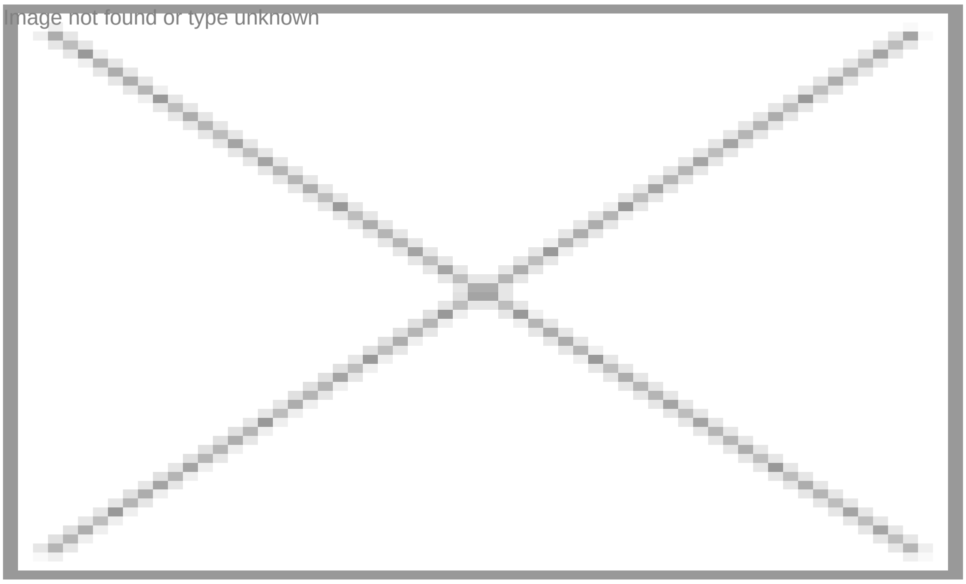
PILOT REPORT: FLYING THE HONDAJET HA-420

News / Business aviation, Manufacturer

Michimasa Fujino, founding president and CEO of Honda Aircraft Company, Inc. (HACI) is understandably proud of the new HondaJet. He has personally guided its progress from initial conception to a fully developed model and certified aircraft, fighting through at least five years of delays in the process.

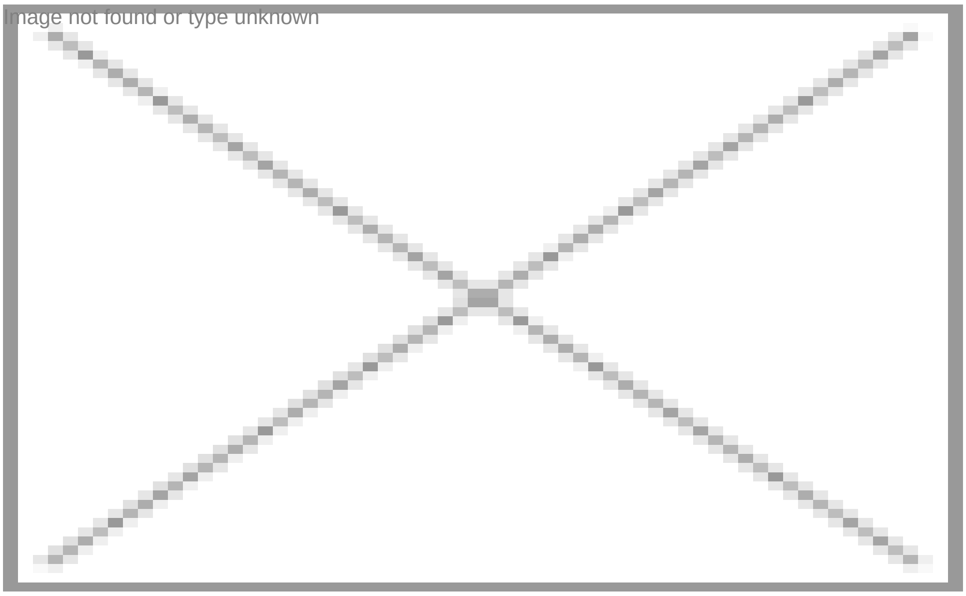
As expected, he is highly protective of this first member of what's likely to be a family of models as it makes its entrance into the world.



This is the culmination of his 30-year dream of building the world’s most advanced light jet, one that would be the highest flying, fastest cruising and most economical, one that would offer passengers the most cabin volume, the quietest interior and the smoothest ride.

His is a product of both nature and nurture. By nature, it has one of the least conventional designs ever incorporated into a production aircraft. Through nurture, it exhibits Fujino’s exceptional attention to detail, including his 3-in. close-up inspection standard for quality assurance. He indeed is the Tiger Dad of the business aviation industry.

He candidly admits, though, that when he first showed a drawing of Honda’s first-ever aircraft to team members at the company’s top-secret R & D facility, their reaction “was kind of unanimous — very ugly.” But as he explained the design details, including its drag-reducing over-the-wing engine mount configuration, bulbous nose that promotes laminar flow along the fuselage, plus its improvements in passenger comfort and luggage capacity, they warmed to its potential as a viable production aircraft.



Despite its apparent merits, the HondaJet project at one point was in danger of suspension. In

1996, Honda shut down most of its aircraft R & D projects and sent the engineers back to Japan to focus their efforts in the increasingly competitive automotive sector. Undeterred, Fujino went to top management and passionately pled his case several times for continuing his jet project. Potential demand for light jets was then especially strong in the U.S., where general aviation aircraft had access to 5,000 airports.

He personally had experienced the inconvenience and inefficiency of America's hub-and-spoke airline system that only offers regular nonstop service between a few dozen major cities. Consequently, he reasoned, smaller cities needed smaller jets, such as the HondaJet, to provide essential air transportation.

Pushing ahead with the HondaJet also would be true to the legacy of company founder Soichiro Honda, who was as fascinated by airplanes as he was by ground vehicles. And as with Honda's automobile design thrust, the HondaJet would offer pilots crisp handling, a sporty thrust-to-weight ratio and unparalleled human engineering.

Fujino's dream now is reality. HACI is delivering the first few HA-420 HondaJets to dealers and owners.

Recently, he took us on a tour of HACI's sparkling and sprawling campus at Piedmont Triad International Airport (KGSO) in Greensboro, North Carolina. (Early on, Fujino experimented with a prototype using Mississippi State University's flight research laboratory. When it came time to set up a production facility, he wanted to remain within the jurisdiction of the FAA's Atlanta office and his company already had good experience manufacturing in the Tar Heel state.)

Our tour included a ride in FlightSafety International's Level D HondaJet simulator with Ken Sasine, HondaJet's chief test pilot. FlightSafety also provided us with a complete set of HondaJet training and operational publications. Then, we flew s.n. 11 with Sasine the following day. And little more than one week later, Will Cutter of Cutter Aviation gave us the opportunity to fly a second time, in HondaJet s.n. 15 with demo pilot Hall Lewallen.

Below, we provide a deep dive into the details of one of the most creative aircraft designs in the history of business aviation.

Hints of Things to Come

Quite clearly, HACI's $120 million, 680,000-sq.-ft. campus, sited on a 130-acre parcel on the east side of KGSO is sized to accommodate future HondaJet models. The hangar doors, for instance, are nearly twice the height of the HA-420's 15-ft.-high T-tail and they open more than twice as wide as its 40-ft. wingspan. And there is ample open adjacent land available for future expansion.

The plant is part demonstration factory for parent company American Honda and part showcase for HACI's advanced aerospace design capabilities. Plant security is paramount. Cameras are forbidden. There is tiered access through locked doors and gates to each section of the facility so that specific employees only are admitted to areas where they have permission to enter.

One reason could be the U.S. Department of State's controls on exporting advanced technologies that have potential military weapons applications, thus the International Traffic in Arms Regulations framed placard prominently displayed in the visitors lobby.

Once inside, guests can see that HACI's work environment is similar to Honda's massive automotive plant at Marysville, Ohio. The ceilings, walls and floors are bright white and abundantly illuminated with overhead LED arrays. Factory workers all are clad in white coveralls with their names embroidered on right sides for easy identification. Mid-shift work breaks are provided for calisthenics.

In addition to the FlightSafety training center, our tour included the customer support hangar, production line, iron bird mock-up, stress and fatigue rig, and flight test area. Most of these points of interest had large-screen monitors that played informational videos explaining the relevance of activities at that site. No expense has been spared to fit the plant with top-shelf computer-controlled mills, automated tools and precision assembly fixtures. Staffing now is up to 1,580 people who work in two shifts per day.

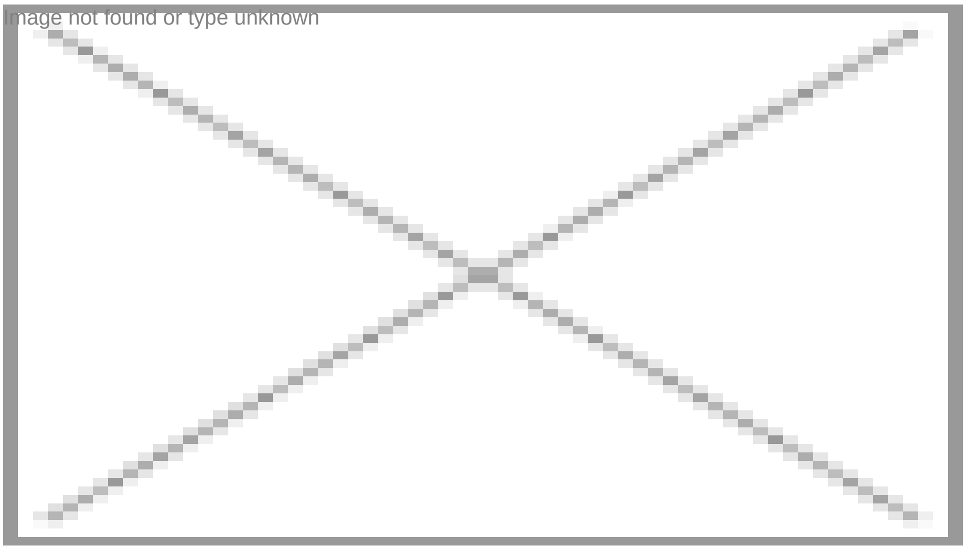
Looking at the inner workings of the plant, it's apparent that research, design, development and testing are the major focus areas at the present time. The HondaJet, for example, is designed for a 20,000-cycle fatigue life and it's already been through 15,000 of 40,000 cycles in the test rig. There are examples of attention to design detail everywhere in the R & D department. Rigorous acoustic testing of the fuselage, for instance, enabled HACI to pinpoint noise emitters and tailor specific insulation blankets for each panel section of the cabin based upon the frequency and amplitude of the sound. Fujino said that such targeted insulation design reduced weight by at least 40 lb., but that cabin noise levels are by far the lowest in the light jet class;

Activity on the assembly line, in contrast, is proceeding slowly. There are 40+ airframes in various stages of completion, but fewer than three aircraft per month are being produced. HACI is in the final stages of earning its production certificate, enabling the factory to clone aircraft with certificates of airworthiness. Currently, each aircraft must be individually inspected for the approval.

In addition, HACI is in the final stages of earning approvals for flight in icing conditions, group approval for flight in RVSM airspace and removal of the requirement to use anti-icing additive in fuel. All approvals should be complete by the time that full-scale deliveries to customers begin at midyear.

High-Tech Airframe and Systems

Fujino's undergraduate degree from the University of Tokyo was in aeronautical engineering. He began his career with Honda working in automotive research but was soon assigned to aviation research. HondaJet's over-the-wing engine mount (OTWEM) configuration is the result of his computational fluid dynamics (CFD) analysis of dozens of clean wing, aft pylon-mounted and OTWEM configurations. Most previous attempts at OTWEM, particularly the 1970s-vintage VFW-Fokker 614, resulted in a substantial degradation in wing performance. Only a few models, such as the Beriev B-200 seaplane water bomber, have successfully employed the concept.



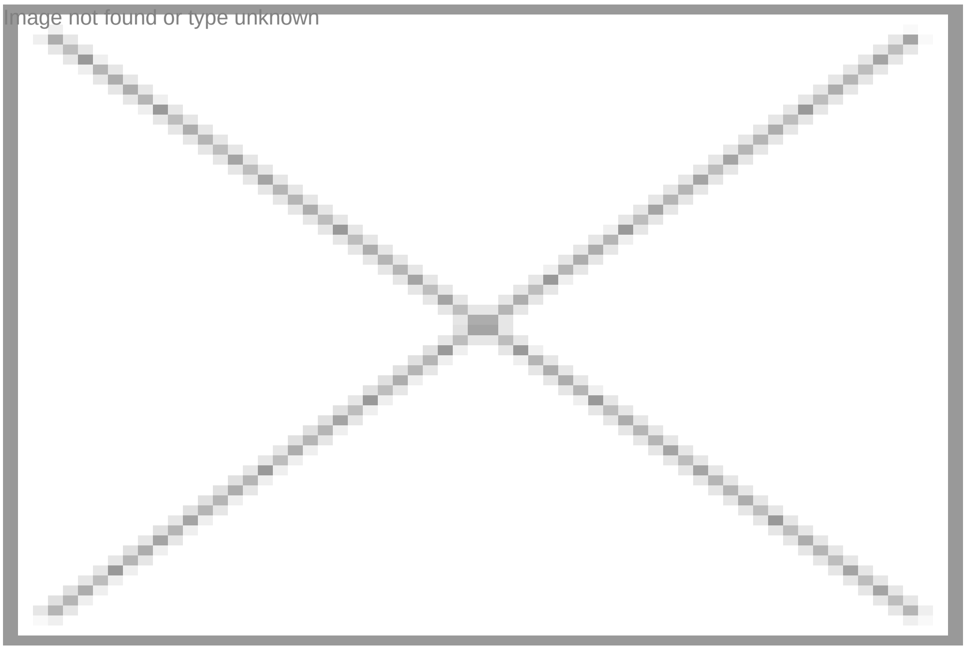
Fujino found that positioning the engines relatively far aft, atop the wing, along with using CFD to shape, size and offset the engine pylons, actually improved the wing's aerodynamic performance by increasing the drag divergence Mach number, the speed at which shock wave drag begins to rise substantially, compared to a clean wing. For the HondaJet, though, the drag divergence Mach number for either the clean wing or OTWEM configuration is well above Mmo, so the comparison is largely academic.

More relevant to everyday operations, he also discovered that the OTWEM configuration improves maximum lift coefficient by 7%, thereby lowering stall speeds. Other benefits of moving the engines onto the wings include a longer net fuselage section that can be used for passengers and baggage because the engine mounting beams don't pass through the structure, lower wing bending moment and less engine noise and vibration being transmitted to the cabin.

Fujino's team and a consulting engineer developed the SHM-1, a new high-speed, laminar flow airfoil for the aircraft that has an 8.5:1 aspect ratio, approximately 15% chord thickness, 9% of span winglets, a 38% taper ratio and 5.1-deg. washout angle. Notably, leading edge contamination results in only a 5.6% reduction in lift coefficient, according to wind tunnel tests. That's impressive for an NLF airfoil that depends upon precise surface smoothness for optimum performance.

The airfoil shape yields a favorable pressure gradient to 42% chord on the upper surface and 63% chord on the bottom surface. The SHM-1 bears some resemblance to the NASANLF(1)-0215F and NLF(2)-0415 airfoils designed by Dan M. Somers, but the shape is refined to achieve a better blend of maximum lift, pitching moment and drag divergence at higher cruise Mach numbers.

Scaled versions of the airfoil were tested in high-speed and low-speed wind tunnels. A full-scale section of the wing was tested by modifying the wings of a T-33 to validate its performance.

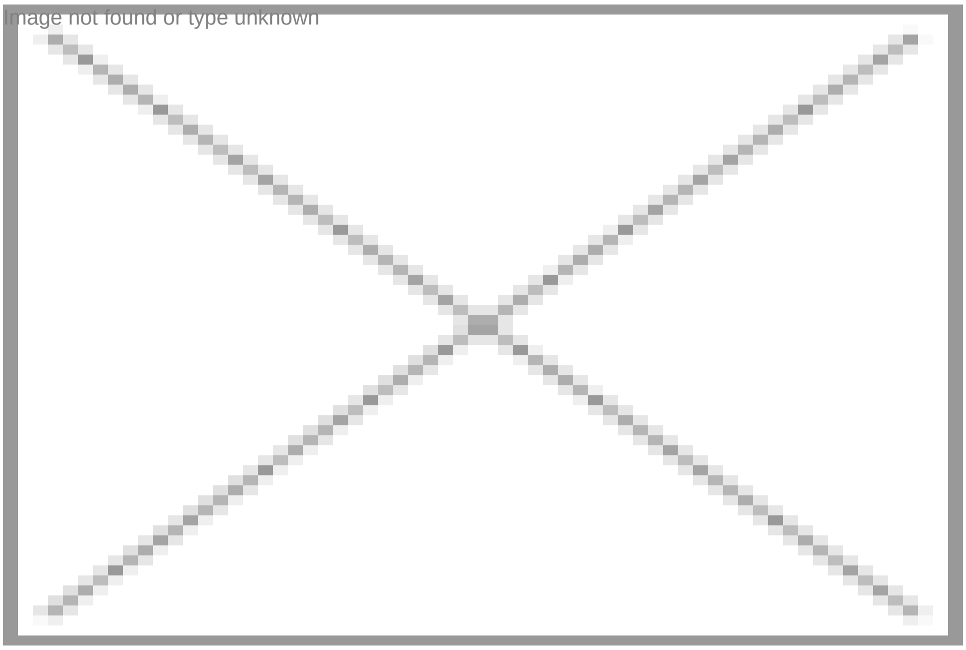


The wing is fabricated from aluminum alloy, opting for metal instead of composites because of better overall combination of strength, weight and volumetric efficiency for fuel storage. Concentrated loads in the areas of the engine mounts also favored use of aluminum construction. The left and right single-piece upper and lower wing skins are milled out of solid billets of metal because shot peening couldn’t produce the consistently tight dimensional tolerances needed to achieve the required laminar flow.

For operators, the aero performance of the SHM-1 airfoil with its OTWEM configuration and winglets means that the wing can be smaller, resulting in less drag, a higher wing loading for ride comfort and better fuel efficiency.

The downside of the small wing and relatively wide stance of the aircraft’s GE Honda Aero Engines HF120 turbofans is higher takeoff V speeds and longer takeoff field lengths. At MTOW, for instance, the HondaJet’s V2 takeoff safety speed is 120 KIAS compared to 98 KIAS for the Embraer Phenom 100E and 111 KIAS for the Cessna Citation M2. Standard-day TOFL at MTOW is 3,934 ft. for the HondaJet versus 3,123 ft. for the Phenom 100E and 3,210 ft. for the Citation M2.

Fujino also created a uniquely shaped fuselage featuring a bulbous nose that promotes laminar flow for a relatively long distance down the fuselage, thereby cutting drag by 10% compared to a turbulent flow fuselage shape. Composite construction also promised a 10% to 15% reduction in weight compared to aluminum, plus a much smoother skin conducive to laminar flow. Actual weight savings was about 8%, according to Fujino.



GKN Aerospace manufactures the composite fuselage components at its Tallassee, Alabama, plant and then ships them to its Orangeburg, South Carolina, plant for assembly. Fuselage halves are laid up by hand in female molds using prepreg cloth Toho G30-500 carbon fiber infused with Cytec 5276-1 epoxy resin. Properly cured, this prepreg has the impact resilience and damage tolerance required for aerospace applications. Plies are four to 10 layers deep depending upon stress concentration. The outer ply is a special Cytec film with an embedded copper mesh for HIRF and lightning protection, along with providing a ground plane for mounting antennae.

Fujino uses a carbon fiber/Nomex honeycomb/carbon fiber sandwich construction for the complex curve nose and tail sections. The constant diameter center section is a “stiffened panel” or “black aluminum” semi-monocoque structure using stressed skins, longerons and hoop frames. Entire left and right fuselage halves, including sandwich sections, and black aluminum skins and longerons are co-cured in a 350F/85 psi autoclave. The hoop frames are manufactured separately and then glued in with Scotchweld adhesive when the left and right halves are joined. The top and bottom edges of the two halves also are glued together. The hoop frames are beefier in the center section to handle the loads of the wing attachment points. The rear pressure bulkhead essentially is a composite plate reinforced with composite beams. The forward pressure bulkhead is an aluminum structure that is integrated with the nosewheel strut mount and wheel well. Some rivets also are used to join composite parts to provide required damage tolerance strength.

The vertical fin and horizontal stabilizer of the T-tail are conventional semi-monocoque aluminum structures.

Systems design is as advanced as the airframe structure but elegantly simple where possible. The primary flight controls are manually actuated through conventional cables, pulleys, bell cranks and pushrods. The autopilot incorporates a combined yaw damper/rudder boost system. The aircraft has three-axis electric trim with primary and secondary horizontal stab trim systems and single path aileron and rudder trim tab systems. The 30% chord, double-slotted trailing edge flaps are electrically actuated with up, takeoff/approach (15.7 deg.) and landing (50 deg.) positions. An optional split-tail speed brake in the aft fuselage is quite effective in flight but has little effect on runway stopping performance. There are no ground spoilers.

The split bus electrical system is powered by left and right 24-volt, 28-amp/hour lead-acid batteries and left and right 28-volt, 325-amp starter generators. Lithium-ion batteries will be optional when the technology further matures. An external power receptacle is positioned just ahead of the right wing leading edge, low on the belly fairing. Left and right doors in the belly fairing, forward of the wing's leading edge, provide access to the batteries and adjacent power distribution units. The PDUs have physical circuit breakers for maintenance and ground servicing access, electronic solid-state relays that can be controlled from the cockpit and various load shed relays.

When an engine is started, the electrical system ties together the left and right bus systems. The loads are split between the left battery that provides uninterrupted power for systems and the right battery that starts the engines. Once one engine is running, its generator assists the right battery in starting the other engine. Connecting the aircraft to external power supplies both buses except during engine start when it assists the right battery. Having a GPU also means the electrically powered vapor-cycle air conditioner can be operated prior to engine start.

When both engines are running, the system reverts to split-bus configuration with the left and right generator and battery powering their respective sides.

Fuel is stored in left and right 93.5-gal. wet wing tanks, plus 243.7 gal. in the center wing carry-through tank and aft fuselage bladder tank that's vertically mounted on the rear of the aft pressure bulkhead. A single refueling port in the aft fuselage is used to replenish the system by gravity. The port is 6.2 ft. above the ramp, virtually requiring the use of a ladder during refueling.

Left and right electric boost pumps are used for starting, for cross-feed, when either fuel level or fuel pressure is low. Jet pumps, powered by motive flow fuel pressure from the engine-driven fuel pumps, provide engine fuel supply and transfer functions. Center tank fuel is used first, followed by the fuselage bladder tank and then the wing tanks to minimize wing bending moment.

A single, dual-mode electrically driven hydraulic power pack, using MIL-PRF-87257 synthetic red fluid, supplies three accumulators that actuate the landing gear and optional speed brake, normal and anti-skid wheel brakes and emergency/parking brake plus nosewheel steering. The pump operates at low pressure on battery power and high pressure when an engine is running or external power is available. The accumulators have ample reserve capacity to actuate their associated systems if the power pack fails.

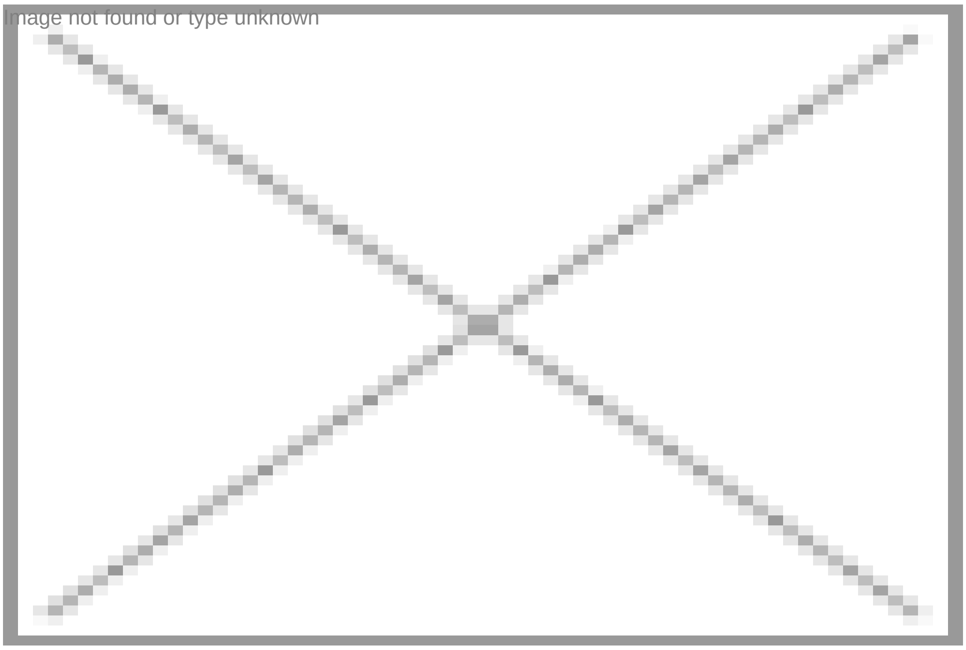
Engine bleed air is used for wing leading edge and engine inlet anti-ice heating, plus cabin pressurization. A separate electro-expulsive deicing system protects the horizontal stabilizer from ice accretion. The windshields, air data probes and ice detector are electrically heated.

The 8.8-psid pressurization system, regulated by primary and secondary outflow valves, is automatic with landing field elevation programmed into the system by the FMS. Cockpit and cabin have separate automatic temperature and fan speed controls. A high-capacity, electrically powered, vapor-cycle air conditioner, with separate cockpit and cabin evaporators, provides cooling in warm weather. The oxygen system has a 50-cu.-ft., 1,850-psi oxygen bottle with quick-donning masks in the cockpit and pressure-activated drop-down masks in the passenger cabin. Crew smoke goggles are stored in the bottom of the crew mask boxes.

Fire protection is provided by a fire detection loop and a single halon extinguishing bottle for each engine.

Cabin Environment, Passenger Amenities and Copious Options

HondaJet sets a new standard for cabin comfort in entry-level light jets. Occupants enter the aircraft through a 2-ft.-wide by 4-ft.-tall airstair door. The pressure vessel's overall length is 17.8 ft. The gross cabin length from cockpit divider to the rear of the aft lavatory is 12.1 ft. The main seating section, including the forward galley storage cabinet, is about 10 ft. long. The standard layout includes four-chair club seating. The OTWEM configuration provides about 14 in. more legroom between facing chairs than in other entry-level light jets. A fifth, forward cabin side-facing chair is optional.



The cabin is 5 ft. wide and 4.9 ft. high, due in part to an 11.5-in.-wide, 5-in.-deep dropped aisle in the center. Each side of the cabin has three, 10.5-in.-wide-by-15.3-in.-tall windows with an electro-chromatic dimming shade. Electrically operated pleated window shades are optional.

A 19-in.-wide-by-26-in.-tall emergency exit plug door is located on the right side of the cabin between the facing chairs. There is a single foldout worktable on the right side of the cabin. Optional are a left-side foldout worktable and cabin power outlets. Many buyers are opting for the Executive Package that includes a slim storage closet behind the pilot's chair, carbon-fiber cabinet face treatment, the right side-facing chair in the forward cabin, upgraded chairs and floor trim upgrade with lighted logos in the aisle railings.

The Executive Package chairs have rake, swivel and forward and lateral track adjustments, plus retractable aisle-side armrests and telescoping headrests. The seat backs are approximately 24 in. high and the bases are 19 in. wide and 14 in. deep. The optional forward, side-facing chair has the same base dimensions with a 19-in.-high seat back. Directly across from that chair is a mini-tray table mounted on the bottom side of a step on the airstair.

Cabin entertainment and communications options include a Gogo Biz Text and Talk system, single-channel SiriusXM satellite radio receiver and basic audio entertainment package, plus basic and enhanced cabin management systems. An audio/visual on-demand system may be offered in the future. HondaJet is in the final stages of certifying a PDA application that will control cabin temperature, window shades, interior lights and IFE.

An aisle carpet runner is not offered. Will Cutter says that he fabricated a custom carpet runner for his demonstrator to protect the standard carpet in the dropped aisle. Some operators also may wish to fabricate their own protective floor liner carpet sections for the main seating areas.

The comparatively roomy aft lavatory is a strong suit. It's available with sliding solid pocket doors (20 lb.), an externally serviced toilet (14 lb.) and lavatory sink with running water (19 lb.). With so many options available, it's useful to peruse the options list for specific weights and prices, particularly to gauge the effect of options on range vs. payload capabilities.

Outside the aircraft, there is a 9-cu.-ft. compartment in the nose that's handy for storing crew gear, duct covers and aircraft equipment. A 57-cu.-ft. aft baggage compartment is accessible through a 31-in.-by-31-in. sliding door with a 46-in.-high sill height for easy loading.

Flying Impressions

Our first flying opportunity was in FlightSafety's Level D HondaJet simulator. Center manager Eric Dixon showed us the facility's "Matrix" classroom learning environment that includes interactive video displays for each student, computerized procedures trainer and six-axis motion simulator. The simulator bay has provisions for a second Level D simulator that will be installed when warranted by client demand.

The low pilot workload of the HondaJet immediately becomes apparent in the sim. Delays in the development of the aircraft enabled HACI to upgrade from its originally planned G1000 to a Garmin G3000 flight deck, providing a step change in aircraft systems and avionics integration. Pre-start checks are automated, weight and balance initialization is quick and flight planning is easy using the Garmin touch-screen control (TSC) units. Operation of external lights, airframe ice protection and transponder(s) is automatic with manual override at the discretion of the pilot.

Actually, the system is a little too automated, in our opinion. We'd prefer to have stand-alone taxi and landing light switches in the cockpit that would be immediately accessible when crossing runways or when instructed to "line up and wait" on an active runway. Stand-alone switches for the beacon and strobes also would be handy for warning ground personnel about an impending engine start or turning off strobes when penetrating thick clouds at night. Such exterior light on/off/automatic switching only can be selected through submenus displayed on the TSC CDUs.

In single-pilot cockpits, however, the G3000's TSC CDUs are easier to use and require less head-down time than other avionics makers' trackball based, point-and-click user interfaces for most other functions, in our opinion. We spent very little time wondering "What's it doing now? And why?" As implemented on the HondaJet, the G3000 truly is iPhone-intuitive because of its easily discoverable user interface.

The TSC CDUs provide complete systems control including audio, weather, traffic and terrain hazard warning systems, setting V speed bugs and display of waypoint information. Future FMS software versions will include full airport performance computations, including OEI climb performance, runway lengths and V speeds.

Aircraft system integration into the G3000 enabled us to check external doors, engine oil levels, fuel quantity in each tank, hydraulic system health, air-conditioning and pressurization system functioning, and electrical system status, including battery charge state, from the comfort of the cockpit. About the only thing missing is an external camera to check to see that the welcome mat and chocks have been pulled prior to taxi.

Fujino's team designed a hands-on-throttle-and-stick airplane. In addition to the standard four-way conical trim switch, there is a left-side on/off checklist control that has a scroll and push feature for sequencing through items and acknowledging they've been accomplished. A long push on the checklist control returns the screen inset back to the previous display, such as an approach chart or weather radar overlap atop a map. The control's on/off feature enables the pilot to cycle between the checklist function and the alternate display almost as fast as picking up or pocketing the hard copy checklist.

The right side of the yoke has a system control shortcut button. When pressed, it takes the pilot to the top level of system controls on the TSC CDU. From there, submenus can be used to control exterior and interior lighting, solid-state circuit breakers, certain engine functions, lights, cockpit and cabin temperature, and other systems functions.

Serial Number 11, the first aircraft we flew, is loaded with all popular options. As a result, it has a 7,381-lb. BEW. With Sasine and me aboard, plus 37 lb. of loose gear and 2,000 lb. of fuel, ramp weight was 9,798 lb. Computed takeoff weight was 9,748 lb. Based upon KGSO's 926-ft. field elevation, 27C OAT and near standard altimeter, V1 was 110 KIAS, Vr was 114 KIAS and V2 was 120 KIAS. TOFL was 3,900 ft. and Venr final segment climb speed was 140 KIAS.

With a GPU providing power, all displays and the air conditioner were powered as soon as we switched on the batteries. After completing the pre-start checks and loading the flight plan, we touched the start button, advanced the throttle to idle and monitored the engine start. Three minutes after engine start, we disconnected the GPU and began to taxi to Runway 23L. The wheel brakes were very smooth, but it took us a little practice not to over-control the power steering. However, it's actually as smooth as the system in the Learjet 75. Power steering eliminated the need to use differential thrust or braking to maneuver the aircraft in tight quarters.

Cleared for takeoff, we advanced the thrust levers to the forward stops. Acceleration was impressive was the aircraft's 2.5:1 weight-to-thrust ratio. Rotation forces were heavy for a light jet, as the main landing gear are positioned well aft of the center of gravity. Once the aircraft lifted off the main wheels, pitch control forces were pleasantly light.

Sasine said that HACI worked diligently to achieve high ratings on the Cooper-Harper handling quality scale. In most of the flight envelope, there is a near ideal 1:2:4 ratio between roll, pitch and yaw control forces. We also noted that roll response is crisp and short period roll and pitch damping is strong. Use of the yaw damper, though, is required for all phases of flight except takeoff and landing. A weight on wheels switch disconnects the damper on touchdown, should the pilot forget.

Atlanta Center was kind to us, clearing us for a direct climb to FL 430. We used the standard 210 KIAS/Mach 0.57 climb schedule. Initial climb rate was in excess of 4,000 fpm. OAT during the climb was near ISA, but it fell to ISA-5C above FL 400, helping our climb rate. Time to climb was 18 min. The HondaJet pilots' operating manual (POM) predicted the climb would take 21 min.

In ISA-5C conditions at FL 430, the aircraft cruised at Mach 0.63 while burning 560 lb./hr. The POM predicted Mach 0.625 on the same fuel flow at ISA.

Down at FL 330 and in ISA conditions, we cruised at 420 KTAS while burning 1,000 lb./hr. at a weight of 9,300 lb., which was very slightly faster than book speed with a slightly lower fuel burn. Conclusion? The HondaJet makes its advertised speed and fuel efficiency numbers, based upon our observations.

After the long-range and high-speed cruise checks, we descended to 17,500 ft. for VFR air work. First impression was that adding thrust causes a noticeable nose-down pitching moment as the engines are positioned well above the center of gravity. Also, extending the speed brake at high speed produces a mild nose-up pitching moment. But the speed brakes are quite effective at slowing the aircraft at high speed or adding drag that permits stabilized descent rates of 7,000 to 8,000 fpm, or more. That asset would come in handy during an emergency descent.

Steep turns are a snap, if operators opt for the optional synthetic vision system. It includes a flight path marker (FPM) that indicates aircraft trajectory. Peg the FPM atop the horizon line and the aircraft won't vary from target altitude. Pitch forces in the 45-deg. bank turns are pleasantly hefty, lessening the need to trim the aircraft in pitch. It takes about 5% more N1 rpm to hold 250 KIAS during the maneuver.

We then flew a standard series of stall approaches in the clean configuration, with takeoff/approach flaps and in the landing configuration. At a weight of 9,140 lb., the stall warning stick shaker triggered at 109 KIAS, 99 KIAS and 95 KIAS in the three configurations. Stall recovery was immediate as soon as pitch attitude was reduced and thrust increased.

Returning to Greensboro, we flew a couple of instrument approaches in IMC to full-stop landings. In cumulus clouds, the aircraft provided a ride quality similar to a large-cabin business aircraft because of its relatively high wing loading. We noted that turbulence does cause some significant nose attitude variations that require control inputs.

At a weight of 9,200 lb., Vapp was 114 KIAS and Vref was 109 KIAS. The aircraft was easy to hand-fly on approach with linear thrust response to throttle movement. Crossing the threshold, we slowed to Vref, pulled the thrust to idle at 50 ft. above the runway and settled into the flare. We encountered some float as the wing sits very low to the runway surface with weight on wheels.

During the second landing, we slowed the aircraft more aggressively when crossing the threshold and there was little float.

We used a similar technique when landing Cutter Aviation's HondaJet demonstrator at Carlsbad's McClellan-Palomar Airport and we encountered very little float. The technique was similar to what we've used in the Eclipse 500 during landings. It, too, has no ground spoilers. It's essential to slow the aircraft well below Vref in the transition to flare to prevent float.

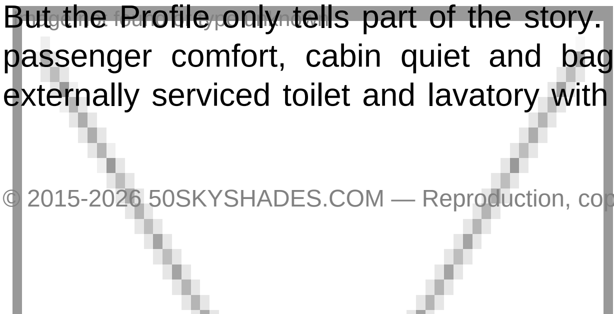
We used the simulator to practice a one-engine-inoperative takeoff. Dixon "failed" the left engine at V1. This caused a pronounced left yawing moment, but it was easily countered with a large amount of right rudder input. Pedal force, though, was impressively moderate because of the effectiveness of the rudder bias system.

Both times when we flew the actual aircraft, we were very impressed with cabin sound levels. Quite clearly, this is the quietest light jet we've yet flown by wide margins. The air-conditioning system is the loudest sound emitter in flight.

Quality, Price and Value

The *BCA* Comparison Profile puts the HondaJet into perspective against the Citation M2 and Embraer Phenom 100E, its two closest competitors in the light jet class. The graph shows it has the highest cruise speeds and sportiest climb performance. It also indicates there are opportunities for improvement in runway performance, tanks-full payload and range.

But the Profile only tells part of the story. The HondaJet raises the bar in entry-level light jets for passenger comfort, cabin quiet and baggage capacity. Optional luxury features, such as an externally serviced toilet and lavatory with running water, are not available in other light jets. The



aircraft also has the best ride quality in turbulence of any entry-level light jet in production, in our opinion.

Fit and finish of this aircraft are unsurpassed in its class. Exterior surface tolerances are tight, all doors fit precisely and the paintwork is superb. The interior furnishings also are first rate, befitting of an aircraft that sells for more than $5.1 million with options.

As a technology demonstrator and testimonial to Honda's design and production capabilities, the HA420 HondaJet is an imposing accomplishment, and has resulted in Fujino receiving several international awards for his work including the American Institute of Aeronautics and Astronautics Aircraft Design Award in 2012 and a Vision Award from *BCA* back in 2008.

However, as is well recognized, the entry-level jet market is far more competitive today than it was when Fujino started production aircraft design in 1997. And today there are more than 400 Citation CJ1, CJ1+ and M2 aircraft in operation and nearly 300 Phenom 100/100E jets. The latest versions of these aircraft are far more competitive than their original models. Moreover, this end of the business aircraft market suffered one of the strongest declines during the 2009 Great Recession.

All this is a small dip in the long-term plans of Honda Aircraft Company, say industry consultants. Honda, a company with long patience and deep pockets, is likely to be in the aircraft business in a big way. Developing the first HondaJet gave it the technologies and experience to develop a wide range of future aircraft with the performance, range, comfort and efficiency to earn sizable shares in several segments of the business aircraft market.

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https://to.50skyshades.com/news/manufacturer/pilot-report-flying-the-hondajet-ha-420