$2.25 million VLJ ran out of time and money.

In April 2008 former Adam employees and a Russian company called Industrial Investors purchased the company's assets for \$10 million under the banner of AAI

Acquisition. They planned to certify and place the A700 very light twinjet into production, but that goal faltered by November. AAI soldiered on, seeking additional capital and consulting work, but by March of this year it was all over. AAI folded and the assets of the company were purchased by industrialist Thomas Hsueh, who is evaluating whether to place the Adam A500 piston twin back into production; however, Hsueh says he has no plans to resurrect the jet program.

Epic Meltdown

At the 2007 NBAA Convention, Epic Aircraft CEO Rick Schrameck insisted the company was on the verge of receiving a \$200 million cash infusion from Indian industrialist Vijay Mallya and sealing a technical cooperation agreement with Airbus. Neither happened.



Epic Elite

By July this year Epic had dismissed most of its 150 employees and defaulted on its Bend, Ore. plant lease. By the end of August the company had been forced down the path to involuntary bankruptcy after a customer brought suit claiming Epic took aircraft deposit money for an engine it never ordered from Pratt & Whitney Canada.

The scope of Epic's ambition cast serious questions on its business strategy and the veracity of claims of a \$170 million (2007 \$) order book and target of producing 400 aircraft per year by 2010. The company claimed to be developing three turboprops and three very light jets, with plans to build them in Oregon, Tbilisi (Georgia), Canada and possibly India. Epic arrived in Bend in 2004 with the help of \$1.3 million in State of Oregon loans and grants on promises of eventually employing almost 4,000 there.

Epic said it was going to develop this diverse stable of aircraft initially as kits and then pursue certification. It did not certify any aircraft. The company did deliver 35 single-engine turboprop kits for its LT model and another 12 of those aircraft are currently locked up on the production line in Bend under the company's "builder assistance" program.

Prototypes for two of Epic's three jets actually did fly; the Elite twinjet made its maiden flight on June 7, 2007, and the single-engine Victory first flew on July 5, 2007. But Epic is likely to be remembered as a company that tried to do too much, too fast, with too little. Meanwhile a court-ordered receiver has taken possession of the business. □



Adam A500