

The Cessna SkyCourier is a regional twin turboprop available in two variants: a dedicated freighter with a gross payload of 6,300 lbs; or in a passenger configuration with windows, emergency exits and 19 seats. It can be operated with a single pilot, and has low direct operating costs (DOC). Developed by Textron Aviation Inc. the Cessna SkyCourier freighter can carry three LD-3 or four LD-2 universal loading devices (ULDs), or similar-sized netted pallets in its main cabin. The passenger variant offers Quick Change (QC) and Combination (Combi) options to increase aircraft utilisation rates on routes with lower cargo traffic volumes.

FedEx took delivery of its first SkyCourier in May 2022 as part of a 50-aircraft order it signed back in 2017. FedEx feeder airline Mountain Air Cargo began using the aircraft commercially on its Orlando to Tallahassee route at the start of 2023.

FedEx needs the SkyCourier to complement its existing fleet of about 240 single-engine Cessna Caravans, which it uses to carry bulk cargo to more remote areas of North America. Growing freight traffic on some of its feeder routes enables FedEx to save costs by operating one SkyCourier instead of two Caravans.

"FedEx approached us asking for a regional feeder freighter that can carry large ULD containers that normally fit in the lower holds of medium and large commercial aircraft," says Martin Tuck, senior technical marketing advisor at Textron Aviation. "Loading and off-loading feeder freighters, such as the Caravan, with individual parcels and bulk cargo is time-consuming and involves a lot of manual labour. So we lined up three LD-3s and designed the freighter around them."

The SkyCourier fills the gap between the Caravan and ATR family of freighters. Textron estimates that the SkyCourier's DOC per freight tonne per nautical mile was \$1.97 in 2022. It estimates the DOC per flight hour (FH) to be \$1,212.50, including \$497 in maintenance reserves and assuming a fuel cost at \$4.50 per US Gallon (USG).

Freight loading

The Sky Courier's main cabin is 23 ft 4 inches long, 6 ft 5 inches wide, and 5 ft 11 inches high, resulting in 884 cu ft. of available volume. This equates to 590 cu ft. of bulk cargo stowage when assuming a 70% load factor. Customers have the option of a cargo loading system (CLS) to carry ULD containers and netted pallets.

"Being able to carry containers is a big differentiator for the SkyCourier, so many potential customers are considering it because of this," says Juan Manuel Escalante, vice president sales - SkyCourier

There is a gap in the market for a low-cost freighter with small payload, that is adaptable for also capturing the passenger market.

Cessna SkyCourier: the pocketknife turboprop freighter

- at Textron Aviation. "The containers save labour costs and protect the cargo from the elements, meaning the freighter is ideal in regions that are hot, cold or rainy."

The SkyCourier has high-floor loading. It has six beams that run the full length of the floor. It can carry about 200lbs per square foot, or almost 975 kilos per square metre as the metric equivalent. There is also a nose baggage compartment that has 18 cubic feet of space and can carry up to 300lbs.

Federal Aviation Administration (FAA) Part 23 airworthiness standards apply to aircraft with a certified maximum take-off weight (MTOW) of 19,000lbs and less, and with 19 or fewer passenger seats. Part 23 regulations also limit the maximum gross payload in the main cabin to 6,000lbs. The optional CLS adds 400lbs to the operating empty weight (OEW) of the aircraft, and is not detrimental to the maximum payload. When operating at its 19,000lbs MTOW, the SkyCourier will have a 200nm maximum range. Take-off field length at MTOW and sea level is 3,660 ft.

Three LD-3 ULDs translate to a typical main cabin tare weight of about 438lbs, and these will provide 477 cu ft. of containerised payload. The result is a maximum net revenue payload of 5,564lbs and so a 11.67 lbs per cu ft maximum packing density. eCommerce and express freight packing density is typically 6-7lbs per cu ft., depending on the ULD load factor.

The SkyCourier has a 2,862lbs maximum revenue payload with three LD-3s loaded at a 6.0lbs per cu ft packing density. This gives the freighter a 600nm operating range. Revenue payload increases to 3,339 lbs per cu ft. at 7.0lbs per cu ft packing density. The maximum operating range at this packing density will be about 550nm. The stage length between Orlando and the FedEx hub in Tallahassee is 190nm, which the SkyCourier can complete in about one hour.

"The typical mission length most of our customers will be flying for a freighter

in this category is 200-400nm. Much of the cargo is relatively low density, so it is likely the aircraft will fill all available volume before the freighter's maximum payload is reached," says Escalante.

Containerised volume increases marginally when the freighter is loaded with four LD-2s. In this configuration the SkyCourier's main cabin can generate 5,484lbs of revenue payload and 496 cu ft of revenue freight capacity. The maximum packing density in this configuration is 11.06 lbs per cu ft.

At a 6lbs per cu ft packing density the maximum revenue payload is therefore 2,976lbs. If the ULDs are loaded at a 7lbs packing density, the maximum revenue payload totals 3,472lbs. The aircraft's maximum operating range is similar when loaded at packing densities of 6-7lbs per cu ft.

The main cabin also features a 2ft deep and 3 ft high aft parcel shelf that has a 38 cu ft. volume and a 400lbs weight limit. The shelf can be used for additional items of bulk cargo as required.

The main cargo-door opening measures 87 inches by 69 inches and has a 42-inch lower-sill height. Both these elements are key to improving the loading efficiency of ULDs and outsized bulk cargo. When configuring the aircraft to QC or combi roles, the large door is useful for removing and replacing passenger seats.

Quick change

According to Textron, the requirement for QC and combi options is the result of a number of customer advisory board meetings. "FedEx helped a lot with the freighter design. We have also, however, enlisted the help of a number of passenger airlines operating Caravans, Twin Otters and Beechcraft 1900s. Requests were made that the cargo door remain because they wanted the freight option," says Tuck. According to Escalante, many operators in the sector see a market for moving passengers on one sector, then carrying a full payload of cargo on the next.



The Cessna Skycourier when configured as a freighter is capable of carrying three LD-3 or four LD-2 universal loading devices and has a gross payload of 6,300 lbs. Launch customer FedEx currently operates the single pilot certified type on its 190nm route between Orlando and Tallahassee.

It takes less than an hour to reconfigure the SkyCourier from a 19-seat passenger aircraft into a freighter. The conversion process is longer when the operator requires the CLS installation. The CLS option is recommended to operators to convert the aircraft configuration on a more seasonal and less frequent basis.

"Customers ask if the CLS option is available for the QC. The answer is yes, but it cannot be changed as quickly. The CLS comprises many parts and can take half a day to install and uninstall, so this is not something operators would do routinely," says Tuck. "Time spent on the ground means the airline is not generating revenue. The CLS option helps maintain residual values because of enhanced dual-purpose capability."

In bulk cargo mode three tie-down curtains span the cabin by attaching to the floor track. Separating the flight deck and the cargo compartment in the dedicated freighter is a fixed rigid barrier. The bulkhead in the passenger, and subsequently the QC version, has an open aperture for crew and cabin access. A centre section fills that space, and separates the compartments when converting from passenger to freighter mode to form the cargo barrier.

"The passenger interior is removable, so there are no obstructing ducting or cabling wires. The passenger service unit (PSU) rails are located in the sidewalls, and the optional modular overhead lockers can be removed easily," adds Tuck. "Magnetically attached blankets protect the passenger sidewalls and windows, as well as offering some fire protection, when the passenger aircraft is operating as a freighter or Combi."

Combi

FAA certification for the combi option is in its final stages of approval. The combi option allows the user to transport both passengers and freight.

Essential Air Service (EAS) is a US government-subsidised service that provides airline services to outlying areas where it is uneconomic for most carriers to operate. The Part 135 scheduled operational requirements are limited to nine passengers in the US, and 12 passengers in national aviation authority (NAA) regions.

One flightcrew member is needed if the aircraft is carrying 0-9 passengers, and two for 10-12 passengers.

Separating the passenger cabin and the freight compartment is a mid-cabin rigid cargo barrier that is easy to install. Cargo is loaded through the aft main cargo door, while passengers enter the cabin through the left and right crew-access doors.

"We designed the front doors wide enough to allow passengers to be boarded. The pilots' seats slide forward enough to facilitate easy passenger access," adds Tuck.

The aft freight compartment is about 450 cu ft and half the maximum volume of the full freighter. Once combi operations have been completed it is possible to reconfigure the aircraft back to a 19-seater or full freighter.

Textron is developing a gravel field performance kit that protects the underside of the aircraft and sensitive antennae when operating from rough surfaces. The optional fenders and deflectors will prevent damage to the aircraft from stones that are picked up by the wheels.

Maintenance

The Skycourier is less complex to operate and maintain than some larger turboprop freighters. "The maintenance steering group-3 (MSG-3) maintenance programme makes a big difference, because the aircraft features small task-based maintenance items and therefore does not need to be grounded for long periods for scheduled maintenance," adds Escalante. "It is possible to start maintaining the aircraft 25 flight hours (FH) before its 800 FH interval. The maintenance tasks can be completed each day within the 775-825 FH interval 'maintenance window', meaning it is still possible to operate the aircraft during this period, without long downtimes for maintenance and losing a single day's revenue."

Airframe design service goals (DSG) are 30,000 FH or 40,000 flight cycles (FC). The PW PT6A-65SC powerplant needs a limited engine inspection at 400 FH, and total time before overhaul (TBO) is 6,000 FH. The 'SC' enhancements include the addition of a torque limiter for engine protection, some durability improvements, and pre-flight check sensors that relay information directly to the flightdeck. FASTBox hardware can transmit near real-time health monitoring and predictive maintenance reports.

Other diagnostic and maintenance systems include a Garmin central maintenance computer (CMC). The aircraft recording system (ARes II) has the option to transfer flight operation quality assurance (FOQA) data and detailed diagnostics via ground WiFi.

Maintenance manuals are animated and fully interactive. They are compatible with multiple browsers and mobile apps.

A comprehensive engine support programme is available costing \$156.00 per FH for each engine. It includes hot section inspection/overhaul, scheduled line maintenance and basic unscheduled engine repair. Fuel nozzle refurbishment, technical publications renewal, and four compressor washes are also included in the support programme. **AC**

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