New Business Jets 2010
Bizjet development projects slow, as manufacturers await rebound
by Matt Thurber

Business aviation is at a crossroads, held back by a brutal economy that is still taking its toll on flight departments, canceled new aircraft orders and used aircraft prices that remain at record lows. Development of new jets remains a bellwether for the industry, driving implementation of new technology, manufacturing jobs and eventually hiring of pilots, mechanics, flight attendants and FBO personnel. But the new aircraft scene has slowed down considerably and some programs are essentially on hiatus, waiting for a financial shot in the arm while others, propelled by surviving orders, are moving ahead.

For the first time in a long time, little activity is expected at the upcoming NBAA Convention in the way of new program launches. Certainly the economy is to blame, but perhaps the dearth of new aircraft on the horizon has more to do with the fact that so many market niches have already been skillfully filled by so many aircraft manufacturers.

Bold manufacturers are moving ahead, however, and for the next few years programs that were launched in better times will come to fruition. And perhaps by then the ranks of used airplanes will have thinned and new technologies will encourage manufacturers old and new to break out their sketchbooks and pen some radical new designs.

Small-cabin Jets

**Cirrus Vision**
Cirrus Aircraft has weathered the recession by embarking on a stringent efficiency improvement program that is helping the company survive in the brutally challenging piston single-engine marketplace. While Cirrus sales are relatively strong, they would have to be substantially higher to provide sufficient excess cash to pay for the expense of bringing the single-engine Vision jet to market, and Cirrus needs millions more dollars to reach FAA certification.

Meanwhile, the Vision jet design has progressed, with about 25 percent of the detail design work accomplished. Cirrus is seeking outside funding to see the jet program through to certification and production for the 430 aircraft in the Vision order backlog and is projecting certification of the Vision jet in 2012 or 2013, depending how quickly the funding comes through.

The $1.72 million (2009 $) Vision jet is powered by a Williams International FJ33-5A and will cruise at 300 knots at a maximum altitude of 25,000 feet. Maximum range will be 1,100 nm with 400 pounds of payload. The Vision jet will seat five, with space for two additional seats.

**Diamond D-Jet**
Diamond Aircraft’s D-Jet remains the front-runner in the single-engine jet race, but problems with the company’s diesel-powered airplanes appear to have drawn resources away from the D-Jet program. The D-Jet was originally scheduled for certification last year, but Diamond delayed the program for a year after opting to certify the jet with a Williams International FJ33-5A turbofan, more powerful than the engine originally planned. More recently Diamond pushed the D-Jet certification to the end of next year, which still keeps Diamond at the front of the single-engine jet certification race. The $1.89 million (2009 $) D-Jet seats five and will fly to 25,000 feet with a maximum cruise speed of 315 knots and maximum range of 1,350 nm.

**Piper Aircraft PiperJet**
Piper Aircraft has taken a different approach to the single-engine jet arena with a much larger jet that will seat six (with an optional seventh
seat) and a significantly higher performance target. The PiperJet’s engine is the Williams International FJ44-3AP. While progress on the PiperJet seemed to have slowed during the recession, Piper says its new owner, the Brunei- and Singapore-based investment firm Imprims, has firmly backed the PiperJet.

Construction of the first conforming PiperJet is under way and first flight is expected next year. Certification and entry into service are planned for mid-2013. Price is $2.199 million (2009 $).

Guaranteed performance specifications include 360-knot maximum cruise speed, full-fuel payload of 800 pounds and 1,300-nm maximum range.

Stratos 714

Stratos Aircraft is aiming for high performance by using a smaller airframe (with seating for just four people) powered by a large engine, the 3,030-pound-thrust Williams International FJ44-3AP. Performance goals include 415-knot maximum cruise speed, 1,800 nm range and 41,000-foot maximum altitude, all for a $2 million price tag.

The Stratos program is still at the early stages and needs a significant infusion of funding to reach the prototype construction phase and achieve certification. Interest in the Stratos 714 remains high, according to chief technology officer and vice president of engineering Carsten Sundin, and the company has completed the baseline design, including computational fluid dynamics analysis of airfoils and systems design and structures analysis.

Stratos is funded to continue at its current pace, but needs new financing to build a prototype. Once that funding is in place, the prototype should fly in about 15 months, according to Sundin.

Honda Aircraft HondaJet

Honda Aircraft won’t be able to bring its first conforming prototype HondaJet to NBAA this year as the airplane is expected to make its first flight soon. That airplane was supposed to fly earlier this year, but Honda Aircraft added another delay in the program and now doesn’t expect certification until the second half of next year, with first deliveries in the first quarter of 2012. Price of the HondaJet is now $4.5 million, including Garmin G3X avionics.

The conforming prototype HondaJet was powered on and completed power-on tests in July. A static-test article equipped with more than 1,800 strain gauges has been assembled at Honda Aircraft’s Greensboro, N.C. R&D facility, and sub-component and control-surface stress testing is complete. Honda Aircraft is manufacturing the metal wings for the conforming prototype itself; these had been contracted to Avecorp of British Columbia. The HondaJet’s fuselage is composite and the engines are mounted in a unique overwing configuration that yields higher aerodynamic efficiency while freeing up fuselage space for passengers and baggage, according to the manufacturer. HondaJets will be produced at a 250,000-sq-ft factory under construction in Greensboro and due for completion early next year.

The HondaJet’s GE Honda Aero Engines HF120 turboprop is slated to achieve certification in the second half of next year, according to company president Bill Dwyer. The first HF120 was used for altitude tank testing and pushed to extremes of internal temperature, pressure, heat, cold, transients and 300 air starts. “We exercised the design to beyond the envelope and technical requirements,” he said. The engine is meeting thrust and specific fuel consumption targets, he added.

Flight testing of the HF120 on the GE Honda CJ1 is expected soon or might have already begun by the time this issue is printed. Some of the tests that were planned for the flying testbed were shifted to the altitude chamber, Dwyer said, “because of some program decisions we made.” Flight testing will be done from GE Honda Aero’s facilities in Burlington, N.C., where engines will eventually be assembled. Early engines are being built at GE’s Lynn, Mass. factory.

So far, five HF120s and one core engine have been delivered and seven engines are under assembly and slated for flight testing and certification. Several of these will be delivered as certified engines. “Every day a lot of people are working around the clock getting the work done,” he said. “This is the fun part of the program.”

Hawker Beechcraft Hawker 450XP

The Hawker 450XP program remains something of a mystery, with Hawker Beechcraft declining to comment on the jet’s current status. The 450XP program was announced at the 2008 NBAA Convention as a long-overdue upgrade of the Hawker 400XP.

The major change is replacement of the original Pratt & Whitney Canada JT15D engines with Fadec-controlled PW535Ds. Both are rated at 2,695 pounds thrust, but the PW535D is flat-rated to ISA + 20 degrees C versus ISA + 12 for the JT15D. With the new engines, the 450XP could fly 235 nm farther carrying four passengers from sea level on a 95-degree F day or 630 nm farther from a 5,600-foot-high airport. Climb to FL370 would be four minutes faster, long-range cruise seven knots quicker (431 knots) and mtow 350 pounds higher (allowing 350 pounds additional fuel load with max payload). Price of the 450XP was set at $7.596 million (2010 $), equipped with Rockwell Collins Pro Line 21 avionics, and deliveries were to begin this year.

Embraer Phenom 300

On schedule, Embraer certified and began deliveries of the $8.14 million (2010 $) Phenom 300 last year. The company has orders for about 800 Phenom 100s and 300s, with two-thirds of those expected to be the 100 model and one-third 300s. One Phenom 300 was delivered last year to Executive Flight Services (a subsidiary of Executive AirShare) and through the second quarter of this year another five were delivered.

The Pratt & Whitney Canada PW535-powered Phenom 300’s performance turned out better than projected, with NBAA IFR range growing to 1,971 nm from 1,800 nm (with six occupants) and both takeoff and landing distance shorter and fuel consumption lower than expected.

Continues on next page
Socata division in 2008. One of 2007, and Daher bought the of EADS Socata from 2003 to back Stéphane Mayer as CEO. The nascent jet design is Daher-nary concept stage. The design is well beyond the preliminary of the P1XX program, and the jet is planning further announcement of these will take place. So far, he has revealed that a dedicated team is working on the P1XX program, and the jet design is well beyond the preliminary concept stage.

**Daher-Socata NTx**

Another company with a nascent jet design is Daher-Socata, which recently hired back Stéphane Mayer as CEO. Mayer was chairman and CEO of EADS Socata from 2003 to 2007, and Daher bought the Socata division in 2008. One of Mayer’s jobs as Daher-Socata CEO is to continue development of the eight- to 10-seat NTXs jet.

**Midsize Jets**

**Cessna Citation CJ4**

Like clockwork, another Cessna Citation model entered service this year, the latest in the line of CitationJets. The CJ4 received FAA certification on March 12 and first delivery was on April 15. With last year’s cancelation of the large-cabin Columbus, for the first time in many years Cessna has no new models on the horizon, unless the company makes a surprise announcement at this month’s NBAA Convention. Scott Donnelly, CEO of Cessna parent Textron, did hint at possible new developments in late July, saying that research and development spending at Cessna and sister company Bell Helicopter will rise as the economy improves, with new models and upgrades to existing aircraft expected as soon as 2012.

The $9 million (2010 $) CJ4 retains the CitationJet line’s single-pilot capability, but adds 300 pounds to the CJ3’s maximum payload, for a payload of 2,100 pounds and full-fuel payload of 1,000 pounds. The CJ4 fuselage is three feet longer than the CJ3’s and features the larger door from the Mustang. A moderately swept wing and more powerful Fadexe-controlled}

### NEW BUSINESS JETS 2010 (Specifications and Performance)

<table>
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<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Category</th>
<th>Launch</th>
<th>First Flight</th>
<th>Est. Certification</th>
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<th>Max Range (nm)</th>
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**Spectrum Aeronautical • S.40 Freedom**

Spectrum’s Freedom is the launch customer for the GE Honda Aero Engines HF120 turbosfan, but it appears that the S.40 and the S.33 Independance programs have stalled due to the recession and tough business jet marketplace. The two jets feature a lightweight composite construction process called fibeX that is supposed to allow for an airframe weight half that of a conventional aluminum airframe and therefore deliver spectacular performance. Last year Spectrum completed the first “fuselage manufacturing demonstrator” test article for use in validating the production process. The goal was to fly the S.40 this year and the S.33 a year later. Specifications of the S.40 include cruise speed 440 knots, IFR range 2,250 nm and seating for seven to nine passengers, all at the low mtow of 9,550 pounds. More recently, according to Spectrum president Austin Blue, more developments in late July, saying that the company’s Avanti with jet engines in place of turboprops but an entirely new design. A launch date for the P1XX program has not been announced. Bingham said in late July that the company is planning further announcements about the P1XX, but he wouldn’t say when these will take place.
the company has slowed develop-
ment of the S.40 and S.33
due to resource constraints. “We
have had to decelerate the pro-
grames considerably, due pri-
marily to our desire to pace
the program optimally with the
resources available,” he told
AIN. “This has meant layoffs
for those involved in both pro-
grams, though we have main-
tained a team that is actively
working on continuing the de-
velopment. For a while now that
focus has been on the core com-
posites technologies, which look
excellent. We have attracted sig-
nificant interest and custom-
ers,” said Blue. “We are confi-
dent that our combination of the
right composites structural
approaches, next-generation au-
tomated manufacture and the
winning designs we have will be
successful. We dearly wish that
we were able to accelerate their
introduction, but for now we are
moving ahead the best we can in
a difficult environment.”

**Embraer Legacy 450 and 500**

Embraer is one of the few
manufacturers moving ahead
with new aircraft programs and
the “midlight” Legacy 450 and
midsize 500 are leapfrogging the
competition in the application of
modern technology to busi-
ness jets. Both the 450 and 500,
made with the same-diameter
flat-floor fuselage and the same
wings and empennage and pow-
ered by Honeywell HTF7500E
engines, feature fly-by-wire en-
velope-protected flight control
systems, the Rockwell Collins
Fusion avionics suite and Hon-
eywell’s Ovation Select cabin
connect system.

The 12-passenger Legacy 500
will fly first next year and gain
certification in 2012, followed
by first flight of the Legacy
450 in 2012 and certification in
2013. Besides the six-foot dif-
ference in the length of the cabin,
the major difference between the
two jets is range. The $15.3 mil-
lion Legacy 450 will fly 2,300 nm
with four passengers while the
$18.4 million Legacy 500 will fly
3,000 nm with the same number
of passengers (with NBAA IFR
reserves).

**Bombardier Learjet 85**

The unique nature of Bom-
bardier’s Learjet 85 is not just
that its airframe is made almost
entirely of composite materials
but that it will be the first com-
posite business jet certified to
FAA Part 25 regulations (Boe-
ing’s 787 should be the first
composite Part 25 airplane to
be certified). The structure for
the $17.2 million Learjet 85 will
be manufactured by the compa-
nny’s Queretaro, Mexico, division
and the jet will be assembled
in Wichita, where Bombardier
plans to invest a total of $600
million in the program.

The first manufacturing val-
idation unit for the Learjet 85’s
pressure vessel was completed
in July and was built on pro-
duction tooling. Production for
the first flight-test jet begins
later this year, and first flight
of the Pratt & Whitney Canada
PW307B-powered Learjet 85
should take place next year,
although Bombardier has not
revealed this timeline specif-
ically. Entry into service is
planned for 2013.

Learjet 85 avionics are the
Rockwell Collins Pro Line
Fusion suite. Besides lower
maintenance costs, advantages
of the composite airframe in-
clude the ability to use larger
passenger windows (measuring
12 by 16 inches) and a more spa-
cious interior offering 665 cu ft
of passenger space and 130 cu ft
for luggage as well as a full gal-
ley and aft lavatory. Range tar-
get carrying four passengers at
the Mach .78 long-range cruise
speed is 3,000 nm.

**Super-midsize Jets**

**Dassault Falcon SMS**

Dassault has not revealed
any details of its so-called SMS
jet. While it was originally
supposed to be powered by the
10,000-pound-thrust class
Rolls-Royce RB282, those
plans have been dropped and
no new information has been
released. The SMS is expected
to use the same fly-by-wire sys-
tem as the Falcon 7X. The use
of the 10,000-pound-thrust
engines may signal Dassault’s
plans to enter the high-speed
range market, but we’ll have to
wait and see if and when the company decides to
make a formal announcement.

**Gulfstream G250**

The super-midsize G250 test
program had logged more than
300 hours and 96 flights as of
late August, according to Gulf-
stream. The third and final
G250 made its first flight on
June 28 from Ben Gurion air-
port in Tel Aviv, Israel. This
airframe is being used for func-
tion-and-reliability testing.

Gulfstream is working with
Rockwell Collins to adapt the
avionics manufacturer’s Pro
Line Fusion system for the
G250’s PlaneView250 avionics
suite. The G250 is powered by
7,445-pound-thrust Honeywell
HTF7250C turbfans and will
fly 3,400 nm at Mach .80 with
four passengers (NBAA IFR
reserves). Total cabin volume is
935 cu ft and baggage capacity
154 cu ft (interior and exterior);
and the G250 offers a full galley
and aft lavatory with wardrobe
 closet, two large windows and
and a vacuum toilet. At maximum
cruise altitude of 45,000 feet,
cabin altitude is 7,000 feet.

**Large-cabin Jets**

**Dassault Falcon 900LX**

Dassault Falcon’s newest
model, the 900LX, received
FAA and EASA certification
in July. Equipped with Aviation
Partners blended winglets, the
900LX can fly 4,750 nm, nearly
300 nm farther than its prede-
cessor. Dassault engineers flew
215 hours in two 900LXs since
flight testing began a year ago.
The avionics suite is Dassault
Falcon’s EASy system, based on
Honeywell’s Primus Epic system
with synthetic vision, runway
awareness system, XM weather
and electronic approach and en
route charts.

**Big Iron**

**Embraer Legacy 650**

Embraer’s Legacy 650 should
be certified and enter service
shortly. The first public ap-
pearance of the new 650 was at
the LABACE show in Brazil in
August. An upgrade of the Leg-
acy 600, the 650 features a rein-
forced landing gear and a new
wing design with an additional
381-gallon fuel tank in the wing
box, boosting range 500 miles,
to 3,900 nm with four passengers.
Also new are Rolls-Royce AE3007A2 engines, with 210 more pounds of thrust than the Legacy 600’s AE3007A1Es.

**Gulfstream G650**

Gulfstream’s large-cabin G650 (S/N 6001) reached Mach .995 during flutter testing on August 12 and the four airplanes in flight test had logged more than 575 hours and 170 flights by late August. Gulfstream may have a G650 at the NBAA Convention static display, but that will depend on flight-test program scheduling, according to a spokesman.

The fifth and final G650 had completed initial phase manufacturing by the end of August and began engine testing. In preparation for certification next year and entry into service in early 2012, Gulfstream will fly the five flight-test G650s for a total of 1,800 hours. S/N 6002 has completed temperature testing at the McKinley Climatic Lab at Eglin AFB in Florida and is now involved in performance testing. S/N 6003 is being used for testing of the G650’s PlaneView II avionics as well as in-flight load measurement and ice protection system testing. S/N 6004, equipped with a full interior, is the function and reliability test article.

PlaneView II is Gulfstream’s implementation of Honeywell’s Epic avionics suite and includes as standard equipment synthetic vision, enhanced vision and a head-up display. The G650 is Gulfstream’s first aircraft with fly-by-wire flight controls, which include envelope protection. Cockpit controls are a conventional yoke, and the system is backed up with hydraulic- and electric-powered backup actuators and a backup flight control computer in case of a complete flight control computer failure.

The 16,100-pound-thrust Rolls-Royce BR725-powered G650 will also be Gulfstream’s longest-range jet, capable of flying 7,000 nm at Mach .85 with eight passengers and four crew (NBAA IFR reserves). High-speed cruise is Mach .90. List price of the G650 is $64.5 million (completed).

**Supersonic Business Jets**

**Aerion SSBJ**

The last great unfilled market niche may yet be filled by Aerion, the Reno, Nev. company that has everything in place to launch a contender in the supersonic business jet (SSBJ) category. Aerion’s proposed $80 million SSBJ taps into currently available technology to deliver a Mach 1.6 jet that would seat eight passengers. No radical engine technology is needed, just two tried-and-true Pratt & Whitney JT8D-219s. Aerion has $250,000 deposits for more than 50 airplanes and is still seeking a major aerospace partner to help bring the SSBJ to market. Further developments of the Aerion jet are awaiting a solid economic recovery, and once the program is formally launched, Aerion SSBJs could be zipping across the Atlantic in four or five years.