

The number of stored aircraft is often used as an indicator of the industry's health. Only when unusable aircraft are eliminated and the number of aircraft that have been parked and reactivated have been analysed can a real impression of size of problem be gained.

Stored aircraft: how serious is the industry surplus?

The past four years have seen a record number of aircraft parked, the majority of which have been older types that were retired early after 11th September. These aircraft do not reflect the true surplus of used aircraft on the market. The number of young and modern generation aircraft that are parked provide a better indication of the availability of usable aircraft. Moreover, the number of these aircraft that have been in and out of storage, and the number that remain in storage, indicate how active the used aircraft market has been. The number that have been returned to service over the past few years are an indication of the demand for aircraft. The type of carriers returning aircraft to service will also provide an indication of the nature of the recovery.

The main types under consideration are the 717, 737-300/-400/-500, 737NG, 757, 747-300 and -400, 767-200 and -300, 777, MD-80, MD-100, and all Airbus models, except the A300B2/4.

2002 to 2004

The total number of these aircraft in storage over the past two years has increased and declined again. The total in passenger configuration for these types was 412 aircraft in October 2002 524 in October 2003, but only 448 by October 2004 (*see table, page 8*). This does not, however, include 81 Fokker 70s and 100s, which are also attractive aircraft to secondary carriers.

The aircraft in storage at any one time are a pool, with the individual aircraft that are parked constantly changing.

Some aircraft are being rejuvenated and returned to service, while others are still being put into storage. More than 500 aircraft that were in storage either in 2002 or 2003 have been returned to operation. This indicates that almost 900 different aircraft have been put into storage over the past few years.

The number put back into operation in relation to the number that remains provides a strong indication of the demand for used aircraft, as well as the popularity of each type. An analysis of each type provides insight into aircraft storage activity.

This analysis does not include, however, some aircraft that were briefly grounded between retirement by a passenger operator and being converted to freighter.

717

A group of 24 717s were parked in 2002. Most of these were returned to operation within one year: 22 with AirTran, and two with Bangkok Airways.

Onlu one aircraft owned by Turkmenistan Airlines was parked in October 2004.

737-300/-400/-500

The 737-300/-400/-500 are among the largest numbers of parked aircraft. The number of parked 737-300s peaked in 2003 at 62 (*see table, page 8*). The aircraft parked in 2002 were mainly from: failed Australian airline Ansett, which had 14 of the 42 parked aircraft; USAirways, which had five of the parked aircraft while it was restructuring under

Chapter 11; and aircraft from Varig and Delta, and from lessors Pembroke Capital, CIT, GECAS and Deutsche Structured Finance.

The 737-300 stored fleet had increased to 59 aircraft by October 2003, with United Airlines and Lufthansa each parking nine and six aircraft respectively. Aircraft had also been parked by Southwest Airlines, UK low-cost carrier Jet2 and Uruguayan flag carrier Pluna.

By October 2004 the number of parked 737-300s had reduced to 34. Seventy aircraft that were parked in either 2002 or 2003 were returned to service (*see table, page 8*), either with original operators or new airlines. Large numbers of these were accounted for by: US majors USAirways, Continental, Delta Shuttle and Southwest; low-cost carriers Jet2 and Gol; and Varig, China Southern, Lufthansa and Garuda Indonesia.

This left 34 737-300s stored in October 2004. A few of these were United Airlines and Jet2 aircraft, but many are owned by lessors. The rate at which 737-300s have been returned to service over the past two years, and the rate at which the net number stored has declined, suggests it will not be hard to replace these remaining parked aircraft.

The number of 737-400s that have been parked over the past two years is small in relation to the -300. Ten -400s were parked in October 2002 (*see table, page 8*). Virtually all of these were returned to service over the following year, while another six were parked. Aircraft that were parked in 2002 went back into operation with USAirways, THY, British Airways, Alaska Airlines, Air Europa and other carriers. Aircraft

SUMMARY OF PARKED YOUNG & MODERN GENERATION JETLINERS OCTOBER 2002, 2003 & 2004

Aircraft type	October 2002	October 2003	October 2004	Aircraft returned to service
717	24	3	1	24
737-300	42	62	34	70
737-400	10	7	1	15
737-500	5	10	24	9
737-700	13			13
737-800		2		2
757-PW	6	24	22	11
757-RR	11	31	10	30
747-300	11	8	11	7
747-400	17	32	23	21
767-200	23	42	36	22
767-300	17	16	5	25
767-400	1			1
777-200	4	6	7	4
MD-80	105	126	126	83
MD-11	9	23	39	6
A300-600/-600R	12	9	3	20
A310-200	4	8	8	3
A310-300	14	23	37	16
A319	15	22	3	30
A320	41	64	33	77
A321	9	22	5	22
A330-200	9	5	1	11
A330-300	1	2		3
A340-200/-300	7	15		19
A340-500/-600		3		3

Source: AvSoft

parked in October 2003 went back into operation with a variety of small airlines within a year, leaving just one parked aircraft in October 2004.

The number of 737-500s that has been parked over the past two years was initially small, but has increased over the past year as United Airlines has parked nine aircraft and GECAS six.

Five 737-500s were in storage in October 2002, with three returning to operation within a year and another eight being parked over the same period to October 2003. This latter group included Lufthansa aircraft which were then

returned to service in the year up to October 2004. Individual aircraft were put into operation with Varig, Air Baltic and Belavia over the same period.

737NG

Since the 737NG is an aircraft in high demand, it has suffered less than all other types in the recent industry slump. The 737NG has also been lucky, however, with none of its operators ceasing operations.

No 737-600s have been parked over the past two years, and only two 737-

800s were parked for a short period in 2003. These were aircraft operated by Turkish carrier Pegasus which returned them to operation.

Only the 737-700 has seen any significant number of parked aircraft. Thirteen were in storage in October 2002; some having been operated by Braathens and Midway Airlines. These aircraft were all back in operation within a year, going into service with Gol, Virgin Blue, Hainan, Aloha, SAS Braathens, Air Senegal and Air Sahara.

757-200

The number of 757-200s that has been parked over the past two years has been well publicised. More than 40 aircraft that were parked over this period have been returned to operation (*see table, this page*) and another 32 were still in storage in October 2004. This is high in relation to the 757s fleet.

There were only six PW2000-powered 757s parked in October 2002, with two Northwest aircraft and one each from Condor, Aeromexico and Mexicana. While most of these went back into operation within a year, another 22 were parked over the following year up to October 2003. Northwest Airlines parked another seven while United parked eight and American Airlines parked four. The past year has seen 11 of these aircraft returned to operation. Many of these have been with Northwest, but also Condor, Mexicana, Uzbekistan Airways and Shanghai Airlines. Northwest and American have, however, parked other aircraft over the year, with little net change in the number parked.

The stored fleet of RB211-535-powered 757s has changed more. Most of the 11 aircraft parked in October 2002 were returned to service during the following two years, mainly to new secondary passenger operators such as Pluna, Primaris, Skyservice Airlines, First Choice, Ryan International and Belair.

A further 23 RB211-powered 757s were parked over the following year, taking the stored fleet to its peak at 31 aircraft in October 2003. Another five were parked over the next year to October 2004, but 26 were returned to service. Many were placed with secondary passenger and charter airlines, although some were placed with China Southern. This high rate of reduction in the number of stored RB211-powered 757s highlights the type's popularity over PW2000-powered examples.

767-200 & -300

There is a contrast between the number of 767-200s and -300s stored over the past two years, the number returned to service and the number still



The past two years has seen large numbers of most types of narrowbody in storage. The one exception is the 737NG. Large numbers of 737-300s/-500s, 757s and MD-80s remain parked. While many stored aircraft have been returned to service over the past two years, the passenger-to-freighter conversion market has not yet materialised as expected, which would have removed larger numbers of surplus aircraft.

parked. All facts point to a decline in the 767-200's popularity, while the 767-300 remains in demand.

The number of 767-200s in storage has steadily increased over the past two years. These can be separated into JT9D-powered and CF6-80-powered aircraft.

There were 12 JT9D-powered stored 767-200s in October 2002, many of them Air Canada aircraft parked while the airline restructured under Chapter 11. More aircraft were parked during the following year, with United Airlines accounting for the majority. Qantas also parked the first of its JT9D-7R4-powered 767-200ERs. More aircraft were parked by Qantas in the next year to October 2004, as well as a few other carriers.

Only three JT9D-powered 767-200s that were parked during this period have been returned to service. There were still 30 aircraft parked in October 2004. The majority of these were United, Air Canada and Qantas aircraft.

Similar numbers of CF6-powered 767-200s were parked between 2002 and 2004. There were 12 767-200s in storage in October 2002. Most of these were Delta, Ansett and Transbrasil aircraft, the latter two having ceased operations.

All 12 of these aircraft were parked a year later in October 2003 and were joined by another 17 aircraft, taking the total to 29. These included 13 from American Airlines. By October 2004 the total had increased to 33, and only four parked since October 2002 had been returned to service, including three with Delta Airlines.

The number of 767-300s in storage

over the past three years has been smaller than the number of -200s in storage. The number of -300s peaked at 16 and 17 aircraft in 2002 and 2003 (see table, page 8), but has since declined to only five in October 2004 with 25 aircraft being put back into operation. The majority of -300s parked were PW4000-powered -300ERs. These have gone back into service with a variety of airlines including, Air Canada, Delta Airlines, Air China, Vietnam Airlines and a selection of small secondary airlines.

Only one Delta Airlines 767-400ER was parked in October 2002, but went back into operation in less than a year.

777-200

Not surprisingly, the number of 777s parked over the past two years has been small. A total of 11 different 777-200s were stored over this period. These are split between four GE90-powered aircraft and seven PW4000-powered examples.

The four GE90-powered aircraft included one Alitalia aircraft that was parked temporarily prior to delivery, and so does not really represent surplus capacity. Another aircraft was temporarily stored for Saudia, but has also gone back into operation. Two early build aircraft were put into operation with Varig in the past year.

Four United aircraft, with PW4000 engines, were in storage in October 2003, having been grounded as part of United's restructuring process under Chapter 11. It parked another three during the following year, and all seven remain stored.

747-300 & -400

The number of 747-300s that has been in storage and remains parked is relatively high for the total of 81 aircraft that were built. Seven JT9D-powered aircraft were in storage in October 2002; including two Northwest, three Corsair and one Cameroon Airlines aircraft. The three Corsair aircraft have been returned to operation, while the Northwest and Cameroon aircraft remain parked. One Air Atlanta Icelandic parked in October 2002 has been put into service with Thai carrier Phuket Airlines. Three CF6-powered aircraft were stored in October 2004, while two Qantas RB211-powered aircraft are also parked.

The number of 747-400s has been relatively small to the total built, and the stored group has been dominated by PW4000-powered units. The number of stored -400s peaked at 28 aircraft in October 2003. Stored 747-400s have been dominated by United and Singapore Airlines (SIA) aircraft. United has had a varying number parked since 2002 while it has restructured under Chapter 11. In October 2002 it had four 747-400s in storage, as did SIA. Three CF6-powered aircraft were parked by Malaysia Airlines and KLM.

Three of the SIA aircraft were leased to Air Pacific and Air Atlanta Icelandic. The United aircraft were joined to by another 13 units by October 2003, including four parked by SIA. The two Malaysia Airlines aircraft were sold to Boeing Aircraft Holding company and were still in storage in October 2004,



while the KLM aircraft went back into operation.

Two SIA aircraft had been returned to service by October 2004, one being taken by Cathay Pacific for conversion to freighter and another aircraft leased to Air Atlanta Icelandic. Of the 18 United aircraft stored in October 2003, United returned eight to operation over the course of the next year, sold one to French charter carrier Corsair and sold another two to Wells Fargo Bank. The two ex-Malaysian aircraft also remain in storage, while one ex-Canadian Airlines and one EVA Air CF6-powered aircraft had also been parked.

MD-80

The number of MD-80s that have been parked is high in relation to the 1,156 aircraft built. The number that have been sold or re-leased and returned to service is also high, indicating the used market for them is still strong. In October 2002 there were 105 MD-80s stored (*see table, page 8*). These were from a variety of sources, one being a batch of ex-US Airways aircraft purchased by Jetran. There were also a group of ex-Continental Airlines aircraft, plus a small number of American Airlines, Delta Airlines and Midwest Express aircraft temporarily stored.

More than 40 of these were returned to service over the year to October 2003. A small number were returned to service by American, Delta and Midwest Express. The majority were sold or leased to a variety of secondary carriers. The largest group was 13 aircraft to Lion

Airlines in Indonesia. Other end-users were West Caribbean, Air Adriatic, Allegro Airlines, Aeromexico, Spirit Airlines and Allegiant Air.

This left more than 60 still parked, subsequently joined by more than 60 more aircraft. American Airlines parked another 24 aircraft, Continental four, SAS three, Swiss five and failed French airline Air Liberte parked four. The remaining aircraft came from a variety of small airlines and lessors. The numbers parked in October 2003 were 126.

The year to October 2004 saw more than 40 aircraft returned to service, but an equal number being parked resulting in no net change to the number stored. Aircraft were returned to service with a variety of airlines, including MNG Airlines, Transmeridian, Lion, Spirit Airlines, American Airlines, SAS, Jetset and Air Adriatic.

These were balanced by aircraft from Allegro Air, Dutch Caribbean Airlines, American, Alitalia and Continental Airlines being parked. By October 2004, American Airlines had parked 30 MD-80s, about 10% of its fleet.

More than 80 aircraft had been returned to service between October 2002 and October 2004, but another 100 had been parked since October 2002. About 20% of the MD-80 fleet had thus been in and out of storage over the two year period: one of the highest rates of turnover for a younger aircraft type. The 126 MD-80s still in storage in October 2004 account for almost one third of the total number of young and modern generation aircraft in storage at the time. The constantly high number of MD-80s

While numbers of stored 767-300s have not been excessive, a large quantity of 767-200s have been in storage for an extended period. This could be combined with further retirements, leading to a fall in value that may then trigger a wave of freighter conversions.

that are parked also indicates the aircraft is entering a period of decline, although numbers would be expected to be high with large numbers of 737-300s on the market. A complete lack of 737s and A320s may eventually lead to a smaller number of MD-80s being available.

MD-11

The MD-11 is popular as a freighter, and several have been converted over the past two years, the majority for United Parcel Service (UPS). In October 2002 four ex-Swiss and one China Airlines PW4000-powered aircraft were parked, while four CF6-powered aircraft were also in storage. All four CF6-powered aircraft have since been returned to service: two with Finnair, and two converted to freighter for UPS.

All five PW4000-powered aircraft were still in service in October 2003. By October 2003 another five CF6-powered aircraft had been parked, including one from Varig and two from Alitalia. Delta had also parked 10 MD-11s; most of its entire fleet.

By October 2004 Delta had parked all 13 of its aircraft, Swiss had parked most of its aircraft, as had Alitalia. Lufthansa Cargo had also parked five aircraft. The total number in storage at this date was 39.

A300-600/-600R

Only small numbers of A300-600/-600Rs have been in storage over the past two years. Aircraft parked have been split between CF6- and JT9D/PW4000-powered aircraft.

Lufthansa has parked and returned to service seven aircraft over the past two years, while Saudia has also parked three and put them back into operation. The same applies to American Airlines and China Eastern Airlines which have parked and returned three and two aircraft to operation respectively. Qatar Airways has also taken two AWAS aircraft. Only five A300-600/-600Rs were left in storage in October 2004.

In addition to passenger aircraft, FedEx has also converted five aircraft to freighter and Qatar Airways converted

one of its own aircraft for freighter services. Islandsflug has also taken four that were converted to freighter.

A310-200 & -300

The number of A310s that have been parked in recent years is high, and relatively few have returned to service. The number in storage has steadily increased from 18 in 2002 to 45 in October 2004.

Up to 11 A310-200s have been stored over the past two years and only three of these have been returned to operation. The majority of these aircraft have come from Air Algerie, Kibris Turkish and Libyan Arab Airlines. Two aircraft owned by FedEx have also been stored.

Two aircraft were returned to service with World Focus Airways and one with Kibris. FedEx has, however, converted a further four A310-200s to freighter.

A total of 45 A310-300s have been parked over the past two years, and only 16 returned to operation. Many of the aircraft parked have come off lease and returned to lessors. Algerian carrier Khalifa Airways ceased operations and parked two aircraft. Lufthansa has parked four, SIA eight and Air Jamaica two.

Besides FedEx, the passenger-to-freighter conversion market has been

slow to develop for the A310, although FedEx announced another batch of conversions in July 2004. Passenger operators that have put A310-300s back into service include SATA, Sibir, Air Transat, Hapag Lloyd, Air Paradise International, Air Plus Comet, Biman Bangladesh, Air India, Emirates, and Pakistan International Airways.

A320 family

Unsurprisingly, the majority of A320 family aircraft that have been in storage over the past two years have been put back into service. The largest number of parked aircraft was 64 A320s in 2003, and is explained by several airline bankruptcies, including Sabena and Aero Lloyd.

A total of 33 A319s have been parked over the past two years, and 30 of these have been returned to service. Many lessors' aircraft have been in storage and these have been leased to Germanwings, Croatia Airlines, USAirways, Meridiana, CCM Airlines, SN Brussels, Finnair, Mexicana, Air France, Frontier and Northwest.

The A320s that have been in storage should be considered in three groups: the CFM56-5A-powered aircraft, CFM56-5B powered aircraft and V.2500-powered aircraft.

A total of 36 CFM56-5A-powered A320s have been in storage over the past two years and only six aircraft remained parked in October 2004 (*see table, page 8*). A few aircraft were parked temporarily by Northwest and Lufthansa, but have been put back into operation. Airlines that have leased stored aircraft from lessors are Air France, Air Luxor, Lao Airlines, Air Memphis, Free Bird Airlines, Germanwings, and Armavia.

The majority of the 23 CFM56-5B-powered aircraft put into storage over the past two years have been aircraft parked by Iberia and Air France, which have subsequently put them back into operation. Eight ex-Swiss/Swissair aircraft have been leased to THY and CCM Airlines. Only six of these aircraft remain in storage.

V.2500-powered aircraft are the largest group of A320s that have been in storage; totalling 43 units over the past two years. Eleven of these are still parked, but 10 aircraft parked by Aero Lloyd have all been re-leased to a variety of airlines, including Volareweb, America West, Niki and Aero Flight. Other airlines that have taken aircraft are Indian Airlines, Egyptair, Ryan International Airlines, Blue Wings, and start-up Wizz Air, which has taken six aircraft.

Only 14 A321s have been in storage over the past two years, with only three

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remaining in October 2004. THY has leased two ex-Swiss A321s, while Air France and Iberia have reactivated their own parked aircraft.

Aero Lloyd parked 11 A321s after it collapsed in October 2003, and only 1 remained stored in October 2004. Other aircraft have been leased to Onur Air, Spirit Airlines, Aero Flight and Niki.

A330-200 & -300

Like the 777, the A330 and A340 have been little affected by the recent downturn. Only two A330-300s have been in storage over the past two years, but are now operational with Korean Air and Air Algerie.

Twelve A330-200s have been in storage over the past two years, but only one Air France CF6-80E-powered aircraft remains parked (see table, page 8). Another aircraft is in service with Air France and one with Qatar Airways.

Nine PW4000-powered aircraft have been in storage since October 2002. Three were ex-Swiss aircraft, and two ex-Sabena. All five of these are now operated by Lufthansa. Another two aircraft were parked by Brazilian carrier TAM, and have been leased to United Arab Emirates start-up Etihad Airways. The two other aircraft are in operation with Air Luxor and Air Greenland.

British Midland has reinstated one Trent 700-powered aircraft.

A340 family

Nineteen A340-200s and -300s have been in storage over the past two years, but all have been returned to operation. Emirates has taken eight ex-SIA aircraft. Other airlines that have taken aircraft are

Royal Jordanian, Lufthansa, Etihad, Cathay Pacific, Gulf Air, Sri Lankan, China Airlines and Swiss.

Three A340-500s and -600s were briefly parked prior to delivery to Air Canada and Iberia.

Summary

More than 900 aircraft of the types analysed were either in storage in October 2002 or entered storage between October 2002 and October 2004. This represents about 10% of the 2004 jetliner fleet. More than 500 of these aircraft that have been parked over this period have been returned to service, with 448 still left parked in October 2004.

The 757-200, 767-200, 747-400, MD-11, A310-300 and A320 family have all had large numbers of aircraft parked. The largest number is accounted for by the 737-300 and MD-80, however. About 155 737-300s and more than 200 MD-80s have been parked over this period.

While large numbers of 737-300s and MD-80s have gone back into operation, large numbers remain. The MD-80 dominates, but there are still more than 40 A310s, 60 767-200s, 30 757-200s and 40 MD-11s in storage. Many of these are attractive freighter conversion candidates, although the market is still weak.

The remaining 448 aircraft in storage in October 2004 represent about 7.5% of the active young and modern generation airliner fleet, but 5% of the total jetliner fleet of 9,000 aircraft. This is still a large portion and represents a large surplus that will still take some time to diminish. This number also has to be considered against the probable 600 aircraft that will be delivered each year for the next two of three years.

Although the recent recession has seen several major A320 operators fail, stored aircraft have quickly been returned to service, with more than 40 being reactivated over the past year.

Many of the parked aircraft do represent good candidates for freighter conversion. The most important types are the 737-300, 757, 767-200, A310-300 and 747-400. The total for these in storage is 190. Although not all these will be converted, a large portion could satisfy demand for freighter fleet renewals, especially in the current climate of renewed freight traffic growth and pressure of high fuel prices. The majority or all of the 39 MD-11s now parked will be converted to freighter, since demand for the type is so strong that it is clear there will be no problem finding end users for it. Freighter conversions could thus absorb 100-150 parked aircraft.

The one type that may give cause for concern is the MD-80. The number stored has not decreased, despite about 80 aircraft being returned to service over the past two years. The prospects for used MD-80s may be made more difficult by Delta's plans to rationalise its fleet by cutting four types over the next four years. After Delta's announcement that two of these types will be the 737-200 and 737-300, the MD-80 and MD-90 are the next two most likely candidates. This would add substantial numbers to the number of parked aircraft, and out the MD-80 in terminal decline, since the large number being retired by Delta and other MD-80 operators would exceed the number being absorbed by secondary carriers. The ability for airlines to acquire several other stored types at attractive rates, as well as new aircraft, means the MD-80 would no longer represent true surplus.

It may therefore be prudent to exclude the MD-80 from the number of stored aircraft. This would take the current number of young and modern aircraft that are stored and parked to about 325. To this should be added the 81 Fokker jets. Many of the total will be acquired by expanding secondary, low-cost and start-up airlines. Others will be acquired for conversion to freighter. The number of stored aircraft may therefore not be such a large surplus, considering that 250 have been put back into service over the past two years. **AC**