NEW BUSINESS JETS

OEMs and startups working on wide array of new designs and derivatives

by Matt Thurber

There are an extraordinary number of business jets in flight test or development or that were certified during the past 12 months, and indications before this year’s NBAA Convention were that more new jets are coming from Dassault Falcon, Embraer, Gulfstream and likely other manufacturers. Look for New Bizliners in next month’s AIN.

IN DEVELOPMENT

CESSNA CITATION CJ4

The Citation CJ4 takes the single-pilot CitationJet into a higher-performance realm while retaining the signature characteristics of what used to be Cessna’s entry-level jet series. The CJ4’s new features should make it easier to fly and maintain than other members of the Citation line.

The biggest change to the CJ line is a new wing for the CJ4, with three upper speed-brake panels on each side and moderate taper. The CJ4’s fuselage is two feet longer than the CJ3’s and the engines are much more powerful, with 3,400 pounds of thrust each, up from the CJ3’s 2,780 pounds. The CJ4’s maximum payload will be 2,100 pounds, 300 pounds more than the CJ3’s. Also new are single-point refueling and electric aileron and rudder trim.

Cessna engineers worked with Rockwell Collins to improve the pilot interface with the Pro Line 21 avionics suite, which has four screens in the CJ4 instead of three. Maintenance costs should be lower, thanks to a Cessna-designed ship diagnostic system that allows downloading of maintenance data on the ground.

First flight of the first CJ4, which is taking shape now in wing and fuselage jigs, is expected during the first half of next year. Cessna will build three flying CJ4s, as well as ground-test articles. Certification and entry into service of the $8 million CJ4 are planned for the first half of 2010.

CIRRUS ‘THE-JET’

Cirrus Design has amassed a respectable number of orders for its single-engine jet, without giving precise performance figures, projections for the development and certification timeline or even a firm price. The first prototype likely won’t fly for another two to three years, but Cirrus has generated a lot of buzz with its plans to enter the personal jet market.

The jet still doesn’t have an official name and is referred to at Cirrus as “The-Jet.” In late June, the company unveiled a mockup of the new jet, which features a V-tail and engine mounted at a front-upward angle parallel to the top of the rear fuselage. The interior and instrument panel look remarkably similar to that of a Lexus or Acura luxury automobile, which fits with Cirrus Design’s desire to attract new entrants to aviation with products that appeal to familiar expectations of what a million-dollar airplane should look like.

The Cirrus jet seats five adults, but there is also room for two smaller seats in the rear for passengers who weigh less than 100 pounds. Mounting the engine atop the fuselage makes extra room for a heated external bagage compartment. The-Jet will be equipped with a ballistic parachute system designed by Ballistic Recovery Systems.

Cirrus engineers have refined the jet’s design in a wind tunnel, with the goal of bringing to market a jet that combines the handling of a Cirrus SR-series piston single with short-field capability and a top speed of 300 knots. The engine is a Williams International FJ33-4A-19, which delivers 1,900 pounds of thrust. No further specifications are available yet, including the choice of avionics manufacturer. Orders currently stand at more than 150 aircraft, most from existing Cirrus piston airplane owners.

EMBRAER PHENOM 300

While the Phenom 100 has garnered more attention recently with its first flight, the Phenom 300 program continues on schedule, according to Embraer. In May the company announced that it has extended the 300’s cabin by 14 inches, but the change did not affect price or performance. The extended cabin, designed by BMW DesignworksUSA, now allows buyers to opt for single- and double-seat divans and a new galley.

The 300’s first flight deck is equipped with Embraer’s Prodigy Garmin G1000-based avionics suite. Powered by two Pratt & Whitney Canada PW535E turbosfans, the $6.65 million Phenom 300 will have a high-speed cruise of 450 kts and range of 1,800 nm. Embraer has not yet released any weight numbers for the 300.

Following first metal cut in March, the first flight-test Phenom 300 is scheduled to fly in the middle of next year, with service entry expected in mid-2009.

EVATION EV-20 VANTAGE

The VisionAire Vantage single-engine jet prototype flew in 1996, and if the design had made it into production it would have pioneered the personal jet marketplace. That program went bankrupt, but a twin-engine version of the airplane might yet be developed.

The Eviation EV-20 Vantage will be an eight-to-10-seat all-composite twin powered...
by Williams International FJ44-1AP turbofans. Price was set at $2.995 million, and in 2006 E0vation predicted the EV-20 would be certified in mid-2007. The relatively low cost was to be possible by having the jet manufactured in Brazil by the Brazilian Center for Aerospace Technology, which is part of the country's air force.

No news has been heard from E0vation about the planned July 2006 first flight of the EV-20 or any current progress on the airplane.

**EXCEL-JET SPORT-JET**

An accident involving a new jet manufacturer's first prototype can cause major setbacks. While accidents have happened to three companies in recent years, the crash of Excel-Jet's Sport-Jet in June 2006 seems to have slowed that company's program more than is the case with Spectrum Aeronautical's and Grob's jet programs.

Fortunately, no one was killed in the crash of the Sport-Jet, which had logged about 25 hours before cartwheeling during takeoff at Colorado Springs Municipal Airport, Colo. Excel-Jet president Bob Bornhofen believes that the Sport-Jet encountered wake turbulence from a departing de Havilland Dash 8-200.

The NTSB concluded, "It is most likely that the wake vortices were neither strong enough nor close enough to the Sport-Jet to cause the violent roll to the left reported by the pilot and witnesses to the accident." The probable cause of the accident, the NTSB stated, was "a loss of control for an undefined reason during takeoff climb that resulted in an in-flight collision with terrain."

Bornhofen said that the company is working on a second Sport-Jet prototype that should fly possibly early next year. This Sport-Jet will not be production conforming, he said, but subsequent models will conform to the final design and production standards. The Sport-Jet's fuselage is composite, while the wings and tail are aluminum. The Williams International FJ33-4A-15 should give the four- to five-seat Sport-Jet a maximum cruise speed of 25,000 feet of 350 knots, top speed of 375 knots and IFR range of about 950 nautical miles.

**MAVERICK JETS SMARTJET**

At last year's NBAA Convention Maverick Jets announced plans to certify the five- seat twin-engine SmartJet. Maverick has not revealed the engines that it plans to use to power the SmartJet, and the company has released no new information since last year.

Projected performance of the $899,000 SmartJet includes 290 kts maximum cruise speed, 25,000-foot maximum altitude, range of 1,250 nm and a fuel burn of 36 gph.

**MILLENIUM FOXJET**

Since announcing that it had purchased the Foxjet program from Tony Fox, an early proponent of very light jets (and of an airplane that has yet to get beyond the mockup stage), Millennium Aerospace has released little information.

Nevertheless, Foxjet was alive and well, executive director Barry Marshall told AIN. Subcontractors all over the world are making subassemblies for the Foxjet in preparation for building the first prototype. Millennium has developed performance projections using two Pratt & Whitney Canada PW615 engines, but Marshall wouldn't reveal any numbers.

Los Angeles-based Millennium doesn't plan to make too many changes to the basic Foxjet design as envisioned and mocked up by Tony Fox. The Fox needs to be changed to fit the PW615 engines, "but very little beyond that," Marshall said.

"There is a lot going on with this [airplane]," he said. "It's going to tickle the industry pink when it comes to the rollout.

"Fox's Tony Team Industries wasn't the first to promote small jets, but it was interesting to note that Fox did see the opportunity to use these jets for air-taxi services. He coined the term Dialjet to describe a system with hundreds of Foxjets available for quick charters, and lower prices for shared trips managed by a computer system.

When Fox introduced the Foxjet concept in 1977, projected performance using two 425-pound-thrust Williams International WR44-800 engines included 356-knot maximum cruise, 41,000-foot maximum altitude and a 955-nm range with reserves (at "best" 286-knot cruise speed).

According to the Web site www.machdynamics.com, Fox spent $3 million on the Foxjet program and built four full-size mockups. Bill Lear reportedly placed the first order and consulted on the project. Price of the Foxjet was to be $500,000 to $700,000.

**PIPER PIPERJET**

Piper Aircraft's all-metal PiperJet, unveiled during last year's NBAA Convention, has been redesigned slightly after wind-tunnel testing showed the need for some changes. The Williams International FJ33-4AP-powered jet is the largest of the single-engine segment, with seats for up to seven occupants.

Based on testing of a one-fifth-scale model at the University of Washington Aeronautical Laboratory's Kirsten Wind Tunnel in Seattle, Piper engineers reduced the size of the engine inlet and swept the horizontal stabilizer 30 degrees. In addition to increasing tail effectiveness, the sweep provides the added benefit of moving the stabilizer out of the rotor-burst path, a consideration for any designer of a single-engine jet.

Other design changes include a new dorsal fairing on top of the engine nacelles to improve directional stability, wing leading-edge extensions at the wing roots and redesigned winglets.

**SPECTRUM S-33 INDEPENDENCE**

Certification of Spectrum Aeronautical's composite S-33 Independence very light jet has been pushed back a year, to 2010, so that the Spanish Firm, Utah company can focus on certifying the midsize S-40 Freedom in 2009.

The S-33 was originally planned around the Williams International FJ33-4A-15, but recent design changes call for upgrading the powerplant to the FJ33-4A-19. The -19 delivers 1,750 pounds of thrust compared with the -15's 1,568 pounds.

Spectrum expects some fairly spectacular performance parameters from the S-33, due primarily to the Fibex composite manufacturing process developed

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**Excel-Jet Sport-Jet**

**Maverick Jets SmartJet**

**Program launch date**

February 2004

**First flight date**

May 14, 2006

**Certification date**

N/A

**First delivery date**

N/A

**Number of crew and passengers**

1 + 3/4

**Cabin dimensions**

7.9 x 3.9 x 4.9 ft

**Cabin volume**

152 cu ft

**Engine make/model**

Williams FJ33-4A (1)

**Engine certification date**

N/A

**Engine thrust rating (sea level, ISA)**

1,500 lb

**Engine derated thrust (sea level, ISA)**

N/A

**Avionics suite**

Garmin G1000

**MTOW**

9,250 lb

**MLW**

8,850 lb

**ZFW**

8,400 lb

**BOW**

N/A

**Maximum fuel weight**

2,750 lb

**Vmo**

N/A

**High-speed cruise speed**

424 kts

**Long-range cruise speed**

N/A

**NBAA IFR range at long-range cruise**

N/A

**Cabin altitude at maximum altitude**

1,000 ft

**Minimum field length (sea level, ISA)**

2,500 ft

**Number of aircraft on firm order**

N/A

**Standard equipped price**

$2 to $2.5 million

**Excel-Jet Sport-Jet**

**Program launch date**

January 2004

**First flight date**

N/A

**Certification date**

N/A

**First delivery date**

N/A

**Number of crew and passengers**

1 + 3/4

**Cabin dimensions**

7.9 x 3.9 x 4.9 ft

**Cabin volume**

152 cu ft

**Engine make/model**

Williams FJ33-4A (1)

**Engine certification date**

N/A

**Engine thrust rating (sea level, ISA)**

1,500 lb

**Engine derated thrust (sea level, ISA)**

N/A

**Avionics suite**

Garmin G1000

**MTOW**

4,900 lb

**MLW**

N/A

**ZFW**

N/A

**BOW**

2,800 lb (empty weight)

**Maximum fuel weight**

1,400 lb

**Mmo**

N/A

**Vmo (kias)**

N/A

**High-speed cruise speed**

340 to 365 kts

**NBAA IFR range at long-range cruise**

1,100 nm

**Cabin altitude at maximum altitude**

N/A

**Balanced field length (sea level, ISA)**

2,300 ft

**Balanced field length (sea level, ISA)**

2,300 ft

**Number of aircraft on firm order**

N/A

**Standard equipped price**

About $1 million

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Rocky Mountain Composites. With an mtorw of 7,500 pounds, the S-33 should cruise at a maximum speed of 433 knots and have a range of 2,050 nm. The S-33 is priced at $3.65 million and will seat seven to nine occupants.

The next S-33, which is currently under construction, will be made on production-conforming tooling, as will three additional construction, will be made on production-conforming tooling, as will three additional test airplanes and one or two static-test airframes. The first S-40 should fly sometime during the second half of next year, then the next S-33 will fly. This will actually be the second S-33, as the prototype crashed on takeoff in July 2006.

Spectrum Aeronautics is focusing on bringing the midsize S-40 Freedom to market before the S-33 because currently there is much less competition in the midsize market, while there are many more players in the S-33’s small-jet segment. Spectrum plans to build four S-40s for its flight-test and certification program, and all will be built on production-conforming tooling, which should speed the transition to post-certification production. The S-40 is now scheduled to fly in the second half of next year, followed by FAA certification in 2009. The S-40 is slated to be powered by the 2,050-pound-thrust GE Honda Aero HF120 turbofan. Maximum cruise speed is 455 kts and range 2,200 nm.

Three companies have expressed interest in building a supersonic business jet, but none of the programs proposed by Aerion, Sukhoi and Supersonic Aerospace has reached the launch stage, and this segment of business aviation will not take off until massive amounts of money are available, sonic booms can be reduced and regulations governing supersonic flight over land are revised. Meanwhile, research continues.

Aerion has progressed farthest, having performed aerodynamic tests of its wing design and having figured out a way to fly efficiently at subsonic speeds over countries such as the U.S. that prohibit civil supersonic flight. Aerion has designed a jet that promises to offer similar NASA IFR range–about 4,000 nm–at Mach 0.95 as it does at about Mach 1.5. Operating expenses should range between those of a Global Express XRS and Boeing BBJ. And the S-33 is priced at $3.65 million and has a range of 2,050 nm.

Work on the Aerion includes wind-tunnel testing to optimize engine inlets, exhaust nozzles, nacelles/airframe integration and empennage size and geometry. Aerion has worked with vendors to design systems architecture and sizing for fuel, electrical, hydraulic, flight controls, pressurization, environmental controls and landing gear.

Working with Cox and Co.’s icing tunnel, Aerion engineers have evaluated worst-case icing building on the wing outboard of the strakes. “The tests indicated that icing does not have a significant effect on the Aerion outer wing panels and tail surfaces,” according to the company. The nose, engine inlets and strakes will need icing protection systems. Engineers have also studied wing design requirements such as optimal wing thickness-to-chord ratio for strength and aeroelastic performance, the company noted, including flutter and divergence analysis.

Aerion is still seeking a manufacturer partner “to assume leadership in integration, certification and production,” although Aerion said that its investors will share in the cost of funding the program. If Aerion is able to find a partner, it hopes to launch the program late next year and begin deliveries in 2014.

Supersonic Aerospace (SAI) said that the cost of bringing its proposed Quiet Supersonic Transport (Q SST) to market would be “around $2.5 billion.” The company, founded by Michael Paulison, is tackling the environmental issues surrounding supersonic flight head on. According to SAI, the Q SST will be able “to fly at supersonic speeds over populated areas and in compliance with current or proposed air-port and environmental regulations.”

SAI contracted with Lockheed Martin’s Skunk Works for some design work on the Q SST program, including wind-tunnel testing and sonic-boom suppression research. Features that enable the Q SST to fly quietly include an inverted V tail and other design elements, according to SAI, that will allow the jet to fly at Mach 1.6 using a “shaped sonic signature” that is “less than one hundred-thousandth of the sonic boom created by the recently retired Concorde.”

The Q SST will need a new engine, and General Electric, Pratt & Whitney and Rolls-Royce have submitted design concepts to power the airplane. SAI said that engine selection should take place next year and if the necessary funding and manufacturer cooperation occurs, the Q SST could be ready to enter service in 2015.

“Our preliminary design work is essentially complete and we are working on certification and regulatory matters,” Paulison told AIN. “We’re working on establishing our international consortium to build and support the aircraft.”

Lockheed Martin is not actively working with SAI, according to a Lockheed Martin spokeswoman. While there is a relationship between the companies, she added, Lockheed Martin is not working on the Q SST program until funding is available to pay for additional effort.

Sukhoi’s interest in SBJ programs is now as a participant in the pan-European high-speed aircraft project. Sukhoi is part of the team studying the application of low-sonic boom technology to an SBJ that would cruise at Mach 1.4 to 1.8, fly 3,000 to 5,000 nm with eight passengers and have a maximum balanced field length of 5,500 to 6,500 feet. Other teams are exploring a low-noise SBJ design and a long-range design.
Adam currently faces dual challenges: building a production capability that can turn out its A500 piston twin (and eventually A700 jet) in high volume; and completing FAA certification of the A700. Originally scheduled for 2008, certification has been pushed farther out, but the company’s new leadership has not yet released a revised certification target date.

A700 number three started flying in April; number four flew on August 24, with number five to follow at the end of the year or early next year. “Those will be the three prototypes that do the majority of work,” said John Wolf, chairman and CEO. A700 number six will be used for function and reliability testing, one of the final steps before certification.

The production interior will first be installed in ships five and six, Wolf said. “I think it’s a fairly typical, straightforward program,” said president Duncan Koerbel. “We’re comfortable with the certification basis of the airplane.” What remains, he added, is performance, handling qualities, systems and runway performance testing, “all the things that are typical of a normal flight-test program.”

Ground-based static and fatigue testing of the airplane is also scheduled, as is work to certify the Avidyne Flight Max Entegra suite for the jet.

The FAA recently issued special conditions for certifying the A700 fire-extinguishing system. Part 23 regulations don’t address the A700 engine configuration, where pilots can’t see the engines from the cockpit, so the FAA added Special Condition 23-210-SC to the type certification requirements. This requires Adam to design a “two-shot” extinguishing system with ventilation in the engine fire zones to prevent flammable vapors from accumulating.

Wolf and Koerbel want the A700 program to achieve a complete type certificate, with no items left open and contrary to the fragmentation of the A500 approval. When the A700 is certified, the airplane will be ready to operate throughout its full envelope, in known icing conditions, RVSM airspace, day/night VFR and IFR and meeting all Part 135 requirements, according to Wolf.

The all-composite A700 will include a lavatory with privacy curtain, a feature that some very light jets won’t be able to offer.

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### Adam A700

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<tr>
<th>Feature</th>
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Aviation Technology Group’s Javelin Mk 10 twin-engine jet meets the sub-10,000-pound definition of a very light jet and ATG is marketing it as an “executive jet,” but the Javelin is sporty and military in style and not a typical business jet. It has tandem seating for two, control sticks instead of yokes, a bubble canopy and F/A-18-like twin vertical fins.

ATG chairman and founder George Bye sketched the first drawings of the Javelin in 1998. In 2000 he formed ATG at Centennial Airport in Englewood, Colo.

The development prototype first flew on Sept. 30, 2005. FAA certification is expected in 2010, followed by EASA certification.

The Javelin will pioneer the use of construction methods that haven’t been applied much in aviation. The primary structure will be made from carbon-fiber-reinforced plastic, which weighs less than traditional resin-impregnated composites, increases stiffness and damage tolerance and involves a simpler one-cure process, according to ATG.

Climb performance is what truly sets the Javelin apart from other VLJs. With two 1,750-pound-thrust Williams International FJ33s, the Javelin boasts the best weight-to-thrust ratio (almost 2:1) of the current crop of small jets. With such a low W/T ratio, the Javelin will be able to climb at a maximum rate of 9,000 fpm and reach 41,000 feet in 17 minutes.

Range is not the Javelin’s strongest attribute, and ATG says that IFR range will be 1,000 nm and endurance 3.5 hours at long-range cruise speed of Mach 0.75 at the 45,000-foot ceiling. Pilots should enjoy the Javelin’s modern amenities, including a three-display Aerosonic Pegasus glass cockpit for both seats, 36-inch-wide elbow room and known-icing certification using an electrothermal de-icing system.

ATG is readying production tooling and fixtures for the first design-conforming versions of the Javelin and expects to begin manufacturing parts early next year. The company will build seven production-conforming Javelins, one of which will be used as the Mk 20 military version on which ATG and Israel Aircraft Industries are partnering. Bye told AIN that ATG will try to obtain FAA type and production certification simultaneously, something that major OEMs such as Cessna achieve regularly but possibly a challenge for a new manufacturer.

Cessna Citation XLS+
The XLS+ is an extension of the Excel/XLS line, deliveries of which began in May 1998. Last year, the 500th Excel/XLS was delivered. On August 2, the XLS+ made its first flight at Rockwell Collins’ facilities in Cedar Rapids, Iowa. The XLS+ is on schedule for certification in the first quarter of 2008.

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NEW BUSINESS JETS

AVIATION TECHNOLOGY GROUP
JAVELIN EXECUTIVE JET MK 10

Program launch date 2000
First flight date Sept. 30, 2005
Certification date Est. 2010
First delivery date Est. 2010
Number of crew and passengers 2
Cockpit dimensions 5.17 x 4.5 x 3 ft
Cabin volume N/A

Engine make/model Williams FJ33-4A-19J (2)
Engine certification date N/A
Engine thrust rating (sea level, ISA) 1,750 lb
Engine derated thrust (sea level, ISA) N/A
Avionics suite Aerosonic Pegasus (formerly OP Technologies)
MTOW 7,200 lb
MLW 6,900 lb
Maximum fuel weight 1,875 lb
Mino Mach 0.86
Vmo 460 ktas
High-speed cruise speed 440 ktas
Long-range cruise speed N/A
NBAA IFR range at long-range cruise 1,858 nm
Certified maximum altitude 45,000 ft
Cabin altitude at maximum altitude N/A
Balanced field length (sea level, ISA) N/A
Number of aircraft on firm order 152
Standard equipped price $11.595 million

Cessna Citation XLS+
Program launch date October 2006
First flight date Aug. 2, 2007
Certification date Est. 1Q/08
First delivery date Est. mid-2008
Number of crew and passengers 2+9
Cabin dimensions 5.17 x 4.5 x 3 ft
Cabin volume N/A

Engine make/model P&W PW545C (2)
Engine certification date N/A
Engine thrust rating (sea level, ISA) 4,119 lb
Engine derated thrust (sea level, ISA) N/A
Avionics suite Rockwell Collins Pro Line 21
MTOW 20,200 lb
MLW N/A
BOW 12,800 lb
Maximum fuel weight 6,740 lb
Mino N/A
Vmo N/A
High-speed cruise speed 440 ktas
Long-range cruise speed N/A
NBAA IFR range at long-range cruise 1,858 nm
Certified maximum altitude 45,000 ft
Cabin altitude at maximum altitude N/A
Balanced field length (sea level, ISA) N/A
Number of aircraft on firm order N/A
Standard equipped price $11.595 million
quarter of next year, with deliveries to follow in the middle of the year. Upgrades from the XLS configuration include Pratt & Whitney Canada PW545C engines with FADEC; 440-ktas maximum cruise speed, seven knots faster than the XLS; and Rockwell Collins Pro Line 21 avionics suite. Price is $11.595 million.

**DASSAULT FALCON 2000DX AND 2000LX**

The 2000DX and 2000LX give Falcon 2000 buyers more options. The 2000DX offers less range—3,250 nm—than the standard 2000EX for operators who don’t need to travel as far. The 2000DX’s ability to land with nearly full fuel tanks makes it possible to fly shorter initial legs to pick up passengers, followed by a longer trip without having to refuel. Examples include New York to Washington, D.C., then to San Francisco, or London to Paris with four passengers, adding four more in Paris, then flying to Dubai. The 2000DX first flew on June 19 and certification and deliveries should take place by year-end.

The second D-Jet took to the skies on July 20 and was built on production-conforming tooling with the same manufacturing processes that will be used for volume production. This is the first of four conforming prototypes that will be used for the certification program. S/N 2’s role is aerodynamics and performance testing; number three will be used for systems development; testing of electrical, autopilot, de-icing and the three-display Garmin G1000 avionics suite will be done in number four; and S/N 5 will conform to the.

**DIAMOND D-JET**

Like Cirrus Design, Diamond Aircraft is making the leap into the single-engine jet marketplace without the interim step of manufacturing a turboprop design. And also like Cirrus, Diamond is targeting the so-called personal jet market with a compact all-composite single-engine jet that will have a maximum altitude of 25,000 feet and a roomy interior. The D-Jet interior is smaller than that of the Cirrus jet, however, and will seat a total of five occupants, with three on the cabin’s bench seat.

The second D-Jet took to the skies on July 20 and was built on production-conforming tooling with the same manufacturing processes that will be used for volume production. This is the first of four conforming prototypes that will be used for the certification program. S/N 2’s role is aerodynamics and performance testing; number three will be used for systems development; testing of electrical, autopilot, de-icing and the three-display Garmin G1000 avionics suite will be done in number four; and S/N 5 will conform to the.

**NEW BUSINESS JETS**

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| Program launch date | First flight date | Certification date | First delivery date | Number of crew and passengers | Cabin dimensions | Cabin volume | Engine make/model | Engine certification date | Engine thrust rating (sea level, ISA) | Engine derated thrust (sea level, ISA) | Avionics suite | MTOW | MLW | ZFW | BOW | Maximum fuel weight | Mmo | Vmo | High-speed cruise speed | Long-range cruise speed | NBAA IFR range | Certified maximum altitude | Cabin altitude at maximum altitude | Balanced field length | Certified maximum altitude | Cabin altitude at maximum altitude | Balanced field length | Number of aircraft on firm order | Standard equipped price |
|---------------------|-------------------|--------------------|--------------------|-------------------------------|------------------|--------------|------------------|--------------------------|-------------------------------------|-------------------------------------|----------------|--------|--------|--------|--------|---------------------|------|-----|----------------------|----------------------|---------------------|------------------------|--------------------------|---------------------|--------------------------|--------------------------|
| Dassault Falcon 2000DX/2000LX | November 2005 | June 19, 2007 | Est. end of 2007 | Est. Q3/08 | 2 x 8 | 26.2 x 6.2 x 7.7 ft | 1,024 cu ft | P&WC PW308C (2) | N/A | 7,000 lb | N/A | Honeywell EASy | 41,000 lb | 39,300 lb | 29,700 lb | 23,190 lb | 14,600 lb | N/A | 250 kcas | 482 ktas | 751 ktas | 3,250 nm/4,000 nm at long-range cruise | 47,000 ft | N/A | 4,800 ft | 4,800 ft | 300+ | $27.3 million |
| Diamond D-Jet | Early 2003 | April 18, 2006 | Est. Q3/08 | Est. Q3/08 | N/A | 11.67 x 4.5 x 4.75 ft | 165 cu ft | Williams FJ33-4 (1) | N/A | 1,400 lb | N/A | 3-screen Garmin G1000 | 5,070 lb | 4,820 lb | 4,070 lb | 3,070 lb | 1,740 lb | Mach 0.56 | 315 kcas | 240 kcas/Mach 0.40 | Details published with flight-test results of D-Jet S/N 002 | 25,000 ft | 8,000 ft | 2,200 ft (takeoff distance over 50 ft) | S/N 2 | 300+ | $1.38 million (July '06 $) |
EMBRAER PHENOM 100

The Phenom 100, Embraer’s very light jet, made its first flight on July 26 and is on schedule for Brazilian and FAA certification and entry into service next year. EASA certification is planned for the first half of 2009.

While the Phenom 100 is close to its planned certification next year, Embraer has not yet released any weight numbers for the jet other than to say the airplane is expected to have an mtow of about 10,000 pounds.

Construction of the Phenom 100 is traditional aluminum, and engines are the 1,615-pound-thrust Pratt & Whitney Canada PW617F. Embraer is branding the Phenom 100’s Garmin G1000-based avionics suite as the Prodigy flight deck. Prodigy features three interchangeable 12-inch displays, two used as primary flight displays and one in the center as a multifunction display. Garmin will also provide the Phenom 100’s GFC700 autopilot as well as a panel-mounted keyboard for pilot input to avionics the system.

BMW DesignworksUSA designed the Phenom 100’s interior. The cabin is wider and taller than that of the Adam A700, Cessna Mustang and Eclipse 500. The executive layout features four seats facing each other club style. Customers can also order seats-facing-forward configurations, with four seats for air-taxi operators or six seats in air-limo style (without the lavatory).

The Phenom 100 is currently undergoing static and fatigue ground testing while flight testing of the first airplane continues and additional flight-test aircraft are completed. Phenom 100 number two is scheduled to fly this month. Numbers three and four and production versions will all be manufactured at the new Gaviao Peixoto facility.

EPIC ELITE

Epic Aircraft’s unusual road to FAA certification of new business jet models appears to be paying off, as the company logged millions of dollars worth of sales at July’s EAA AirVenture show in Oshkosh, Wis. Epic launches its designs, which include turboprops and jets, as amateur-built airplanes, then uses data gathered from flights of those airplanes to support the certification program.

At AirVenture, Epic said it had logged $40 million in sales. For the single-engine Victory, Epic said that 25 percent of sales...
were for the certified version, but sales for the twin-engine Elite were primarily for the certified airplane.

The Elite should be Epic’s first certified jet program and is scheduled for certification in 2010. Epic is planning to certify airplanes first in Canada at a facility it is building at Springbank Airport in Calgary, Alberta. That facility also includes a customer build center for the amateur-built Epics.

The Elite is powered by two Williams International FJ33-4s and first flew on June 7, followed by a public debut at AirVenture alongside the single-engine Victory.

Price of the six- to eight-seat 412-knot certified Elite is $2.2 million.

**EPIC VICTORY**

This seems to be the year of the single-engine personal jet, and Epic Aircraft is offering one called the Victory. Epic Aircraft’s team of engineers and builders managed to deliver the first all-composite Victory in less than seven months and brought it to the EAA AirVenture show at Oshkosh.

The Victory first flew on July 6 at Epic’s Bend, Ore. facilities, and the jet had already accumulated about 50 hours by the time it arrived in Oshkosh.

Like the Epic Elite, the Victory will be certified in Canada first and also is available as an amateur-built version, carrying a price tag of about $1 million. The certified version should cost $1.3 to $1.5 million.

Epic hasn’t decided which engine will power the Victory. The prototype flew with the Williams International FJ33-4, but the company is considering either the Pratt & Whitney Canada PW615 or 617.

With a certified ceiling of 28,000 feet, the Victory won’t quite make it into RVSM airspace. Maximum cruise speed should reach 320 to 330 knots. With a maximum weight of 5,950 pounds, the Victory will be able to carry a full load of people 1,200 miles, with reserves, at the 250-knot economy cruise speed. Epic is projecting certification in 2009.

**GROB SPn**

Grob Aerospace is forging ahead with plans to earn EASA certification of its SPn light jet shortly after April next year, followed by FAA certification during the second quarter. Orders stand at more than 60 aircraft, which will keep the production line humming for the first two years. The SPn, made of carbon fiber, will sell for less than $8 million.

The airplane will be certified for single-pilot operation and will fly 1,800 nm with NBAA IFR reserves at long-range cruise speed of 355 kts. At sea level, the SPn will have a balanced field length of 3,000 ft.
which meets Grob’s design goals of offering turboprop field performance in a modern jet. Mtow is 13,889 pounds and maximum altitude 41,000 feet. Power is provided by two Williams International FJ44-3As, each delivering 2,820 pounds of thrust.

The third flight-test airplane—to be used for systems testing—joined the fleet in August. Completions might be done eventually at Grob’s new facility at the Pease International Tradeport in Portsmouth, N.H., but that hasn’t been decided yet. The Portsmouth facility’s primary focus is product support, parts distribution and customer delivery.

Designed by Porsche Design Studio, the interior of the SPn features an eight-seat option with forward lavatory and galley or six seats with aft lavatory and forward galley. The eight-seat interior is convertible to a cargo configuration that can fit standard 84-centimeter pallets.

HAWKER BEECHCRAFT
HAWKER 750

Launched at last year’s NBAA Convention, the Hawker 750 made its first flight on August 23. Like Dassault Falcon’s 2000DX, the Hawker 750 is a derivative model that fills another market niche with a shorter-range version of an existing airplane. The Hawker 750 is basically a Hawker 800-series without the ventral fuel tank. Continues on next page.
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Instead of the tank, the Hawker 750 has a heated external baggage compartment that adds 32 cu ft of baggage capacity. Range without the ventral tank is 2,100 nm. Hawker Beechcraft expects deliveries of the $11.2 million (standard) or $11.9 million (typically equipped) Hawker 750 to begin after certification late in the fourth quarter.

HAWKER BEECHCRAFT HAWKER 900XP

Also launched at last year’s NBAA Convention, the Hawker 900XP boasts a new engine—the Honeywell TFE731-50R—and winglets, which reduce fuel burn and total direct operating costs by 5 percent. The new engine delivers 4.5 percent more power at 5,000 feet in ISA+20 conditions and increases major periodic and compressor zone inspection intervals, to 2,100 nm from 2,111 nm in the 850XP. Compared to the 850XP, the 900XP requires 1,767 fewer feet less runway when departing from a 5,000-foot airport in ISA+20 degrees C conditions, according to Hawker Beechcraft. In addition, the 900XP can fly 611 nm farther.

HONDA HONDAJET

At 9,200 pounds mtow, Honda Aircraft’s HondaJet qualifies as a sub-10,000-pound very light jet. At that weight, which is not currently part of Honda’s publicly released specifications, the HondaJet should be able to outclimb its competitors, thanks to a weight-to-thrust ratio that is better than that of a Learjet 25 and lower than that of other small jets. Honda Aircraft hasn’t yet released any time-to-climb numbers, but the HondaJet, powered by two 2,050-pound-thrust GE Honda Aero HF120 turbofans, should exceed outpace airplanes with higher weight-to-thrust ratios like the Adam A700, Cessna Mustang, Eclipse 500 and Embracer Phenom 100. At $3.65 million, the HondaJet isn’t aiming for the low-cost VLJ business model. Rather, its designers have made performance and cabin comfort the priority. The HondaJet, for example, will have seating for two crew and five passengers or one pilot and six passengers and an enclosed lavatory in executive layout. For air-taxi or corporate shuttle operations, six passenger seats with two pilots are an available option, but this configuration won’t offer the lavatory.

With a high-speed cruise of 420 knots at 30,000, the HondaJet will be able to carry a maximum payload of 3,378 pounds, or full-fuel payload of 1,400 pounds. Maximum altitude is 43,000 feet. With full fuel, one pilot and a 644-pound payload, range is 3,120 ft, which increase the display area by 55 percent compared to the 604. The 605 also has a 200-pound addition to payload, which increases operational flexibility. The 605 entered service in January.

BOMBARDIER LEARJET 60XR

Bombardier’s Learjet 60XR received certification and began deliveries in July. Equipped with a new four-display Rockwell Collins Pro Line 21 avionics suite, the 60XR offers new interior options. These include a larger galley and vanity cabinet, five different floor plans, LED lighting, added storage space and a new Audio International cabin electronic system. In designing the new cabin layouts, Bombardier engineers were able to reclaim a window in the aft lavatory area.

CESSNA CITATION ENCORE+

Cessna’s follow-on to the Encore, the Encore+, received FAA type certification last December. The Encore+ adds FADEC-control to the Pratt & Whitney Canada PW535B engines, Rockwell Collins Pro Line 21 avionics, LED cabin lighting and 340 more pounds of payload compared to the Encore.

CESSNA CITATION MUSTANG

Cessna’s Citation Mustang qualified as the first very light jet to achieve complete FAA certifications when Cessna was granted the type certificate on Sept. 8, 2006. The only pending item, known-icing certification, was wrapped up two months later. Cessna has honored the art of airplane
development into a tightly scripted process and achieved the milestones set when the Mustang was launched in 2002 on time or ahead of schedule.

While early Cessna Citations experienced several teething problems, the only trouble that the Mustang had was a software bug in the Garmin G1000 avionics suite, which delayed early deliveries by five weeks. The first delivery took place in December 2006. During the first quarter of this year, Cessna did not deliver any Mustangs but ramped up to 10 deliveries during the second quarter.

**DASSAULT FALCON 7X**

The 7X, the first clean-sheet business jet certified with fly-by-wire flight controls, was jointly certified by the FAA and EASA on April 27 and entered service on June 14. Dassault and its contractors used a product lifecycle management system to coordinate the design and manufacturing efforts, which helped reduce the time to build the first flight-test 7X by 50 percent compared to previous Falcon programs.

Advantages of fly-by-wire flight controls include weight savings compared to mechanical flight controls, lower maintenance costs and safety benefits, including flight envelope protection that allows pilots to fly to the limit of the 7X’s capability without breaking the airplane.

Equipped with Honeywell EASy avionics, the P&WC PW307A-powered 7X can fly 5,950 nm with eight passengers.

**ECLIPSE 500**

Eclipse Aviation is well into its first year of volume deliveries and after receiving its FAA production certificate in April has ramped up the assembly line at the company headquarters in Albuquerque, N.M. By the end of June, Eclipse had certified 31 airplanes and delivered 22 to customers.

The improvements include larger wingtip fuel tanks, a redesigned tail bullet, engine nacelle refinements and main landing gear fairings. All earlier Eclipse 500s will be modified to the latest configuration. The FAA certified the performance improvements and issued a revised type certificate for the Eclipse 500 reflecting the changes. The biggest changes evident from the revised type certificate are new maximum ramp and takeoff weights.

The Eclipse 500 was FAA certified last September with a maximum ramp weight of 5,800 pounds and mtow of 5,760 pounds. The new numbers are 6,029 pounds maximum ramp weight and 5,995 pounds maximum takeoff weight. Zero fuel weight climbed to 4,922 pounds from 4,860 pounds, and maximum landing weight grew to 5,600 pounds from 5,415 pounds.

A freezing problem with the pitot/angle-of-attack probe has been resolved and all Eclipse 500s have already been modified with the new AOA/pitot system. A cracking problem with cockpit windshields and side windows continues on next page...
windows has also been solved by adding more fasteners to the window assemblies. This improvement resulted in increased replacement and inspection intervals. Inspections must now be done every 300 flights, with windshield replacement at 1,500 flights and side windows at 600 flights.

Eclipse’s next steps are to certify the Avio NG avionics system, which will provide full avionics functionality for the Model 500, and obtain known-icing certification. Eclipse demonstrated the first Avio NG system in a Model 500 at EAA AirVenture Oshkosh and expects to retrofit the entire fleet by year-end.

HAWKER BEECHCRAFT

After a long development process, the Hawker 4000 received FAA certification last November, but volume deliveries have yet to begin.

A Hawker Beechcraft spokesman told AIN that the company is working on obtaining its FAA production certificate to ramp up Hawker 4000 production and that, in late August, all the necessary paperwork had been provided to the FAA. Deliveries should begin next month, the spokesman said.

The Hawker 4000 is the second of Hawker Beechcraft’s composite-fuselage business jets; the first was the Premier I. The composite fuselage takes up less valuable cabin space with structure, and the Hawker 4000 has a stand-up cabin 72 inches high and flat floor for the length of the cabin.

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