



Learjet 60XR

Pro Line 21 cockpit and cabin upgrades
add utility to the ultimate legacy Learjet.

By Fred George

The Learjet 60 always has had favored status in the Bombardier Aerospace family. That's because it was the first new model to be developed after Bombardier bought the marque from cash-strapped Integrated Resources in 1990. So when Bombardier announced the XR upgrade for its firstborn at the 2005 NBAA Convention, it came as no surprise to anyone in the family back in Wichita.

While first among the Bombardier Learjets, the Model 60 also is the last of the legacy Learjets. It traces its roots back to the 1966 Learjet 24, the almost legendary hot rod of the then nascent business jet industry. The Learjet 24 was capable of out-climbing and

out-cruising any of its competitors by a wide margin. Its pilots, cruising up at FL 410, smirked at folks in lesser performing aircraft, plodding along as much as 100 knots slower and about a mile or two below. Most models that succeeded Learjet 20-series airplanes, such as the 30- and 50-series, provided operators with more utility, larger cabins, better fuel efficiency and lower operating costs, but they just didn't have the same kick-in-the-pants performance of the original.

Up until the Model 60's debut, all previous Learjets depended upon General Electric CJ610 turbojet or TFE731 turbofan engines, sized to power light jets. But the larger Learjet 60 changed all that. It was fitted with two 4,600-pound-thrust Pratt & Whitney Canada PWC305A turbofans, sized from the onset to power midsize aircraft. So when Learjet 60 deliveries began 13 years ago, top

dog performance once again returned to the Learjet lineup. This Learjet could out-climb any other midsize airplane. Seat belts weren't just for safety — aboard this Learjet they were needed to hold folks snugly in their seats during 6,000-plus fpm climbs.

The Learjet 60's climb performance still is unsurpassed by any aircraft in *B&CA's* 2005 *May Purchase Planning Handbook*. It also cruises faster than many competitors. And it gets better fuel economy than most other midsize aircraft because it cruises higher. No wonder many of its pilots have that same smirk of yesteryear's Learjet drivers.

Bombardier has delivered nearly 300 Model 60s since 1993. While the aircraft still has plenty of kick, it has become the patriarch of the Learjet fleet and demand is weakening. After 13 years of production, the Learjet 60, customers and prospects told



Bombardier, was due for a midlife cabin and cockpit makeover.

"We've now addressed all the key issues impacting our customers that they highlighted to us," explained Brad Nolen, manager for product planning and strategy at Learjet. "We've actually gone above the call of duty."

Cabin Improvements

While its cabin cross section has been one of the Learjet 60's strong points, cabin length has not. In spite of the Model 60's fuselage being stretched 28 inches compared to the Learjet 55C, its main, albeit more expensive, competitors still offer three to seven feet more cabin length. So short of making major airframe modifications, Bombardier decided to redesign the interior better to make use of the available volume.

Rearranging the front of the cabin was the key. It made possible the creation of two distinct, usable seating sections. The forward-facing chair on the left side of the cabin, just aft of the entry door, always had been in an awkward position. It was orphaned from the main aft section of the cabin, positioned across from a two-place divan and behind a narrow coat closet. In addition, the left forward seat also was exposed to slipstream noise coming from the entry door. A small galley was squeezed in between the cockpit bulkhead and the divan, which was also exposed to noise coming from the door area.

That's all been changed in the Learjet 60XR. The single, left forward chair has been removed and in its place, there's a new galley, one that has larger cabinets and drawers, plus considerably more counter space. The galley has a tall cabinet on the forward end of the

unit that abuts the interior shell. Bombardier plans to install an acoustical curtain or some other sound absorbing treatment in the space between the galley cabinet and the coat closet to hush the door roar. This improvement, along with a new technology cabin shell supplied by the Nordam Group and improved acoustical insulation throughout the cabin, should lower interior noise levels by several decibels.

Relocating the galley from its old location also makes room for a new three-place divan in the right front section of the cabin. The aft cabin has a four-seat club section, the same arrangement used in the older Model 60. However, all the individual chairs have been redesigned for greater comfort and they will be furnished by IPECO, a well-known supplier of high-strength, lightweight crew chairs. The seat redesign also makes available

photography courtesy of Bombardier Aerospace



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slightly more legroom. Sturdier worktables are fitted to the side walls between the pairs of facing seats.

The two-section configuration will be offered in five layouts. In addition to the basic floor plan just described, the three-place divan may be swapped for either of the pairs of facing chairs in the aft cabin, as shown in the accompanying illustrations. The divan also may be removed entirely from the aircraft and replaced by a pair of facing chairs, creating a six-seat configuration. For higher seating density, the galley may be removed and replaced by a two-seat divan. But it's not known what effect the latter configuration would have on installation of an acoustical door curtain.

The lavatory has been redesigned to expose the cabin window on the left side of the compartment. There's a larger vanity cabinet fitted to the lav and most of the A/V equipment has been relocated behind the aft bulkhead to make available more storage space. The commode will be offered with an optional belted lavatory seat, certified for full-time occupancy.

Improvements have been made to the cabin to increase dispatch reliability. First among these is a switch to LED lighting that will replace the overhead fluorescent wash lights and reading lights. The change reduces electrical load, slashes heat output and potentially increases light MTBF to 5,000 to 10,000 hours, based upon industry experience with LED technology.

The A/V system has been upgraded with Audio International cabin management system control modules that have three-inch LCDs and jacks for connecting laptop computers or Apple iPods to the audio system. Individual CMS units are readily accessible as they are mounted on the face of the sidewall cabinetry, not buried in hidden compartments as before.

Cabin options abound, although Nolen



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said prices for equipment have not yet been set. An Iridium satcom phone, Airshow 410 or 4000 A/V system, front and rear bulkhead-mounted 15.1-inch flat-panel monitors and DVD systems are likely to be popular with buyers, Nolen said. Other options include pyramid cabinets that fit into the recesses behind seat backs, warming or microwave oven, dual hot drink containers, XM Radio and the ever popular, high-gloss finishes for the wood cabinet veneers.

Pro Line 21 Cockpit

Bombardier is making a wholesale shift toward Rockwell Collins Pro Line 21 avionics in its business aircraft line, with the Learjet 60XR the latest model so equipped. It will replace the Pro Line 4, resulting in more display area, reduced weight and power consumption, higher reliability and considerably more capabilities.

Most noticeable are the four eight-by-10-inch Pro Line 21 LCDs, which offer 75 percent more display area than the Pro Line 4's quad pack of six-by-seven-inch CRTs. The PFDs will have edge-to-edge attitude indicators, a first for Bombardier in this class of aircraft. The larger faces enable the LCDs to display both engine and system instruments. Landing gear, trim and wing flap positions, for example, now are presented on the right-side MFD, along with electrical system, cabin temperature control and battery status. This eliminates the need for more than a dozen steam-gauge and system instruments, plus another half-dozen or so stand-alone dials, needles and indicators.

But such electronic instrumentation is only halfway to a true engine instrument/crew alerting system (EICAS) capability. Nolen said it wasn't cost-effective to upgrade to a CAS display on the MFD, so the glareshield panel remains home to more than five dozen annunciators.

All the main digital flight guidance system controls have been moved to the glareshield or to the top of the instrument panel. Moving up the most frequently used autopilot knobs and button controls from the center console to this heads-up position improves CRM because each pilot can more easily monitor the hand actions of the other.

Perhaps the biggest change pilots will notice is the standard availability of Jeppesen E-charts. The baseline aircraft comes with a single Pro Line 21 file server unit that provides this capability, among other functions. Chart selection is linked to the FMS flight plan route, so it's easy to call up the appropriate arrival or departure chart from sub-menus. Both pan and zoom functions are available, so those with less than eagle eyes won't have to strain to see text, symbols and details. Aircraft position is tracked on the E-chart display for added situational awareness.

For full paperless EFB certification, an optional second file server must be installed. Just step on board with a single binder full of en route and terminal area charts and you're ready to fly. Other options include enhanced map graphics capable of displaying geopolitical and special use airspace boundaries, plus airways and jet ways, XM WX Satellite Weather or Universal Weather text and graphics, and a three-dimensional map display of flight plan route.

Plenty of subtle improvements have been wrapped into the Learjet 60XR's Pro Line 21 avionics package. The AHRS, FMS, dual Mode S transponders and radio tuning units all have been upgraded for greater reliability and improved functionality. The RTUs, for instance, now can provide backup engine instrument display, gear and flap position and HSI functions. That's a significant improvement because the RTUs are powered by the emergency bus, along with

the electronic standby instrument system, so there's plenty of useful information available to the crew to continue safe flight and landing should all the normal DC power sources fail. Topping all that, the avionics warranty has been extended to five years.

The Best Learjet 60 Ever

The Model 60XR has considerably more capabilities than its predecessor. It's also priced about \$400,000 higher. With popular options, such as a DVD system, XM Radio entertainment and Iridium satcom phone in the cabin, plus full Class 3 EFB capability and XM weather in the cockpit, the Learjet 60XR will retail at more than \$13 million.

The Learjet 60XR is one of the fastest and highest flying midsize aircraft, plus it has excellent fuel efficiency. But it also has the smallest cabin in its class and the least range. Additionally, it has the highest V speeds and needs more runway than any competitor outside of the Gulfstream G150. This is particularly apparent when departing hot-and-high airports. Once the aircraft is airborne, though, its OEI second-segment climb performance is excellent, surpassed only by the Citation Sovereign.

First flight of the Learjet 60XR is slated for this month. FAA and Transport Canada type certification is on track for third quarter, with initial customer deliveries to begin in early 2007.

Whether Nolen's team has "gone above the call of duty" will be determined by the Learjet 60XR's market acceptance. Nolen said that Bombardier's Flexjet fractional ownership program has 15 on order, but he declined to provide the number of retail orders.

Doubtlessly, the Learjet 60XR is the ultimate legacy Learjet. Bombardier officials hope that will translate into increased sales starting next year. **B&CA**