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# PAC 750XL: rugged and ready


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# PAC 750XL demonstrates toughness, versatility

Developed from a family of aircraft dating back sixty years, the Pacific Aerospace 750XL has evolved far beyond its original role, writes **Andrzej Jeziorski.**

The PAC 750XL utility, built by New Zealand's Pacific Aerospace, is a rugged turboprop whose market appeal has evolved considerably since it was initially conceived, mainly to serve the skydiving sector.

The aircraft has a heritage going back some six decades, evolving over that period from the same manufacturer's FU-24 Fletcher – an agricultural aircraft built for aerial topdressing. Over the years, the Fletcher's characteristic lightness and toughness has been retained as more power, space and improved avionics have been built into the aircraft we see today.

"Because it was originally an agricultural aircraft, a big part of the design focused on minimum weight – but because it was operating from rough strips, it also had to be rugged and durable," says Todd Stephenson, Pacific Aerospace's general manager for sales and marketing. Those attributes, along with the aircraft's high-lift wing, "lend themselves to other roles", he adds.

Thus, Stephenson says, today's PAC 750XL shares the same wing profile as its predecessors, along with its tricycle landing gear – a design feature that originally met with some scepticism from agricultural aircraft operators, where tail-dragging aircraft were the norm. But the tricycle design is helpful because it offers pilots better visibility on touch-down and while manoeuvring on the ground – a useful attribute on unsurfaced airfields.

"Having said that, the 750 is a very different aircraft," Stephenson says, pointing out that the fuselage is 8ft (2.4m) longer than the Fletcher's and the 7,500lb (3,420kg) maximum take-off weight is substantially higher than the older aircraft's 5,430lb.

The FU-24 also had a reputation for being underpowered, with its 260hp (190kW) Continental IO-470-D powerplant. By comparison, the 750XL is powered by a beefy, 750hp Pratt & Whitney Canada PT6A-34 turboprop, allowing the aircraft to carry 18 parachutists to 12,000ft and return to land within 15 minutes.

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***The PAC 750XL is designed for operations from rough airstrips.***

## Defender derivative

The FU-24 itself was a derivative of the FD-25 Defender, a light attack aircraft that first flew in 1953. The first prototype FU-24 flew in 1954 and was built by Air Parts, a predecessor company of Pacific Aerospace.

Since then, the Hamilton-based manufacturer has built more examples of this model than of any other. The exact number is uncertain, the manufacturer says, but is generally thought to be about 300 factory-produced with about 10 assembled from spares by James Aviation and several other companies in New Zealand.

Production of the model was halted in 1992, in favour of another crop-sprayer, the 08-600 Cresco – itself a design that had evolved from the Fletcher at the end of the 1970s.

According to Pacific Aerospace, the Cresco retained all the best features of the Fletcher, but with a longer fuselage, large hopper, enlarged fin and rudder, and a redesigned wing with integral fuel tanks. The aircraft's aerodynamics were also tweaked for improved handling. The modifications included: redesigned ailerons with a new, shielded horn balance; the addition of 15 vortex generators in front of the ailerons; and shielded horn balances for the rudder and elevators.

Instead of the Fletcher's piston engine, the Cresco was initially powered by a 600hp Lycoming LTP 101 turbine. That engine was succeeded in 1992 by the 750hp PT-6-34AG, a powerplant specifically designed for the agricultural aircraft market.

"In the steep New Zealand hill country, 'operating' means operating from an unimproved landing strip, often on the side of a hill with a flat spot at the top to load," Pacific Aerospace says.

In agricultural operations, aircraft often return for reloading within four minutes. "From brakes on to brakes off, the loading operation is completed in around seven seconds and power is applied for the take-off run," the manufacturer says. According to Pacific Aerospace, the Cresco introduced an

unexpected 'problem': it was delivering its load faster than trucks could bring it to the aircraft.

The type also began to be used by parachute clubs as a jump platform, with the addition of special steps, a new door and grab rails. Pacific Aerospace says that of the last 10 Cresco airframes produced, five were agricultural models and five were utility parachuting variants.

## 750XL development

It was demand from the skydiving market that spurred the development of the PAC 750XL. In 1999, representatives of US parachuting operators came to Pacific Aerospace to ask for an enlarged version of the Cresco, capable of carrying 17 jumpers to altitude and return to its point of origin with 15 to 16 minutes.

They also needed an aircraft offering guaranteed reliability under continual use, ease of operation and maintenance, while utilising common, readily available parts. "The final design brief called for a strong, rugged aircraft with STOL [short take-off and landing] performance for freight, passenger, agricultural, photography; any market that demanded a well-engineered utility aircraft," the company says.

The 750XL flew for the first time in 2001 and was certificated by the US Federal Aviation Administration (FAA) in March 2004. With enough space to carry 18 parachutists on benches lining the cabin walls, the first nine aircraft were sold into the skydiving market, previously dominated by aircraft such as the de Havilland Canada DHC-6 Twin Otter, Piper PA-31 Chieftain and Short SC.7 Skyvan.

"Taking the aircraft from initial drawings to FAA certification took about 52 months," says Pacific Aerospace. "In the aircraft certification business, this was a remarkable feat."

Other design changes from the Cresco included aerodynamic improvements such as increasing the area of the fin and tailplane, a new flap system to boost STOL capability and the addition of an optional cargo pod. The jump door is design to be closeable by the pilot, and the aircraft is designed to fly stably over a wide range of positions for the centre of gravity. The aircraft is designed to handle well at low speeds.

Stephenson says the controls are operated electrically, not hydraulically, to save on weight and maintenance costs. The aircraft in general has lower maintenance requirements than many, with a 150-hour interval between inspections, compared with the norm of 100 hours.

## Additional roles

Although the skydiving role is what the 750XL was designed for, the manufacturer now says it is now primarily marketing the aircraft for the other roles, where demand is potentially larger.

"Originally, it was almost exclusively for skydiving operations – but we're now selling more and more for freight and utility [roles]," Stephenson says. He adds that the aircraft is convertible from passenger-transport to cargo configuration in half an hour, thanks to eight quick-install seat attachment points in the cabin floor.

In this role, the aircraft offers 6.8 cubic metres of

***The manufacturer's major markets are in equatorial regions, including Africa.***

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*In the utility role, the aircraft can be switched from passenger to freight configuration within half an hour.*

cargo space with another two in the cargo pod, which alone can carry up to 1,000lb of freight.

The Pacific Aerospace executive says the aircraft's main markets are in equatorial regions around the world, where the need for good hot-and-high performance from rough airstrips is greater. Primary markets include Africa, South-East Asia, India and Nepal, while no sales have yet been recorded in Central or South America.

According to Stephenson European and US skydiving operations are now considered secondary markets.

"We're focusing on utility and freight operations," he says. "There's definitely a bigger market. A lot of the attributes that make [the aircraft] suitable for skydiving also make it suited to the freight role."

In the Asia-Pacific region, the manufacturer has had successes in Australia, New Zealand, Papua New Guinea and Indonesia. In Papua New Guinea, Adventist Aviation Services, the aviation of arm of the Seventh-Day Adventist Church and its missionaries, has acquired the type. In Indonesia, too, the aircraft is being used by a missionary organisation – Associated Missionary Aviation, which took delivery of the first aircraft to be operated in that country in March, following type approval last year from Indonesian aviation authorities.

The aircraft has just recently won type approval in India, where no aircraft have been sold yet. Stephenson says Pacific Aerospace is taking one newly sold aircraft on a promotional tour of India prior to its delivery to a customer in Nepal. He adds that two more aircraft are expected to go to Nepal later this year.

According to Stephenson, 54 aircraft have been built to date, 27 of which are being used by skydiving operations. Of the remainder, 22 are operating in the passenger/freight utility role, three are being used for aerial survey missions and just two operate in the agricultural top-dressing role.

## Shifting demand

It is interesting to note, however, that of the last 28 airframes built, 54 percent have been sold into the utility role *(see table)*, compared with 27 percent of the first 26 built. Conversely, the proportion of skydiving sales has dropped from 65 percent of the first 26 airframes to 36 percent of the last 28, illustrating the 750XL's increasing acceptance in the transport role and the slowing demand in the skydiving market.

Geographically, sales to Asian customers have grown from just one of the first 26 airframes built to six of the last 28. That makes it the 750XL's second-largest regional market for the most recently built aircraft, up from being the smallest for the first 26 aircraft built, which were mostly sold in North America and Australasia.

"We expect our production rate will increase to 30 aircraft per annum from 16 now, primarily on the strength of the utility-freight role in equatorial markets," Stephenson says.

The 750XL's construction is traditional, with its airframe made mostly of aluminium. Some composite components are included, but these are not load-bearing parts. The aircraft features Garmin avionics, a Honeywell weather radar optionally integrated into the wing, and a three-bladed, constant-speed Hartzell propeller.

Stephenson says the company is considering a future avionics upgrade to an electronic flight instrument system, but no other major improvements are under consideration for now. ●

**First-quarter 2009 global airline traffic trends* (by region)**

| Configuration | First 26 | | Next 28 | |
|---|---|---|---|---|
| Utility (freight/PAX) | 7 | 27% | 15 | 54% |
| Skydive | 17 | 65% | 10 | 36% |
| Survey | 0 | 0% | 3 | 11% |
| Agricultural Top Dressing | 2 | 8% | 0 | 0% |
| TOTAL | 26 | 100% | 28 | 100% |

**P-750 XL Sales to April 2009**

| Region | First 26 | | Next 28 | |
|---|---|---|---|---|
| Africa | 3 | 12% | 7 | 25% |
| Asia | 1 | 4% | 6 | 22% |
| Australasia | 10 | 38% | 6 | 21% |
| Europe (100% skydive) | 4 | 15% | 5 | 18% |
| North America (100% skydive) | 8 | 31% | 4 | 14% |
| TOTAL | 26 | 100% | 28 | 100% |