The 727F's future has almost been stopped in its tracks. The swap of USPS contracts to FedEx, a downturn in US domestic freight traffic and fleet replacements by major 727 operators has reduced 727 freight conversions to a trickle.

What is the future for the 727F?

For many years it was believed the 727 would continue to have a future as a freighter well into the 21st century. This meant not only that existing 727Fs would continue to operate, but that there would also be continued demand to convert passenger aircraft up until 2005.

The reasoning behind this assumption was based on the fact that there are no aircraft with low enough values and of the same capacity and cross-section dimensions as the 727 to replace it. Demand for further 727-200 conversions would be stimulated by the fact that the 727-100F fleet is split between the -100F and -200F fleets. This is because younger -200s could replace -100s.

The 727-100F fleet totals about 160 aircraft. Major operators have started to consider retirements and replacement options. Many think the most logical candidate to replace the 727-100F and -200F is the 727-200A, because of its low build costs compared to alternatives such as the 737-300/-400. Replacement with the 727-200A would soak up a large number of retired passenger aircraft.

Several factors in the past year may have changed the 727's fortunes for the long-term, and possibly forever. These events have shown that competitive operating costs and payload characteristics are not enough to guarantee an aircraft's future.

Changing fortunes

The 727F fleet numbers about 160 -100Fs and 270 -200Fs, but these are constantly diminishing. These two fleets are dominated by UPS and FedEx, which have 117 -100Fs and 104-200Fs between them. While the most important 727 operators are in the US, the stability of the 727F's market has always been especially sensitive to UPS's and FedEx's fleet plans.

It has always been expected that the FedEx and UPS fleets would remain in operation for several more years, although these carriers are unlikely to increase their 727s. FedEx has possible plans to keep its -200F fleet until 2008.

In 2001 FedEx secured contracts from the United States Postal Service (USPS), which had previously been operated by Emery, Kitty Hawk, Amerijet, Ryan International, Capital Cargo and Express One all with substantial 727 fleets.

The USPS contracted Emery to do part of the flying for the USPS contract. Emery, in turn, sub-contracted some of this work to these other operators, which also had direct contracts with the USPS.

Emery also has its own express package system, and so other traffic to utilise its aircraft. Although Emery was grounded by the Federal Aviation Administration (FAA), the airline was planning to operate with a reduced fleet after losing the USPS deal.

The other USPS operators have other contracts, and so did not lose all their business because of the transfer to FedEx.

The USPS ran its overnight operation from Indianapolis. Following the transfer of contracts to FedEx, 35 727s operated by Emery and the other sub-contractors were grounded. Other aircraft types, including A300B4Fs and DC-10Fs were also affected.

Despite the additional business FedEx had secured, the airline was able to increase the utilisation of its own fleet, and so avoided the need to increase its own capacity.

In addition to the 727's woes, freight traffic declined from the spring of 2001, with resulting over-capacity. FedEx itself parked some aircraft and deferred or cancelled orders for fleet additions. In March 2001 FedEx announced it would retire half of its 727-100F fleet by 2005. It also deferred some aircraft deliveries and cancelled some MD-10 conversion orders because of a fall in US domestic traffic. The volume of business won from the USPS contact is therefore insignificant compared to the rest of FedEx's business. By June 2001 FedEx had announced that it was accelerating retirement of its 727-100Fs.

727F retirements

The overall effect of the transfer of the USPS contract to FedEx has been a reduction in the 727 fleet. The 727 has been further hit by a fall in traffic, following an economic slowdown, and the fleet plans of several major 727 operators to start retiring aircraft.

UPS has already announced that it will phase out its 727-100Fs. Its original fleet of 60 -100Fs has been reduced to 45, and will be retired by 2005.

In June 2001 DHL stated that it was ready to phase out its 11 727-100Fs. DHL has been adding 727-200Fs, but only a few. DHL's partner European Air Transport will start to swap 727s for 757s from spring 2002.

A large number of major 727F operators have already made 727 retirement and replacement decisions. DHL's European partner, EAT, will phase out its 727s and replace them with 757-200SFs. DHL Airways in the US has been adding 727-200s to its fleet, but only one or two at a time. All other major 727F operators have stopped taking more 727Fs, and FedEx and UPS have both started retiring 727-100Fs.

Ryan International has parked 15 727-100Fs, following the loss of its USPS contract through Emery.

TNT may acquire 757-200Fs to replace 727-200Fs. It returned some 727s to its lessor in August 2001.

Potential 727F market

DHL is the only major operator in the US or Europe to show signs of adding 727-200Fs to its fleet. It added two -200Fs to its fleet in June 2001, and another two in September 2001.

Other markets showing signs of interest in the 727 are Latin America and Asia. Aerosucre took a converted 727-200 in mid 2001, and Air Macau has expressed interest in acquiring two -200Fs.

Karl Brunjes, director of aircraft sales & leasing at Republic Financial Corporation, explains that it has now left the deal to convert 100 of ex-Delta 727-200s to freighter. "We expect a slight continuance of 727 freighter conversions, but this will only be one or two at a time with -200As. This will be to replace a few older -200Fs with poorer specifications and with mounting maintenance costs. Total build cost for a 727-200AF is now so low it is the most economic way to replace older freighters."

Bob Olson, president of Quiet Wing Corporation, believes the 727-200 will continue to make the most economic freighter in its market size. Olson cites the emerging market in China and the Asia Pacific as one potential market for 727-200Fs. Olson also says the carriers that were sub-contracted to the USPS continue to have contracts with other freight providers, and may yet require more aircraft. He believes that the 727 freighter conversion market will remain vibrant for the next five years.

Finova converted nine 727-200s with Hamilton Aviation's modification. Two have so far been delivered to All Canada Express. Another of Finova's aircraft is going to the Asia Pacific.

Another two aircraft were converted with the same modification by Timco; these have been taken by Cougar leasing. They are believed to have received Civil Aviation Authority (CAA) certification in the United Kingdom; the only freighters to have UK CAA certification.

Clayton Hamilton, executive vice president of Hamilton Aviation, now expects 727s to migrate outside the US and Europe. While Hamilton does not expect 727F operators to have a net increase in their fleets, he believes the -100F and -200F replacement markets could be good opportunities for some -15/-17-powered aircraft conversions.

727 availability

Besides the reduction in the 727F fleet, the 727F's future is influenced by the availability of converted aircraft and supply of better quality -200 passenger configured aircraft. High availability will keep values and lease rates low, widening the gap with competitor aircraft.

The switch of the USPS contracts to FedEx put a large number of 727Fs on the market. Prior to the terrorist events of 11th September 2001 in the US, this included more than 10 20-25 year old high gross weight -200Fs with JT8D-15/-17 engines.

Also, prior to 11th September 2001, there were about 130 passenger 727-200s with -15 or -17 engines parked, which included more than 22 aircraft younger than 25 years old. In addition to these, there were more than 250 727-200s with -15/-17 or -217 engines in passenger service in North America prior to the terrorist attacks. The retirement of these aircraft was already in the process of being accelerated.

In the immediate aftermath of the terrorist attacks, US majors cut back schedules, and so fleets, by 15-20%. The first and obvious casualties in the majors' fleets were the 727s. These have been parked en masse. The number of 727-200s available reached 325: equivalent to 68% of the passenger-configured fleet.

The recession of the early 1990s saw a large number of 727s parked, when it was expected that many would not go back into passenger operation. This gave freight operators the opportunity to acquire good quality -200s in the region of $2 million during 1993-95.

The climb in passenger traffic from 1994 onwards saw majors start to put many of their aircraft back into operation. There was also a surprising demand from freight operators, and 727 values increased again. In 1999 older -7/-9 powered aircraft were valued in the region of $3 million, and younger -15/-17 aircraft at about $5 million.

With a need to overhaul two engines, the total build cost for a -15/-17-powered freighter in 1999 was in the region of $8 million *(see Late 727 retirement calls for*

The transfer of USPS contracts to FedEx grounded 35 727s operated by the previous sub-contractors. FedEx was able to increase utilisation of its existing fleet to carry the additional volume.

prudent acquisition decisions, Aircraft Commerce, May/June 1999, page 19). This was escalated by the short supply of aircraft and -15/-17 engines.

With the US major 727 fleets finally being retired, and this accelerated by the effects of the terrorist attacks, the supply of ex-passenger 727-200s is now about 325, and will remain high. This will also result in a glut of -15/-17 engines, depressing their values. Buyers will be able to acquire time-continued modules at knockdown rates. This will further aid a low build cost for a 727-200F.

The supply of 727-200As and demand for freighter conversions means that good quality passenger aircraft are at distress values, and can be acquired for less than $1 million.

727-100F replacement

The only major operators in the market for 727-100F replacements, which have not already made decisions, are UPS, FedEx and DHL.

FedEx has, to an extent, already adopted the policy of replacing two 727-100Fs for one A310. It has already acquired the majority of the A310-200 fleet, and is eventually likely to be the sole operator. FedEx will, however, need to replace some of its -100Fs with smaller aircraft.

The options for 727-100F replacement are limited. Most operators will only be interested in aircraft that have an identical fuselage cross-section to the 727-100F, and similar capacity. Operators that strictly want additional capacity to the 727-100F will have to rule out the 737.

Airlines that want similar or larger capacity will have their options limited to the 737-300/-400 and the 727-200A, on the basis of fuselage cross-section and economics. The 727-100F has nine pallet or 125-inch by 88-inch containers, providing 4,122 cubic feet of container volume. The 737-300 can accommodate eight containers, and so have a volume of 3,664 cubic feet. The 737-400 has an identical fuselage capacity of nine containers and 4,122 cubic feet to the 727-100F's *(see Are the 737-200 & -300/-400 ready for freight conversion?, Aircraft Commerce, June/July 2001, page 11).* This makes the 737-300/-400 the closest 727-100F replacement candidates in terms of same container type and containerised volume.

The 727-200F can carry 12 of the same containers, and has a containerised volume of 5,500 cubic feet.

To compete with the 727-100F, the 737-300/-400 or 727-200AF will have to match the 727's ton-mile and trip costs. The 737 models have significant advantages over the 727-100 in terms of fuel burn, maintenance costs and flight crew numbers.

Aircraft build costs

The value of 727-200As is now in the region of $1 million. There are several freighter modifications available, but these all have similar costs in the region of $1 million. Hamilton Aviation's modification, which was conceived to take account of all structural airworthiness directives, was originally priced at $1.3 million. Hamilton Aviation recently reduced its price after altering its floor beam supplier.

Besides freight modification, buyers will have to consider bridging airframe maintenance, component exchanges and repairs and engine work. With the glut of engine modules available, a buyer can have three service-ready engines for a fraction of the cost of conventional shop visits. A bridging C check and component work may total in the region of $800,000, while engine work or module exchanges are unlikely to exceed $1 million. A 727-200A can therefore be converted to a service ready freighter for $3.5-4.0 million, depending on the immediate maintenance status of the aircraft.

The low build cost of a 727-200AF means that lease rates of older 727-200Fs will be under pressure. Prior to the switching of the USPS contracts to FedEx, 727-200AF lease rates were in the region of $110,000 per month. This compares to $77,000 per month for passenger aircraft converted at current market values, based on a lease rate factor of 1.7% per month.

This has to be considered against the 737-300/-400. Lease rate factors for the 737-300/-400 will be in the region of 1.2% per month of capital cost. Lease rates will have a high influence on total aircraft operating costs in typical small package operations with low aircraft utilisations. The 737-300/-400's total build cost, lease rate and so cost competitiveness against the 727-200F will therefore depend on 737 market values.

Market values have come under pressure after a large number of 737s were parked following the terrorist attacks. A few US carriers may become bankrupt as a result of the drop in load factors. Despite having already parked a large portion of their fleets, these airlines would be expected to return parked aircraft back to service when traffic volumes return to normal. If a few airlines become bankrupt several aircraft will be available for longer. There are about 85 737-300s available, equal to 8% of the global fleet.

Values of 737-300/-400s were already softening prior to the terrorist attacks, since the availability of 737-700s at rates as low as $250,000 per month from the mega lessors was already exerting pressure on older aircraft.

Like the 727, total build costs for 737 freighters will depend on the freight

modification and maintenance work. Pemco is one of several modifiers offering a 737 freighter conversion programme. Others include General Electric-Israeli Aircraft Industries and AEI. Ameco Beijing has also expressed an interest in offering a 737 freight modification programme for the domestic Chinese market.

The number of 737-300/-400 conversion programmes has grown steadily in 2001, presumably to catch the anticipated 727-100F replacement market.

Pemco's modification has a cost of $2.2 million. While this is high compared to the 727-200, the 737 will have airframe maintenance costs of about $0.5 million to bear during conversion. Engine maintenance could be high, if two engine overhauls are required. This could be as high as $1.5 million. Total modification and maintenance costs could therefore be $3.0-4.2 million.

Values of the oldest 737-300s had reached about $15 million by the first half of 2001, and $19 million for the -400s. The terrorist attacks put the 737-300/-400 market in a state of flux.

The European passenger airline Ryanair has said that it wants to acquire 50 737-300/-400s, which will push up values, or at least prevent them from falling as fast. Gecas has also said that it intends to convert 30-50 737-300s.

With a market value of $17 million, a 737-300 would have a build cost in the region of $20 million, and lease rate of about $240,000. A 737-400 valued at $19 million will have a build cost of $22 million and lease rate of $264,000.

Base values of 737-300/-400s have taken a theoretical hit of up to 40% as a result of en masse parking. This would take values of the oldest and middle aged 737-300s down to $8-12 million. Values for -400s will have been reduced to $12-16 million. This is only in a distress sale, however. Build costs for the oldest 737-300Fs would then come down to $13 million and about $17 million for the -400F.

Unit costs

The lease rates of aircraft built when acquired at normal market values have to be taken in context with cash operating costs. Current fuel prices are high, in the region of 85 cents per US Gallon, and the 727-200A has about 65% higher fuel burn than the 737-400. The 727-200A also suffers from higher and unpredictable maintenance costs.

The 727-200 has two ageing aircraft modification packages. The first is due at 20 years, and so all aircraft will have had these completed. The second package, due at 60,000 flight cycles, is considered to be the ageing watershed for the 727, and so this cost will not be incurred by freight operators either.

The 727's corrosion prevention and control programme and supplemental structural inspection document will be incorporated into airframe checks, and consequently raise man-hour inputs. The 727 has also been the victim of several other airworthiness directives (ADs), all of which continue to raise maintenance costs. The implications are that 727 airframe maintenance charges are about twice the 737's.

Replacement of the 727-100F has to be considered in the context of low utilisation operations. The 727-100F, leased at $60,000 per month, achieves unit costs of 84 cents per available ton-mile (ATM) with an operation of 500 FCs averaging 800nm per year. This generates just 1,200 block hours (BH) per year, and is representative of typical small package operations. This cost level includes fuel, maintenance, flight crew and lease charges.

The 737-400 with a lease rate of $266,000 per month has an equivalent cost of 110 cents per ATM, when fuel prices are as high as 87 cents *(see table, this page)*. Lease rates would have to fall to about $170,000 for the 737-400's unit costs to reach the 727-100F's unit and trip cost level. This is now possible if aircraft are acquired at distress values.

The 727-200AF, acquired at current low market rates and with a lease rate of $75,000 per month, would have lower unit costs of 67 cents per ATM *(see table, this page)*. The 727-200AF's trip costs would only be about $700 higher than the 727-100F's. A newly converted 727-200AF will therefore provide 33% more volume for little additional cost, thereby underlining the economic viability of the 727-200A as an appropriate 727-100F replacement. The 727-200AF also has a 33% payload advantage but lower trip costs than the 737-400F.

With a doubling of utilisation, which some major small package airlines achieve with twice-daily operations, the 737-400F has similar trip and unit costs as the 727-100F *(see table, page 47)*. The 737-400F's trip costs are also about $300 lower than the 727-200AF's. The trip cost difference between the 727-200AF and 727-100F is also reduced, and the -200AF has an ATM cost of 60 cents.

If the 737-400F can be acquired at distress values and a lowered lease rate of

COMPARATIVE 727-100F REPLACEMENT ECONOMICS

Aircraft type	727-200AF	727-100F	737-400F	737-400F
Annual utilisation (FC for 800nm trip)	500	500	500	500
Monthly lease rate ($month)	75,000	60,000	265,000	170,000
Trip cost-$	8,750	8,200	10,700	8,400
Unit cost (Cents/ATM)	67	84	110	87

Aircraft type	727-200AF	727-100F	737-400F	737-400F
Annual utilisation (FC for 800nm trip)	1,000	1,000	1,000	1,000
Monthly lease rate ($month)	75,000	60,000	265,000	170,000
Trip cost-$	7,800	7,500	7,500	6,400
Unit cost (Cents/ATM)	60	77	77	66

COMPARATIVE 727-200F REPLACEMENT ECONOMICS

Aircraft type	757-200SF (Boeing)	757-200SF (Pemco)	727-200F	727-200AF
Annual utilisation (FC for 800nm trip)	500	500	500	500
Monthly lease rate ($month)	330,000	230,000	Fully depreciated	75,000
Trip cost-$	13,600	11,300	7,000	8,900
Unit cost (Cents/ATM)	74	59	44	58

Aircraft type	757-200SF (Boeing)	757-200SF (Pemco)	727-200F	727-200AF
Annual utilisation (FC for 800nm trip)	1,000	1,000	1,000	1,000
Monthly lease rate ($month)	330,000	230,000	Fully depreciated	75,000
Trip cost-$	9,400	9,000	7,000	8,200
Unit cost (Cents/ATM)	50	48	44	51

$170,000, it has a lower unit cost of 66 cents per ATM. This compares to the 727-100F's 77 cents *(see table, page 47)*.

This is the strongest indication that the 737-400F will be a more economic option for major express package carriers replacing at least some 727-100Fs, where similar capacity is required, rather than converted 727-200As now available on the market. This cost advantage caused by higher aircraft utilisation also suggests that operators will not be as sensitive to the 737-400's current market values and can make an economic case of converting the aircraft with values in the region of $18 million. All FedEx needs is to be offered an attractive deal, including one where its 727-200s were removed, for it to retire them earlier than expected.

In addition to current level unit costs, major small package carriers will be analysing life term costs and reliability, which will clearly give the 737-400 an advantage over the 727-200A in 727-100F replacement.

727-200F replacement

The argument for further 727-200A conversions is that it will provide the lowest cost freighter to replace older 727-200Fs with lower specification weights and power engines.

This is more likely to be the case for operators with ad hoc, low utilisation and low revenue operations wishing to minimise their risk, taking one or two aircraft at a time. Airlines with high rates of operation and longer planning horizons will consider alternatives to the 727-200A, irrespective of their low market values.

The economics of 727-200F replacement are largely determined by the lease or depreciation rates of aircraft in operation, and the required reliability and utilisation. Airlines with fully depreciated aircraft will find it hard to make a case for 727-200F replacement on a purely economic case, especially where no additional payload capacity is required and utilisations are likely to be low.

A 500FC per year operation will result in the fully depreciated 727-200F's trip costs for fuel, maintenance and crew being in the order of $7,000 *(see table, this page)*. A newly converted 727-200AF, with a lease rate of $75,000 will have trip costs of $8,900. The 727-200A can therefore only offer itself as an economic alternative to an older 727-200F if utilisations are higher, bringing the new 727-200AF's trip costs closer to those of the fully depreciated aircraft. For a 727-200F on lease, an operator may wish to take advantage of acquiring a younger and more capable aircraft with lower maintenance costs.

The 757-200 is the closest alternative to the 727-200A, with three more containers and 20% more payload than the 727-200. Current market values of 757's are high, and the availability of aircraft was not affected by the terrorist attacks. Market values of the youngest aircraft are in the region of $20 million. The only conversion programme available is Boeing's modification, and lease rates of converted aircraft are unlikely to be less than $330,000.

At low rates of utilisation the 757-200SF will have trip costs about $4,500 higher than the 727-200AF. Pemco is one company in the process of developing an alternative freighter modification. Combined with lower market values, this will offer aircraft at lower lease rates that can generate trip costs only about $2,000 higher than the 727-200A.

A doubling of utilisation to 1,000FCs will reduce the gap between the 757-200SF, acquired at current values and converted with Boeing's modification, and the 727-200AF to about $1,200. The 757-200SF will also have lower unit ATM costs.

The difference between 757s acquired at lower values and converted with a lower cost modification and the 727-200AF will only be about $800. The unit ATM costs of the two aircraft will be similar.

As with the 737-400F, this suggests that major small package carriers, which require higher reliability and aircraft utilisation and have a longer term planning horizon, will opt for alternatives to the 727-200A.

Conclusion

The 727-200AF will remain the right aircraft for smaller freight carriers for another eight to 10 years. This will continue to provide a steady stream of 727 conversions.

The larger operators may acquire a few more 727-200s for up to another five years. Younger types will become available in a large enough supply at low enough values in the next five to eight years for these operators to take the opportunity to replace their 727s.

Once FedEx and other large 727 operators retire a portion of their fleets the market will be flooded with 727Fs, all but killing the market for further conversions.