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PHOTOGRAPHY BY CHRIS ROSE



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A SPECIAL SECTION FOR THE TURBINE OWNER-PILOT

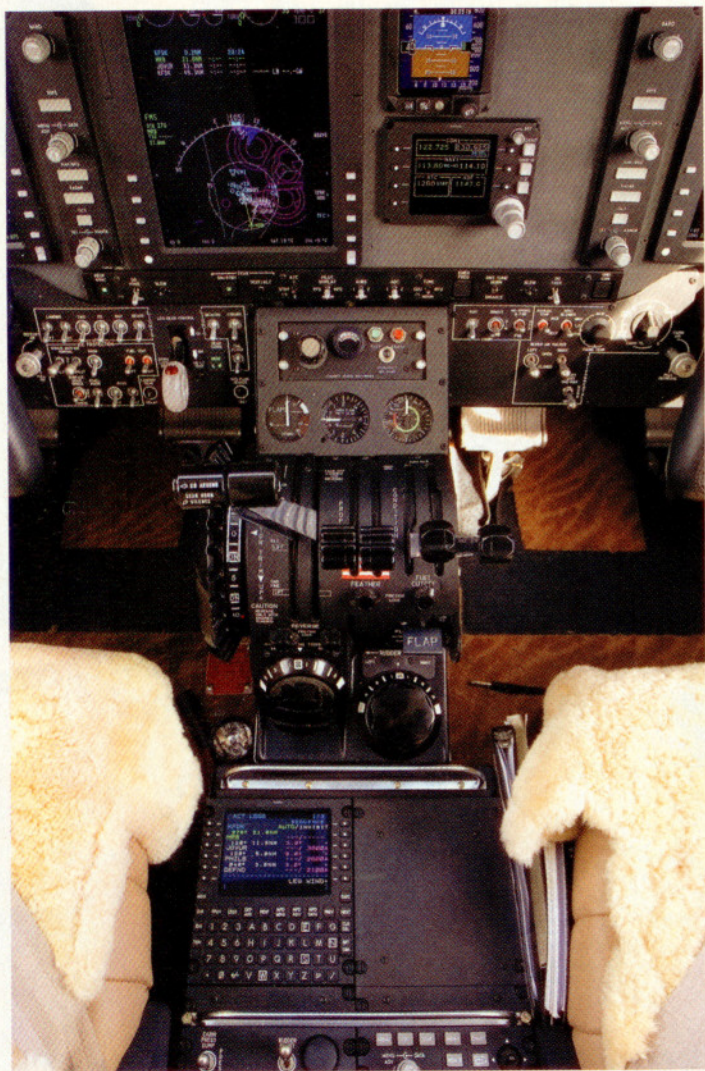
King Air C90GTi:

More power, more panel

BY THOMAS A. HORNE

All the attention given to the burgeoning light and very light business jet market obscures a significant fact: Turboprops are alive and well. Just look at Hawker Beechcraft's King Air line of turboprop twins. King Airs have dominated the turboprop market since their

introduction in 1964, racking up more than 7,000 sales and 50 million flight hours. The 2007 delivery numbers from the General Aviation Manufacturers Association (GAMA) list 157 King Air sales. Compare that to the numbers for the only other turboprop twin being manufactured today—Piaggio Aero's P.180 Avanti, with 21 sales in 2007.



The C90GTi cockpit is a mix of old and new. The power levers, pressurization gauges, and trim controls are in the same places as before (left), but the Pro Line 21's FMS occupies space previously assigned to autopilot controls. Buttons at the bottom right of the photo are for calling up electronic chart views on the multifunction display. Not shown is a hinged cover that can be lowered over the center pedestal—to protect its hardware from being kicked by ingress and egressing pilots.

For many, the C90 King Airs (the so-called “baby” King Airs, even though their max takeoff weights hover around 10,000 pounds) retain their appeal as step-up airplanes for those coming from top-of-the-line complex piston singles and twins, or as alternatives to turboprop singles and light jets. Boosting that appeal has been a priority over the past two years.

GT power

First came an engine upgrade. In 2006, Hawker Beechcraft (then under the ownership of Raytheon) replaced the C90B's 550-shaft-horsepower Pratt &

Whitney PT6A-21 engines with PT6A-135A powerplants. Thus was born the C90GT. The -135A engines are thermodynamically capable of 750 shp, but for the C90 application they're derated to 550 shp—the airplane's originally specified power rating. Why change engines if the power rating is the same? Because that extra thermodynamic horsepower means the engines are capable of producing the full 550 shp under high and hot conditions, and at higher altitudes. This is a result of the -135A's higher ITT (interturbine temperature, as measured between two turbine wheels) redline of 805 degrees Celsius; the -21

engines have 695-degree ITT redlines. That extra 110 degrees of redline margin means more torque and power at altitude, and under other conditions that would have limited the smaller engine. Simply put, the -135As loaf in situations where the -21s “temp out.”

This all boils down to faster times to climb than C90 models prior to the GTs, better takeoff performance, and faster cruise speeds at higher altitudes. Hawker Beechcraft says that the C90GT is 26 knots faster than plain-Jane C90Bs, coming in with max cruise speeds up to 272 knots at 20,000 feet or slightly higher. The C90B tops out at



The Pro Line 21 displays give the traditional C90 panel a radical cleanup (above), yet yield much more information. Autopilot controls are under the glareshield. Here, the pilot's primary flight display shows traffic superimposed on an HSI navigation view. Co-pilot PFD shows radar imagery, flight planned route, and traffic in an arc view. High gear extension speed—182 knots—lets C90GTi pilots merge (right) with faster-moving traffic at high-density airports.

247 knots at 16,000 feet. As for time to climb, the GTi can reach 30,000 feet in 25 minutes. A C90B takes a whopping 46 minutes to climb to that altitude.

During my demonstration flight with Hawker Beechcraft's Trevor Blackmer and Brady Stewart, the C90GTi was still climbing at 1,300 fpm passing through 14,000 feet, and it took us just 16 minutes to reach FL240.

Pro Line glass

Last December, Hawker Beechcraft added Rockwell Collins' Pro Line 21 avionics suite to the C90GT. This latest improvement is just as significant as



the engine upgrade, in that it modernizes the panel, cleans it up, and offers plenty of workload-saving capabilities. The system includes three eight-by-10-inch liquid crystal displays; a glareshield-mounted autopilot/flight guidance mode control panel; a flight management system (FMS); and a ded-

icated radio-tuning unit (VHF radios can also be tuned via the center pedestal-mounted FMS).

The two primary flight displays (PFDs) show airspeed, altitude, and vertical velocity using the now-familiar vertical-tape display format and, using the FMS and flight guidance system, you

TURBINEPILOT

The Pro Line MFD (right) shows engine information along the screen's top border, with torque and interturbine temperature presented on the same gauge. The next information block gives time, speed, distance, plus fuel remaining and landing weight at destination. The MFD plan view shows airspace, nav aids, and flight-planned route. Emergency HSI and radio tuning units (far right, top and bottom, respectively) round out the Pro Line package. VHF nav and com frequencies, transponder codes, and ADF frequencies can also be selected using the communications page on the FMS keypad. Like all King Air cabins, the C90GTi's (below) has plenty of room and comfortable seats.



can put V-speeds, altitude, airspeed, and navigation preselect information on the screens. The flight guidance panel is intuitive to operate, and its location under the glareshield promotes more heads-up time. Earlier King Airs had autopilot and flight guidance controls far aft on the center pedestal, which meant looking down each time an input was made.

Starting from the top of the MFD, you see first the engine indicating system (EIS) information, consisting of analog and digital formats for propeller torque and speed, and engine ITT, turbine speed, fuel flow, and oil temperature and pressure. Next on the screen is a list of flight plan waypoints, along with the time and distance to each.

Also posted is fuel remaining in terms of both pounds and flight endurance.

A range of information can be presented on the lower segment of the MFD, including views of the flight planned route, traffic collision avoidance system targets from the ship's L-3 SkyWatch; ground proximity information from the TAWS (terrain awareness



and warning system); datalink weather from XM WX Satellite Weather; airborne weather radar imagery from the airplane's own Collins WXR-800 weather radar; and electronic Jeppesen arrival, approach, airport, taxi, and departure charts. Victor and Jet airways can be called up on the MFD's map displays, as can checklists. You scroll through checklists with a yoke-mounted pushbutton switch as you complete each item. Again, another design aimed at keeping the pilot heads-up, and not fumbling for printed checklists.

Flight insights

Like all King Airs, the C90GTi exudes a sense of substance. It's a big, sturdy airplane that stands tall on the ramp and turns heads. Once up the airstair door, hang a left at the aft lavatory and make your way forward.

The first time in the cockpit you're sure to be overwhelmed by the Pro Line 21, but anyone familiar with a King Air front office will certainly recognize the rest of the switchology. After all, most of the entire subpanel and center pedestal are unchanged from those in King Airs many years older. Those flying the Pro Line 21 say that it takes about 20 hours to become completely familiar with



working its FMS (a second FMS is optional), programming the flight control system, and setting up the PFD views.

Although the C90GTi is a big airplane, its V speeds are similar to those of big singles. V_1 (takeoff decision speed), for example, is between 83 and 86 knots. Similarly, V_Y (all-engine best rate of climb speed) is 101 knots.

As an example of the effects of the -135A's flat-rating, with climb power set and passing through 14,000 feet,

our ITTs were showing 718 degrees Celsius. ITT redline is 805 degrees. That extra 87 degrees means that you can safely add power (by advancing the power levers to obtain higher torque values) without causing any engine damage. Climbing through FL210, our torque was a hefty 1,300 foot/pounds, but our ITTs were at 776 degrees—still below redline. In a straight C90B, we would have had to cut back on torque (to about 900 foot/pounds)

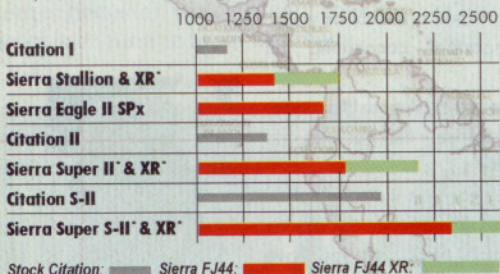
Range Rules.

Typical FJ44 Sierra XR Range:

- Citation I: Chicago to Los Angeles - 1515 nm.
- Citation II: New York to Los Angeles - 2150 nm.
- Citation SII: Miami to Vancouver. - 2433 nm.

MAXIMUM RANGE - NM

Projected Maximum Range Capability



Sierra's new "XR" extended-range enhancements for our Williams-powered Citations kicks these already-capable aircraft up another notch. Featuring a double-walled aluminum fuel cell installed in front of the aft cabin bulkhead, this FAA-approved modification adds up to 60 minutes of additional cruise time and as much as 400 nautical miles to Sierra's FJ44 enhanced-range *Stallion*, *Super II* and *Super S-II* aircraft. The efficient, powerful Williams engines make it possible to enjoy the increased fuel capacity and range while retaining substantial useful payload.

The *Stallion XR* gives you greater speed, range and efficiency than a CJ2 at half the cost. Our Citation 550 and S550-based *Super II XR* and *Super S-II XR* modifications, with more capacity and range, will receive FAA approval shortly. Positions are available now for 2008 deliveries. Call or visit our website for details on these superb Citation enhancements.



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SPECSHEET

King Air C90GTi

Average-equipped price: \$3.327 million

Specifications

Powerplants.....	Pratt & Whitney PT6A135A, 550 shp (flat rated)
Length	35 ft 6 in
Height	14 ft 3 in
Wingspan	50 ft 3 in
Wing area	294 sq ft
Seats (standard)	2 + 6
Cabin length.....	12 ft 7 in
Cabin width.....	4 ft 2 in
Cabin height	4 ft 9 in
Basic operating weight	7,150 lb
Max ramp weight	10,160 lb
Max takeoff weight.....	10,100 lb
Max zero fuel weight	No limit
Max useful load (excluding crew).....	3,010 lb
Max payload (as limited by max landing weight).....	1,934 lb
Payload w/full fuel	437 lb
Max landing weight.....	9,600 lb
Max fuel capacity	384 gal 2,573 lb
Baggage capacity	350 lb, 48.3 cu ft

Performance

Takeoff distance over 50-ft obstacle.....	2,392 ft
Rate of climb, sea level	1,953 fpm
Single-engine ROC, sea level	474 fpm
Cruise speed/range w/NBAA IFR fuel rsv, 100-nm diversion (fuel consumption, both engines); one pilot + 4 pax:	
@ Max power setting, FL290	272 kt/894 nm (612 pph/91 gph)
@ Max range setting, FL260	208 kt/957 nm (332 pph/50 gph)
Max operating altitude	30,000 ft
Service ceiling	30,000 ft
Single-engine service ceiling	19,170 ft
Sea level cabin.....(5.0 psid) to 11,065 ft	
Landing distance over 50-ft obstacle	2,355 ft

Limiting and Recommended Airspeeds

V_1 (takeoff decision speed)	86 KIAS
V_2 (takeoff safety speed)	99 KIAS
V_{REF} (approach speed).....	101 KIAS
V_{FE} (max flap extended)	184 KIAS
V_{LO} (max gear operating)	
Extend	182 KIAS
Retract	163 KIAS
V_{MO} (max operating speed)	226 KIAS
M_{MO} (max Mach number)	0.46 M
V_{SO} (stall, in landing configuration)	77 KIAS

For more information, contact Hawker Beechcraft Corporation; Post Office Box 85, Wichita Kansas 67201-0085; 316-676-5034; www.hawkerbeechcraft.com

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.



Like all King Airs, the C90GTi exudes a sense of substance. It's a big, sturdy airplane that stands tall on the ramp and turns heads.



Beefy gear makes any pilot's landings look good.

to keep from busting that airplane's 695-degree ITT redline.

At max cruise power at FL230, our numbers confirmed book promises. Our torques were 1,260 foot/pounds (redline is 1,520 foot/pounds), ITTs were a comfortable 760 degrees, and fuel flows were 270 pph (about 40 gph) per side. True airspeed was 269 knots—not bad, given the minus-16-degree Celsius free air temperature, which is 10 degrees C above standard. Compared to a typical light jet, we were flying some 70 to 80 knots slower, sure, but the C90GTi's fuel flows are about 100 pph lower. On a typical trip of, say, less than 400 nm, the King Air comes in as the more fuel thrifty.

As for landings, all King Airs are pilot-friendly. Target V speeds for the GTi's final approach segment (V_{REF}) run from 99 to 101 knots, depending on weight. Again, a familiar and easily

memorized speed for those new to the type. Pull the power levers to flight idle at about 10 feet above the runway, hold the nose off, and the result is usually a graceful arrival. Reverse thrust can be used to substantially shorten the rollout.

In all, the C90GTi is a winner. With standard safety features such as auto-feather and rudder bias (to apply rudder pressure in case of an engine failure), the extra engine power, the Pro

Anywhere Map Lines, and a cabin that's comfortable and spacious, this newest King Air maintains a strong tradition. So far, 35 C90GTis have been delivered, and in 2008 Hawker Beechcraft expects 90 more to go out the door. Add those to the 7,000 King Airs already in service and you can see that the market likes the brand. **ACPA**

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