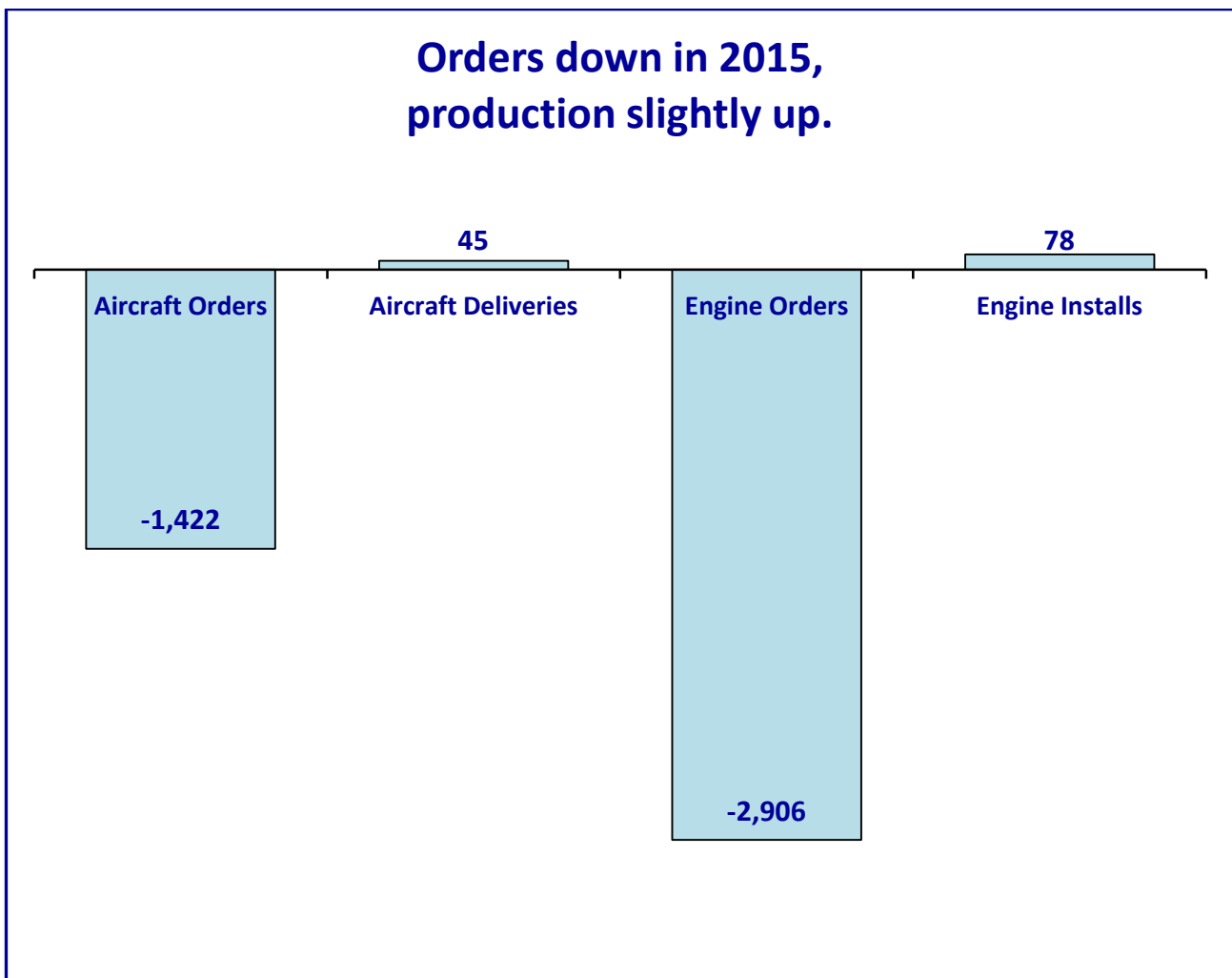


Aerospace Market News

January 2016



Fewer aircraft and engine orders than in 2014 but an increase in delivery numbers.

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2015: The order intake was low but production was up.

Something the aircraft and engine manufacturers have not said very much about in the context of 2015 is just how low the order intake was. Aircraft orders fell by 41% and engine orders fell by 49%. Production was up and there has been a lot of talk about a record production year but a closer look at the figures shows that production was not appreciably up. It might not be appreciably up in 2016 either.

The Large Commercial Jet Aircraft Backlog : 18

The fifth consecutive year-end backlog record.

The large commercial jet backlog grew by 407 aircraft in 2015 and the current figure of 13,331 aircraft is a new industry record. The number of single-aisle aircraft on firm backlog order grew by 499 last year and there is a new single-aisle backlog record. In the widebody segment, deliveries and cancellations outstripped the order intake and the backlog at the end of the year was down 92 aircraft.

Backlog Development of Minor Aircraft Programs. 21

Single-aisle and Widebody Backlogs. 25

Orders for Large Commercial Jets : 28

The lowest annual order intake since 2010.

It was clear early on last year that the order intake was much lower than in 2014. The intake in each of the first seven months of last year was lower than in the corresponding month the previous year. In fact, the first time there was a larger monthly intake was in August but by then the intake was already well over 700 aircraft less than by the end of August 2014. By the end of December, the total intake for the year was just over 2,000 aircraft which was some 1,400 fewer than in 2014.

Deliveries of Large Commercial Jets : 36

Delivery numbers were up last year, but not by much.

The annual increase in large commercial jet delivery numbers has clearly slowed, down from 85 more in 2013 (than in 2012) to 78 more in 2014 (than in 2013). The 2015 increase was 45 more aircraft; six more from Airbus and 39 more from Boeing. Even so, both manufacturers had a record production year.

The share of deliveries in 2015. 40

Current Production Rates : 45

Aircraft Engines : 47

Orders were quite a bit down in 2015 but installs were up.

The engine manufacturers may not be too concerned about the order intake last year. Over 3,000 large civil jet engines were ordered, just over half the 2014 intake. The manufacturers' main focus now is on production. New engine installs were actually not up by that much last year and the rate of increase has been slowing to the extent that the install increase last year was the lowest since 2010. There were more new engine installs than in 2014 but the year-on-year increase was not exactly exciting.

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Engine Programs : The Firm Order Books : 65

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Summary Data : Aircraft.

The Large Commercial Jet Backlog.

	Aircraft on Firm Backlog Order on December 31, 2012	Aircraft on Firm Backlog Order on December 31, 2013	Aircraft on Firm Backlog Order on December 31, 2014	Aircraft on Firm Backlog Order on December 31, 2015	Change in 2015
Single-aisle aircraft	7,327	8,636	10,177	10,676	499
Widebody aircraft	2,352	2,661	2,747	2,655	-92
Total	9,679	11,297	12,924	13,331	407

Aircraft Orders.

	Orders in 2012	Orders in 2013	Orders in 2014	Orders in 2015
Single-aisle	2,192	2,498	2,834	1,632
Widebody	286	689	605	385
Total	2,478	3,187	3,439	2,017

	Fourth Quarter 2012 Orders	Fourth Quarter 2013 Orders	Fourth Quarter 2014 Orders	Fourth Quarter 2015 Orders
Single-aisle	874	681	988	507
Widebody	122	339	205	128
Total	996	1,020	1,193	635

Cancelled Aircraft Orders.

	Cancelled in 2014	Cancelled in 2015
Single-aisle	318	147
Widebody	142	66
Total	460	213

Aircraft Deliveries

	Delivered in 2012	Delivered in 2013	Delivered in 2014	Delivered in 2015
Single-aisle	870	933	975	986
Widebody	319	341	377	411
Total	1,189	1,274	1,352	1,397

	Fourth Quarter 2012 Deliveries	Fourth Quarter 2013 Deliveries	Fourth Quarter 2014 Deliveries	Fourth Quarter 2015 Deliveries
Single-aisle	243	250	268	259
Widebody	105	103	113	112
Total	348	353	381	371

The Current Position : Aircraft on December 31, 2015.

Aircraft Model	Backlog on Dec 31, 2014	Backlog on Dec 31, 2015	Backlog change in 2015	Gross Orders in 2015	Cancelled In 2015	Net Orders In 2015	Deliveries In 2015
A318	0	0	0	1		1	1
A319	45	20	-25		4	-4	24
A319neo	49	50	1	3		3	
A320	911	630	-281	69	44	25	282
A320neo	2,817	3,327	510	564	11	553	
A321	552	414	-138	35	10	25	184
A321neo	755	1,094	339	294		294	
A330-200	65	52	-13	17		17	30
A330-200F	8	9	1	4		4	3
A330-300	120	119	-1	83	14	69	70
A330-800	10	10	0				
A330-900	110	160	50	50		50	
A350-800	16	16	0				
A350-900	594	565	-29	16	19	-3	14
A350-1000	169	181	12				
A380	165	140	-25	3	1	2	27
Airbus	6,386	6,787	401	1,139	103	1,036	635
737-700	104	40	-64	1		1	10
737-800	1,282	1,096	-186	201	64	137	396
737-800A	28	26	-2	13		13	15
737-900ER	222	158	-64	33	14	19	74
737 MAX	2,663	3,072	409	418		418	
747-8	24	13	-11				11
747-8F	12	7	-5	6	4	2	7
767-2C	4	4	0				
767-300ER	0	0	0				
767-300F	43	76	33	49		49	16
777-300ER	233	176	-57	22		22	79
777-F	45	42	-3	16		16	19
777X	286	306	20	20		20	
787-8	241	162	-79	10	2	8	71
787-9	463	455	-8	68	26	42	64
787-10	139	162	23	21		21	
Boeing	5,789	5,795	6	878	110	768	762
CS100	63	53	-10				
CS300	180	190	10				
Bombardier	243	243	0	0	0	0	0
C919	350	350	0				
COMAC	350	350	0	0	0	0	0
MS-21-200	15	15	0				
MS-21-300	141	141	0				
Irkut	156	156	0	0	0	0	0
Grand Total	12,924	13,331	407	2,017	213	1,804	1,397

Major Programs : Orders and Deliveries in 2014 and 2015.

Aircraft	Gross Orders in 2014	Gross Orders in 2015	Deliveries in 2014	Deliveries in 2015
A318	0	1	0	1
A319	33	3	34	24
A320	1,117	633	306	282
A321	395	329	150	184
A330	174	154	108	103
A350	57	16	1	14
A380	20	3	30	27
Total Airbus	1,796	1,139	629	635
737	1,196	666	485	495
747	2	6	19	18
767	4	49	6	16
777	283	58	99	98
787	65	99	114	135
Total Boeing	1,550	878	723	762
CS100	0		0	
CS300	63		0	
Total Bombardier	63	0	0	0
C919	30		0	
COMAC	30	0	0	0
MS-21-200	0		0	
MS-21-300	0		0	
Total Irkut	0	0	0	0
Total	3,439	2,017	1,352	1,397

Order Cancellations (2012 to 2015).

Aircraft	Cancelled in 2012	Cancelled in 2013	Cancelled in 2014	Cancelled in 2015
A318	1	2		
A319	1	19	21	4
A320	39	64	138	55
A321	3	6	65	10
A330	22	8	20	14
A340	2			
A350	13	9	89	19
A380		8	7	1
Airbus	81	116	340	103
737	60	162	92	78
747	6	5	2	4
767	1			
777	7	8		
787	62	1	24	28
Boeing	136	176	118	110
CS100	5	3		
CS300	10		2	
Bombardier	15	3	2	0
Total	232	295	460	213

Major Programs : Gross and Net Aircraft Orders in 2015.

Aircraft	Gross Orders	Cancelled	Net Orders
A318	1		1
A319	3	4	-1
A320	633	55	578
A321	329	10	319
A330	154	14	140
A350	16	19	-3
A380	3	1	2
737	666	78	588
747	6	4	2
767	49		49
777	58		58
787	99	28	71
CSeries	0		0
C919	0		0
MS-21	0		0
			0
Total	2,017	213	1,804

Aircraft Deliveries 2011 – 2015 (Minor Programs).

Aircraft Program	Delivered in 2011	Delivered in 2012	Delivered in 2013	Delivered in 2014	Delivered in 2015
A318	2	2	1		1
A319	47	38	38	34	24
A320	307	332	352	306	282
A321	65	83	102	150	184
A330-200	40	37	43	28	30
A330-200F	4	8	8	5	3
A330-300	43	56	57	75	70
A340-500		2			
A350-900				1	14
A380	26	30	25	30	27
Total Airbus	534	588	626	629	635
737-700	51	9	17	14	10
737-800	293	353	348	388	396
737-800A	4	9	8	13	15
737-900ER	24	44	67	70	74
747-8		12	5	10	11
747-8F	9	19	19	9	7
767-300ER	15	14	9	1	
767-300F	5	12	12	5	16
777-200ER		3	4		
777-200LR	6	1	1	3	
777-300ER	52	60	79	83	79
777-F	15	19	14	13	19
787-8	3	46	65	104	71
787-9				10	64
Total Boeing	470	601	648	723	762
TOTAL	1,011	1,189	1,274	1,352	1,397

Summary Data : Engines.

The Large Civil Jet Engine Backlog.

	Jet Engines on Firm Backlog Order on Dec 31, 2012	Jet Engines on Firm Backlog Order on Dec 31, 2013	Jet Engines on Firm Backlog Order on Dec 31, 2014	Jet Engines on Firm Backlog Order on Dec 31, 2015	Change in 2015
Single-aisle engines	13,278	14,682	16,688	16,654	-34
Widebody engines	4,556	4,908	5,118	5,034	-84
Total	17,834	19,590	21,806	21,688	-118

Engine Orders.

	Orders in 2012	Orders in 2013	Orders in 2014	Orders in 2015
Single-aisle engines	4,300	3,636	4,710	2,174
Widebody engines	588	1,218	1,240	870
Total	4,888	4,854	5,950	3,044

	Fourth Quarter 2012 Orders	Fourth Quarter 2013 Orders	Fourth Quarter 2014 Orders	Fourth Quarter 2015 Orders
Single-aisle engines	1,196	934	1,154	826
Widebody engines	244	570	400	164
Total	1,440	1,504	1,554	990

Cancelled Engine Orders.

	Cancelled in 2014	Cancelled in 2015
Single-aisle	544	272
Widebody	272	148
Total	816	420

Engine Installs

	Installs in 2012	Installs in 2013	Installs in 2014	Installs in 2015
Single-aisle engines	1,738	1,866	1,950	1,972
Widebody engines	762	780	852	908
Total	2,500	2,646	2,802	2,880

	Fourth Quarter 2012 Installs	Fourth Quarter 2013 Installs	Fourth Quarter 2014 Installs	Fourth Quarter 2015 Installs
Single-aisle engines	486	500	536	518
Widebody engines	260	244	258	250
Total	746	744	794	768

The Year-end Firm Engine Order Book.

Program	Firm Order Book on December 31, 2013	Firm Order Book on December 31, 2014	Firm Order Book on December 31, 2015.	Change in 2015
CFM56-5B	1,416	1,450	1,032	-418
CFM56-7B	3,834	3,272	2,640	-632
CFM LEAP	5,724	8,328	9,440	1,112
CF6-80	154	166	226	60
GE90	628	556	436	-120
GE9X	132	572	612	40
GEEx	1,054	954	752	-202
GP7200	308	224	136	-88
PW1000G	2,250	2,660	2,996	336
PW4000	68	50	42	-8
V2500	1,458	978	546	-432
Trent 700	308	220	172	-48
Trent 7000	0	240	340	100
Trent 900	180	116	292	176
Trent 1000	452	462	502	40
Trent XWB	1,624	1,558	1,524	-34
Total	19,590	21,806	21,688	-118

Gross and Net Engine Orders in 2015.

	Gross Orders	Cancellations	Net Order Intake
CFM56-5B	104	66	38
CFM56-7B	496	156	340
CFM LEAP	1,136	6	1,130
CF6-80	120		120
GE90	80		80
GE9X	40		40
GEEx	64	72	-8
GP7200	0	4	-4
PW1000G	336		336
PW4000	0		0
V2500	102	44	58
Trent 700	110	22	88
Trent 7000	100		100
Trent 900	200		200
Trent 1000	124	12	112
Trent XWB	32	38	-6
Total	3,044	420	2,624

Engine Orders.

	Gross Orders in 2013	Gross Orders in 2014	Gross Orders In 2015
CFM56-5B	328	748	104
CFM56-7B	1,018	832	496
CFM LEAP	1,626	2,572	1,136
Total CFM	2,972	4,152	1,736
CF6-80	4	44	120
GE90	110	134	80
GE9X	132	440	40
GEEnx	272	98	64
Total GE	518	716	304
GP7200	16	0	0
Total Engine Alliance	16	0	0
PW1000G	560	486	336
PW4000	0	0	0
V2500	104	72	102
Total Pratt & Whitney	664	558	438
Trent 700	126	64	110
Trent 7000	0	240	100
Trent 900	0	0	200
Trent 1000	80	94	124
Trent XWB	478	126	32
Total Rolls-Royce	684	524	566
GRAND TOTAL	4,854	5,950	3,044

Engine Installs.

	Installs in 2013	Installs in 2014	Installs in 2015
CFM56-5B	552	614	576
CFM56-7B	880	970	990
Total CFM	1,432	1,584	1,566
CF6-80	84	50	66
GE90	188	198	196
GEEnx	186	220	238
Total GE	458	468	500
GP7200	64	84	84
Total Engine Alliance	64	84	84
PW4000	46	20	8
V2500	434	366	406
Total Pratt & Whitney	480	386	414
Trent 700	136	158	164
Trent 900	36	36	24
Trent 1000	40	84	100
Trent XWB	0	2	28
Total Rolls-Royce	212	280	316
GRAND TOTAL	2,646	2,802	2,880

Industry Overview

2015: The order intake was low but production was up.

Something the aircraft and engine manufacturers have not said very much about in the context of 2015 is just how low the order intake was. Aircraft orders fell by 41% and engine orders fell by 49%. Production was up and there has been a lot of talk about a record production year but a closer look at the figures shows that production was not appreciably up. It might not be appreciably up in 2016 either.

The Aircraft Manufacturers' Backlog Order Books.

	Airbus	Boeing	Bombardier C Series	COMAC C919	Irkut	Total
Backlog on Dec 31, 2014.	6,386	5,789	243	350	156	12,924
Backlog on Dec 31, 2015.	6,787	5,795	243	350	156	13,331
Backlog change in 2015.	401	6	0	0	0	407
Gross Orders in 2014.	1,796	1,550	63	30	0	3,439
Gross Orders in 2015.	1,139	878	0	0	0	2,017
Change in 2015	-657	-672	-63	-30	0	-1,422
Deliveries in 2014	629	723	0	0	0	1,352
Deliveries in 2015.	635	762	0	0	0	1,397
Change in 2015.	6	39	0	0	0	45

Airbus and Boeing both had record production years. So too did some of the engine manufacturers. Airbus and Boeing both finished the year with larger backlogs, as did Rolls-Royce. Aircraft and engine orders were down but, there again, 2014 was a record year for orders and one could hardly expect the 2014 volume to be repeated again the following year.

Take a slightly closer look at delivery numbers and it is clear that most of the gain last year was due to Boeing. Airbus delivered one more single-aisle aircraft than in 2014, and five more widebodies. Boeing delivered 10 more single-aisles and 29 more widebodies. The total works out at 11 more single-aisle aircraft deliveries than in 2014 and 34 more widebody deliveries. In terms of engines there were 22 more single-aisle engine installs and 56 more widebody engine installs. These are not huge engine numbers but in 2014 there were 84 more single-aisle engine installs than in 2013, and 72 more widebody engine installs.

Production has certainly gone up, but the rate of the annual increase has definitely slowed in overall terms. In 2014, for example, there were 42 more single-aisle aircraft deliveries than in the previous year, and 36 more widebody aircraft deliveries. The 2015 figures of 11 more single-aisle aircraft and 34 more widebody aircraft certainly point to some sort of slowing.

Airbus and Boeing are both looking to have more deliveries in 2016 than last year but, as in 2015, this might come more from an increase in widebody delivery numbers than single-aisles. Airbus will step up production of the A350 and Boeing will deliver more 787s. A330 production is slowing and there will be no massive increase in A380 production. Boeing is cutting 747 production to six per year as of September and 777 production may drop slightly. 767 production rather relies on what FedEx wants to do.

Airbus and Boeing both ended 2015 with larger backlogs but this was a case of a very much larger Airbus backlog and not much change in the Boeing backlog. The Airbus backlog grew by 401 aircraft last year while Boeing's backlog was up six aircraft on the figure at the start of the year. Bombardier, COMAC and Irkut took no orders and had absolutely no backlog change.

Both Airbus and Boeing ended the year with larger single-aisle backlogs than at the start of the year but both had smaller widebody backlogs. In the single-aisle segment, the Airbus backlog was up 406 aircraft while Boeing's backlog was up 93.

The Airbus widebody backlog fell by five and Boeing's widebody backlog dropped by 87. Despite this, there were some noticeable gains: The A330-900 backlog was up 50 aircraft on the figure at the start of the year and the A350-1000 backlog was up 12. Boeing's 767-300F program finished last year with 33 more aircraft on backlog. The 777X was up 20 and the 787-10 was up 23.

For much larger numbers, both up and down, one has to look at the single-aisle programs. The largest backlog gains last year were made by the A320neo (+510), the 737 MAX (+409) and the A321neo (+339). Current engine option single-aisles were less fortunate; the A320ceo backlog fell by 281 aircraft last year, the A321ceo backlog dropped by 138 and the 737-800 backlog dropped by 186 aircraft.

While there was a new single-aisle aircraft backlog record at the end of last year, as well as a new total aircraft backlog record, in the engine industry things were quite different. The total number of large civil jet engines on firm order at the end of last year was 118 lower than at the start of the year, made up of 34 fewer single-aisle engines and 84 fewer widebody engines. Something that contributed to this was the number of aircraft firm ordered without engine selections. What illustrates this rather well is the statistic that the single-aisle engine order intake of 2,174 last year would have been 1,090 larger if all the customers ordering single-aisle aircraft had ordered engines at the same time.

This leads on to the big peculiarity of the engine industry; the number of To Be Decided engines. At the end of 2015 there were 2,614 aircraft on firm backlog order without engine selections and those aircraft will ultimately need 4,698 single-aisle engines and 596 widebody engines. The single-aisle engines will be shared by CFM and Pratt & Whitney and the widebody engines will be shared by GE, the Engine Alliance, P&W and Rolls-Royce. To CFM and P&W it doesn't really matter that their order intake last year was lower than in 2014, and it also doesn't really matter that their firm order books were lower at the end of the year than at the start of the year. After all, they have all this enormous potential to look forward to.

For the widebody engine manufacturers the potential from TBDs is clearly much smaller. Their problem last year, such as it may be, was that far more engines went out in the form of installs and cancellations than were ordered. For every five widebody engines ordered, six came off the order book.

What is important to note here is that single-aisle and widebody aircraft and engine deliveries have been increasing year by year. What has slowed, in some segments, is the rate of increase. For example, between 2012 and 2013 aircraft deliveries increased by 7.1% and engine deliveries increased by 5.8%. Last year the aircraft increase was 3.3% and the engine increase was 2.7%.

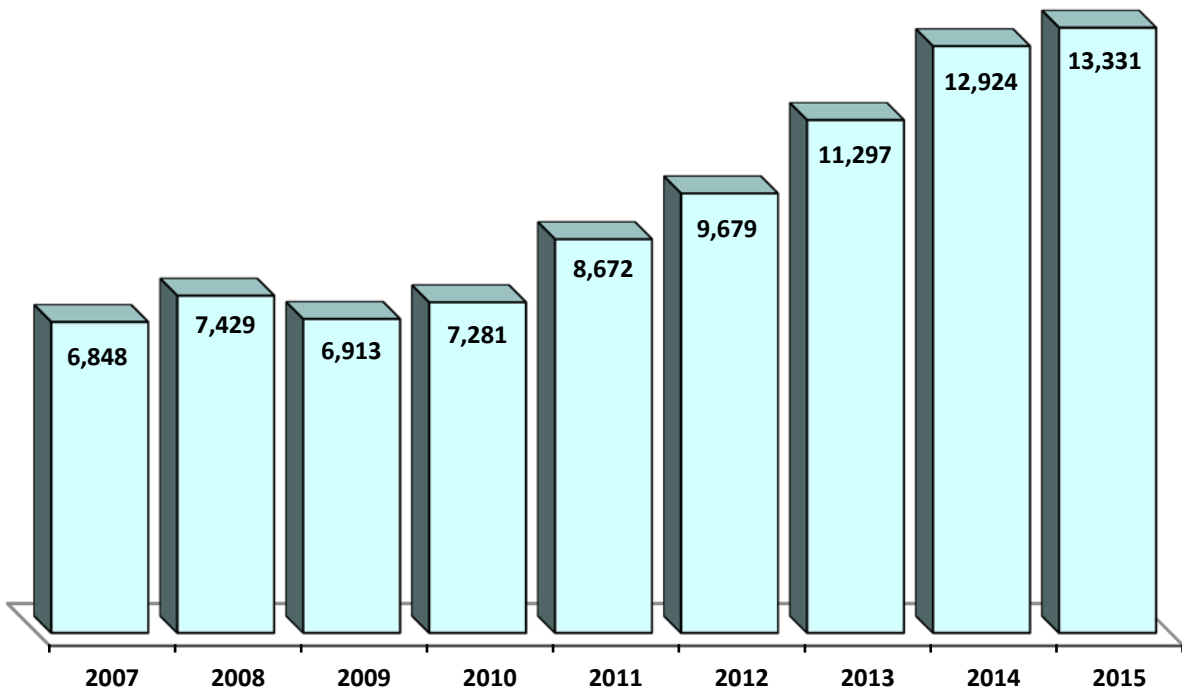
This has a bearing on 2016 production levels. Airbus and Boeing are both looking to have another record production year but working through the various announced production rate figures for different programs shows that while there will be even more single-aisle and more widebody delivery numbers this year, and consequently more engine install numbers in both segments, the gains over the 2015 figures might not be very large. There may be an element of conservative projections here but add up all the program numbers and it looks like about 996 single-aisle aircraft deliveries in 2016, and about 428 widebody aircraft deliveries. That translates into 10 more single-aisle aircraft deliveries than in 2015, and 17 more widebody aircraft deliveries.

These numbers may appear quite small but they will still set a new record.

The Engine Manufacturers' Backlog Order Books.

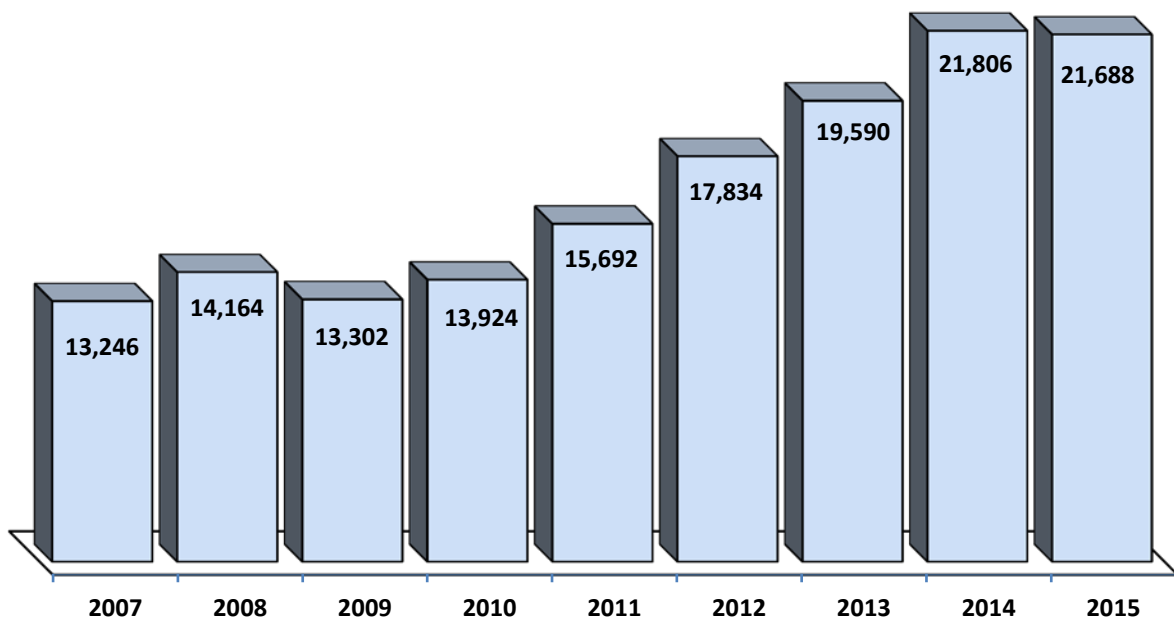
	CFM	GE Aviation	Engine Alliance	Pratt & Whitney	Rolls-Royce	Total
Order Book on Dec 31, 2014.	13,066	2,248	224	3,672	2,596	21,806
Order Book on Dec 31, 2015.	12,856	1,998	152	3,584	2,830	21,420
Order book change this year.	-210	-250	-72	-88	234	-386
Gross Orders in 2014.	4,152	716	0	558	524	5,950
Gross Orders in 2015.	1,736	304	0	438	566	3,044
Change in 2015	-2,416	-412	0	-120	42	-2,906
Installs in 2014	1,584	468	84	386	280	2,802
Installs in 2015.	1,566	500	84	414	316	2,880
Change in 2015.	-18	32	0	28	36	78

The Year-end Backlog : Large Commercial Jet Aircraft.

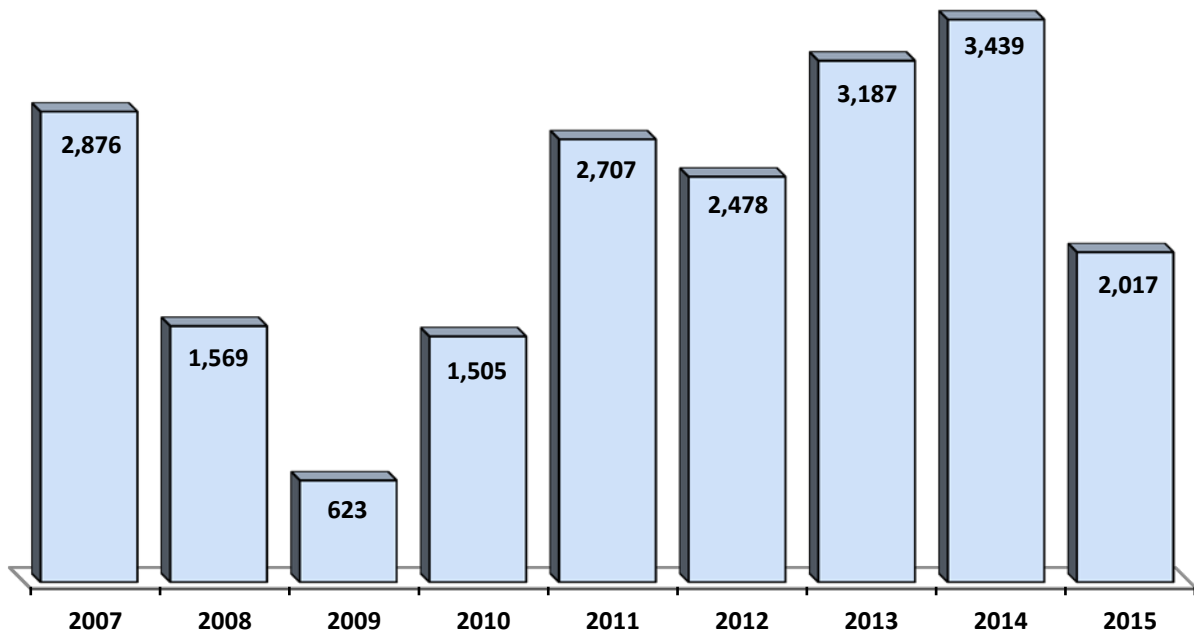


Year-end Backlog : The aircraft backlog has increased each year for the last six years. Since the end of 2009 the aircraft backlog has grown by over 6,400 aircraft (92.8%). The number of engines on firm order at the end of 2015 was slightly down on the 2014 figure but the current figure of 21,688 is 8,386 more than were on order at the end of 2009. This is a gain of 63%.

Engines on Firm Order at year-end.

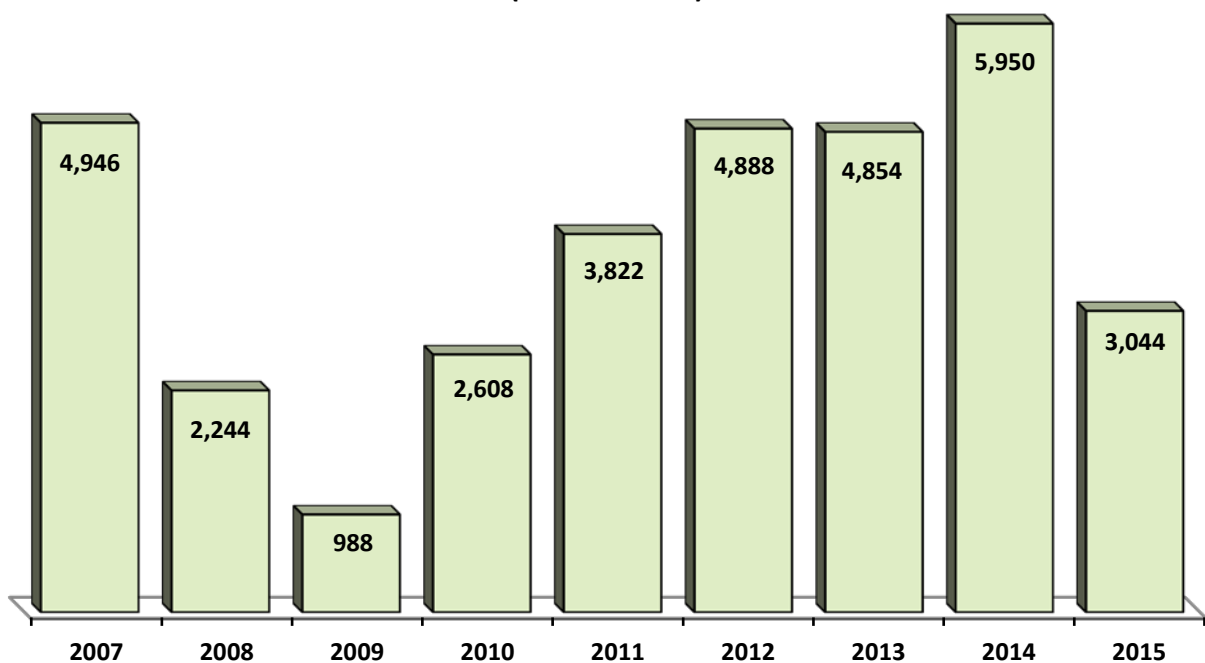


**Annual Orders for Large Commercial Jets.
(Gross orders.)**



Annual Orders : 2014 was a record year for both aircraft and engine orders. The drop in aircraft orders and engine orders in 2015 was the largest ever recorded. However, this does not necessarily signal a downturn and both the aircraft and engine order intakes were relatively strong. Part of the problem here is that 2014 was a record year and that was not sustainable going into 2015. The combined 2014 and 2015 aircraft order intake was actually just 209 lower than the combined 2012 and 2013 intake. This is not much. It is the same sort of thing with engine orders: 2014 and 2015 combined orders amount to 748 fewer engines than in 2012 and 2013, a drop of 7.6%.

**Annual Orders for Large Civil Jet Engines.
(Gross orders.)**



Orders for Aircraft and Engines.

	2011 Orders	2012 Orders	2013 Orders	2014 Orders	2015 Orders
Single-aisle aircraft	2,273	2,192	2,498	2,834	1,632
Widebody aircraft	434	286	689	605	385
Total Aircraft	2,707	2,478	3,187	3,439	2,017
Single-aisle engines	3,058	4,300	3,636	4,710	2,174
Widebody engines	764	588	1,218	1,240	870
Total Engines	3,822	4,888	4,854	5,950	3,044

Orders for widebody aircraft and widebody engines in 2015 were the lowest for a single year since 2012 but orders for single-aisle aircraft and single-aisle engines were lower than in recent years. Last year, 1,202 fewer single-aisle aircraft were ordered than in 2014, and 2,536 fewer single-aisle engines. With widebodies it was a case of 220 fewer aircraft and 370 fewer engines.

Aircraft Orders in 2014 and 2015.

Aircraft	Ordered in 2014	Ordered in 2015	Change (Number)
A318	0	1	1
A319	33	3	-30
A320	1,117	633	484
A321	395	329	-66
Airbus Single-aisle	1,545	966	-579
A330	174	154	-20
A350	57	16	-41
A380	20	3	-17
Airbus Widebody	251	173	-78
Boeing Single-aisle	1,196	666	-530
747	2	6	4
767	4	49	45
777	283	58	-225
787	65	99	34
Boeing Widebody	354	212	-142
CSeries	63	0	-63
C919	30	0	-30
MS-21	0	0	0
TOTAL ORDERS	3,439	2,017	-1,422

This table shows the change in the mix of major rather than minor programs. In both the single-aisle and widebody segments the order intake was down, single-aisles by 1,202 and widebodies by 220 aircraft.

Engine Orders in 2014 and 2015.

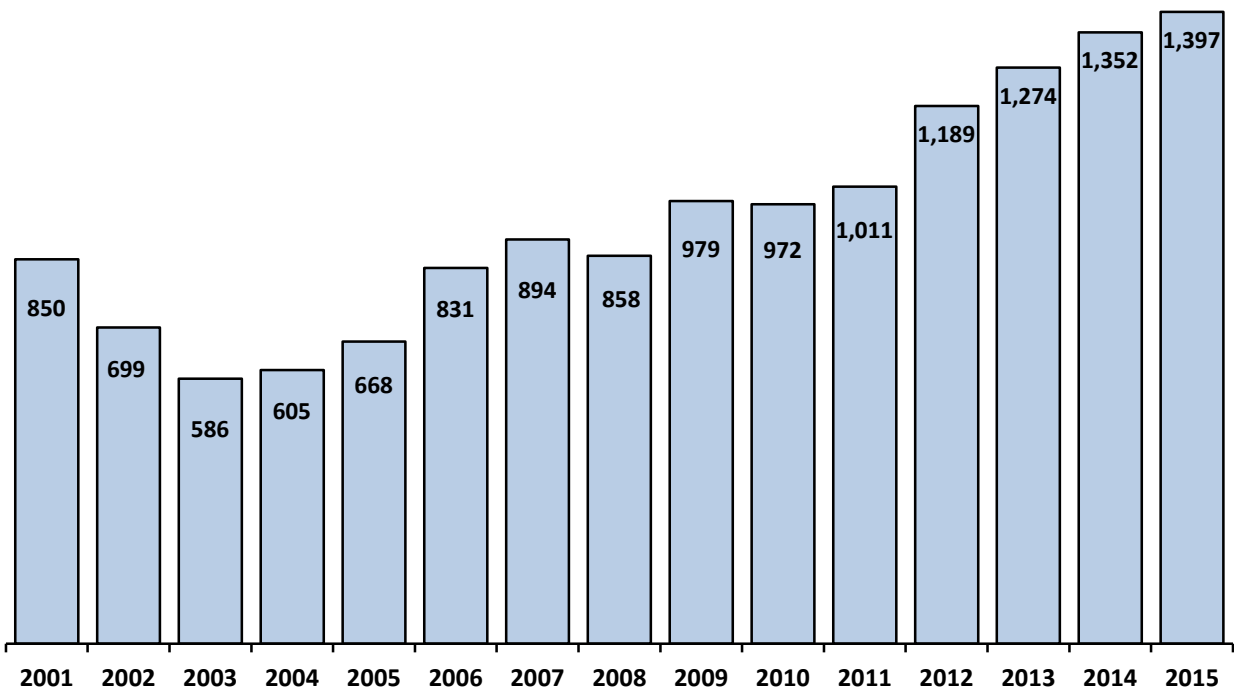
Engine	Ordered in 2014	Ordered in 2015	Change (Number)
CFM56-5B	748	104	-644
CFM56-7B	832	496	-336
CFM LEAP	2,572	1,136	-1436
PW1000G	486	336	-150
V2500	72	102	30
Single-aisle engines	4,710	2,174	-2,536
CF6-80	44	120	76
GE90	134	80	-54
GE9X	440	40	-400
GEEx	98	64	-34
GP7200	0	0	0
PW4000	0	0	0
Trent 700	64	110	46
Trent 7000	240	100	-140
Trent 900	0	200	200
Trent 1000	94	124	30
Trent XWB	126	32	-94
Widebody engines	1,240	870	-370
TOTAL ORDERS	5,950	3,044	-2,906

Deliveries of Aircraft and Engines.

	2011 Deliveries	2012 Deliveries	2013 Deliveries	2014 Deliveries	2015 Deliveries
Single-aisle aircraft	793	870	933	975	986
Widebody aircraft	218	319	341	377	411
Total Aircraft	1,011	1,189	1,274	1,352	1,397
Single-aisle engines	1,586	1,738	1,866	1,950	1,972
Widebody engines	506	762	780	852	908
Total Engines	2,092	2,500	2,646	2,802	2,880

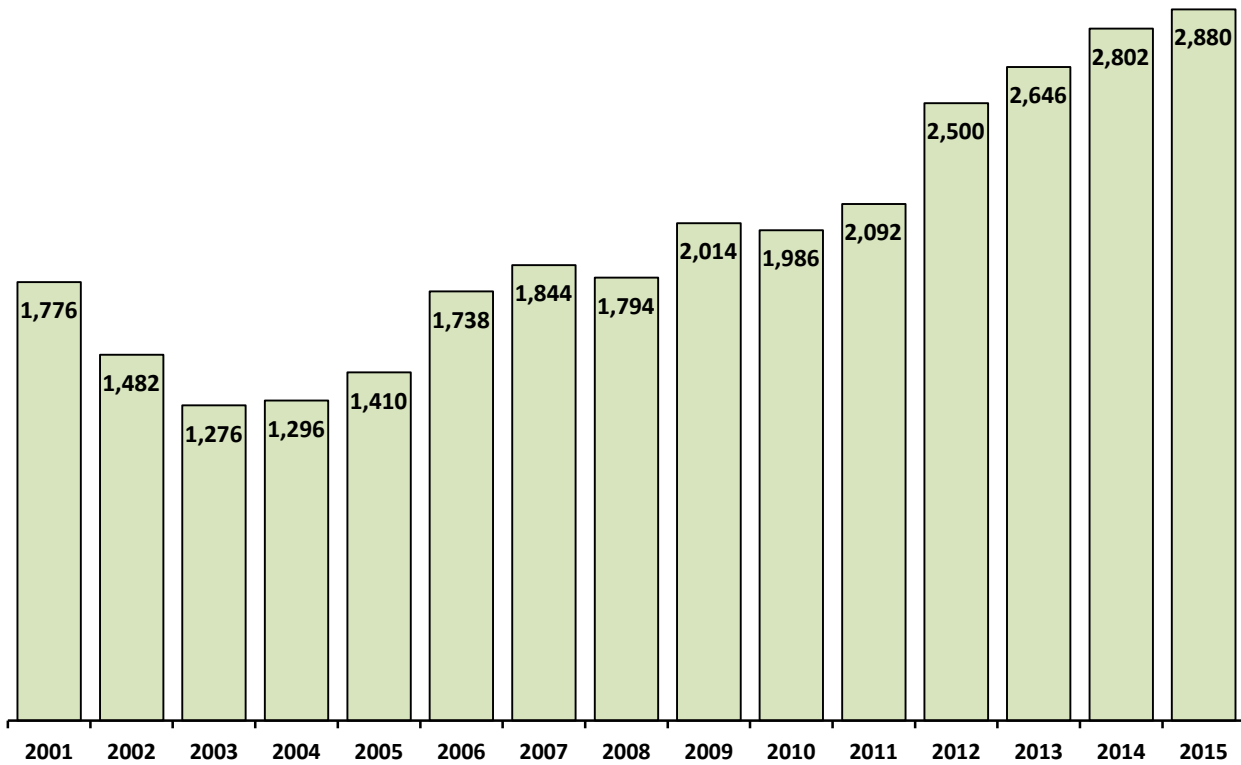
Aircraft and engine delivery numbers in both the single-aisle and widebody segments have increased each year for some time now but the rate of increase has recently slowed. It is anticipated that in both segments there will be record delivery numbers in 2016 but the increases over 2015 figures will probably not be very great.

Annual Large Commercial Jet Aircraft Deliveries.



Aircraft Deliveries and Engine Installs : With the exception of 2008 and 2010, annual aircraft and engine delivery numbers have increased every year since the low-point of 2003. Since the start of 2004 there have been just over 12,000 aircraft deliveries and over 25,000 new engine installs.

Annual Large Civil Jet Engine Installs.



Aircraft Deliveries in 2014 and 2015 : Major Programs.

Aircraft	2014 Deliveries	2015 Deliveries	Change (Number)
A318	0	1	1
A319	34	24	-10
A320	306	282	-24
A321	150	184	34
Airbus Single-aisle	490	491	1
A330	108	103	-5
A350	1	14	13
A380	30	27	-3
Airbus Widebody	139	144	5
Boeing Single-aisle	485	495	10
747	19	18	-1
767	6	16	10
777	99	98	-1
787	114	135	21
Boeing Widebody	238	267	29
TOTAL DELIVERIES	1,352	1,397	45

The mix is rather different. Airbus has delivered more A321s than in 2014 but fewer A319s and A320s. The European manufacturer has also delivered fewer A330s and A380s. Boeing's single aisle deliveries are up but there have been slightly fewer 747 and 777 deliveries. In terms of single-aisle aircraft, the A321 has had the largest gain. The 787 has had the largest widebody gain. More A321 deliveries have resulted in more V2500 installs and the GEnx increase is due to more 787 deliveries.

Engine Installs in 2014 and 2015.

Engine	2014 Installs	2015 Installs	Change (Number)
CFM56-5B	614	576	-38
CFM56-7B	970	990	20
V2500	366	406	40
Single-aisle engines	1,950	1,972	22
CF6-80	50	66	16
GE90	198	196	-2
GEnx	220	238	18
GP7200	84	84	0
PW4000	20	8	-12
Trent 700	158	164	6
Trent 900	36	24	-12
Trent 1000	84	100	16
Trent XWB	2	28	26
Widebody engines	852	908	56
TOTAL ENGINES	2,802	2,880	78

Philip G. Abbott
Editor.

The Large Commercial Jet Aircraft Backlog :

The fifth consecutive year-end backlog record.

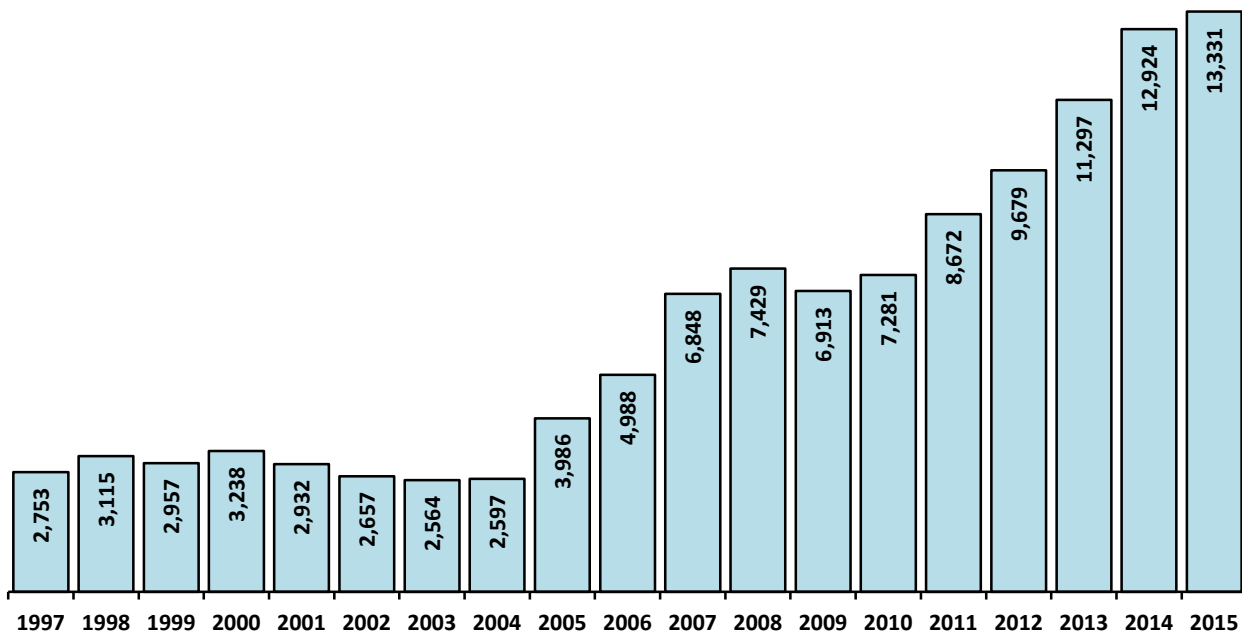
The large commercial jet backlog grew by 407 aircraft in 2015 and the current figure of 13,331 aircraft is a new industry record. The number of single-aisle aircraft on firm backlog order grew by 499 last year and there is a new single-aisle backlog record. In the widebody segment, deliveries and cancellations outstripped the order intake and the backlog at the end of the year was down 92 aircraft.

Last year could hardly have been more different to 2014 in backlog terms. By the end of December 2014 there were 1,541 more single-aisle aircraft on firm backlog order than at the start of the year, and 86 more widebody aircraft. The single-aisle backlog increase last year was less than a third of the 2014 increase and, instead of a widebody gain there was a widebody drop. There are currently six fewer widebodies on backlog than at the end of 2013, but there are 2,040 more single-aisles.

The difference between the Airbus and Boeing backlogs by the end of the year was also quite different. Airbus ended 2015 with 401 more aircraft on backlog than at the start of the year. Boeing had six more. In the single-aisle segment, Airbus had a gain of 406 aircraft. Boeing's gain was 93 aircraft. At the start of last year, Airbus had 830 more single-aisle aircraft on firm backlog order than Boeing. By the end of the year that number had grown to 1,143 more. COMAC, Bombardier CSeries and Irkut had no backlog change at all last year.

In the widebody segment, Boeing ended the year with 87 fewer aircraft on backlog than at the start of the year. Airbus had five fewer widebodies on backlog. Boeing has always had the larger widebody backlog and at the start of 2015 had 233 more widebodies on firm backlog order than Airbus. By the end of last year, that margin had shrunk to 151 aircraft.

How the Year-end Large Commercial Jet Backlog has changed.

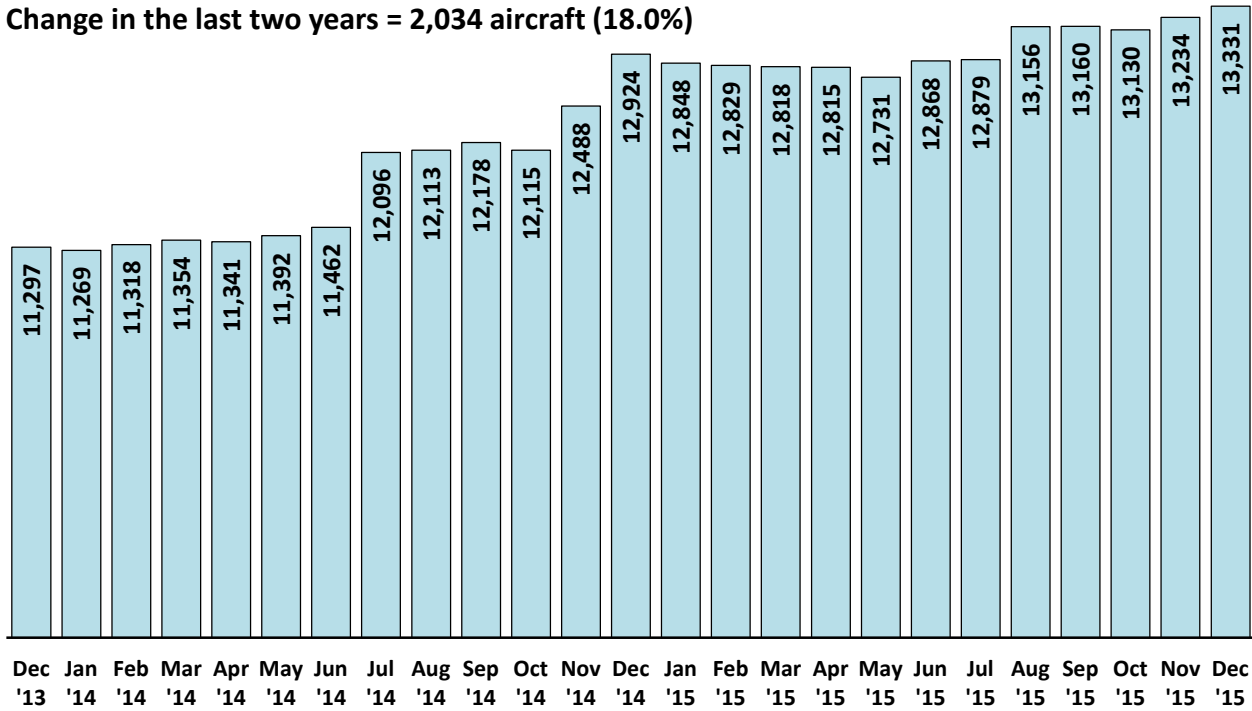


The Year-end Backlog: Compared to what has happened in recent years, there was very little backlog change until 2005 which is sometimes described as the “year of orders recovery”. (The current backlog is over four times the size of the backlog at the start of 2005.) The industry then had some fairly steep annual backlog increases until 2008/9 when the global economic downturn kicked in. The backlog started to increase again in 2010 and it shot up in 2011 when the first volume orders for the A320neo were announced. Since the start of 2011 the backlog has increased by 6,050 aircraft, or 83%. One common misconception about annual backlog change is that 2014 was the year with the largest increase. Actually, the increase in 2007 was larger.

Development of the Large Commercial Jet Backlog.

Change in the last 12 months = 407 aircraft (3.1%)

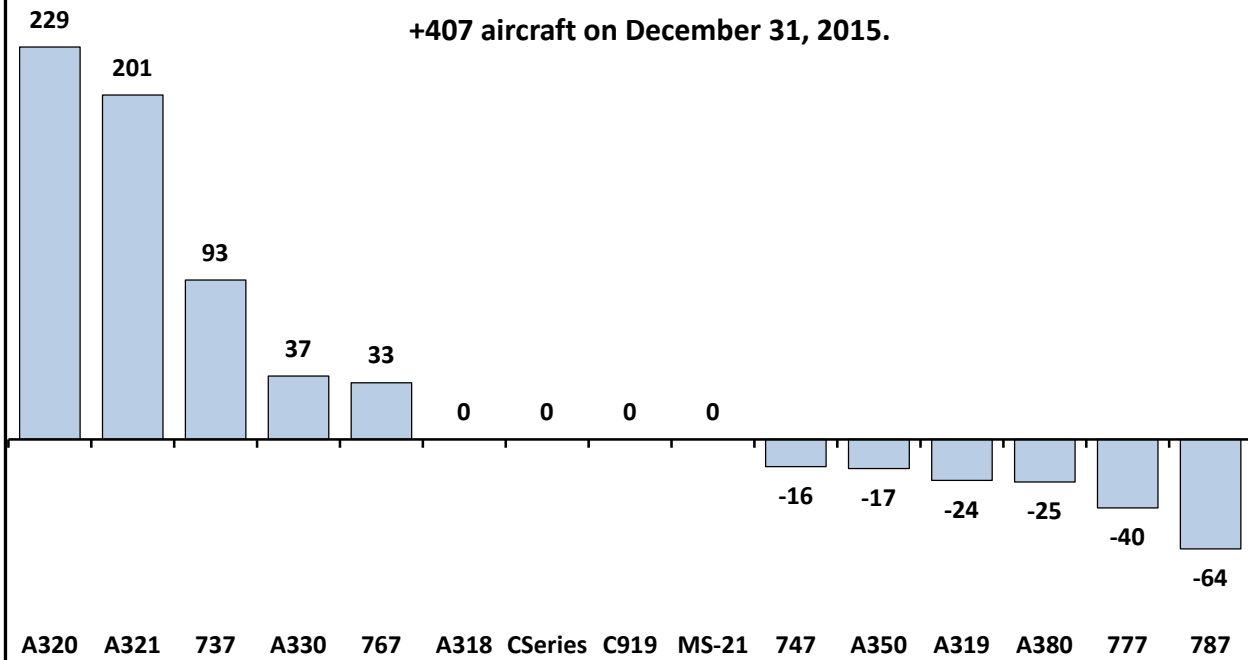
Change in the last two years = 2,034 aircraft (18.0%)



Development of the Large Commercial Jet Backlog: A new backlog record was set at the end of December, the fourth in 2015. Much of the gain is due to a much larger Airbus single-aisle backlog which increased by just over 400 aircraft during the year. Boeing had a single-aisle backlog increase of 93 aircraft but both manufacturers had smaller widebody backlogs at the end of the year.

Backlog change in 2015.

+407 aircraft on December 31, 2015.



Backlog Change: This chart shows the change to major programs. The A320 gain is due to 510 more A320neo aircraft (the A320ceo backlog dropped by 281 aircraft) and the A321 gain is due to 339 more A321neo aircraft while the A321ceo has dropped 138 aircraft. The 737 gain is due to 409 more 737-MAX jets on backlog but there are 316 fewer 737 Next Gen aircraft. The A330 gain is due to more A330-900s and the 767 gain is due to more 767-300Fs.

Monthly Backlog : Major Programs.

Aircraft Model	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	June 2015	July 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015
A318	0	0	0	0	0	0	0	0	0	0	0	0	0
A319	94	88	87	81	81	78	73	71	76	71	69	69	70
A320	3,728	3,710	3,708	3,685	3,737	3,717	3,775	3,737	4,027	3,997	3,977	3,999	3,957
A321	1,307	1,301	1,290	1,322	1,326	1,328	1,333	1,353	1,336	1,434	1,420	1,501	1,508
A330	313	313	305	327	319	313	321	320	333	330	354	363	350
A350	779	779	779	778	778	777	776	769	777	777	777	764	762
A380	165	164	163	161	158	155	152	150	148	146	144	141	140
Airbus	6,386	6,355	6,332	6,354	6,399	6,368	6,430	6,400	6,697	6,755	6,741	6,837	6,787
737	4,299	4,269	4,284	4,244	4,201	4,170	4,253	4,264	4,269	4,243	4,219	4,231	4,392
747	36	35	37	35	33	32	31	31	29	23	22	20	20
767	47	45	44	42	42	41	39	83	83	81	80	79	80
777	564	559	558	547	556	548	563	561	552	541	535	530	524
787	843	836	825	847	835	823	803	791	777	768	784	788	779
Boeing	5,789	5,744	5,748	5,715	5,667	5,614	5,689	5,730	5,710	5,656	5,640	5,648	5,795
CSeries	243	243	243	243	243	243	243	243	243	243	243	243	243
Bombardier	243	243	243	243	243	243	243	243	243	243	243	243	243
C919	350	350	350	350	350	350	350	350	350	350	350	350	350
COMAC	350	350	350	350	350	350	350	350	350	350	350	350	350
MS-21	156	156	156	156	156	156	156	156	156	156	156	156	156
Irkut	156	156	156	156	156	156	156	156	156	156	156	156	156
Total	12,924	12,848	12,829	12,818	12,815	12,731	12,868	12,879	13,156	13,160	13,130	13,234	13,331

Backlog Change : Major Programs on December 31, 2015.

	Change since December 31, 2014	Change since March 31, 2015	Change since June 30, 2015	Change since September 30, 2015
A318	0	0	0	0
A319	-24	-11	-3	-1
A320	229	272	182	-40
A321	201	186	175	74
A330	37	23	29	20
A350	-17	-16	-14	-15
A380	-25	-21	-12	-6
Airbus	401	433	357	32
737	93	148	139	149
747	-16	-15	-11	-3
767	33	38	41	-1
777	-40	-23	-39	-17
787	-64	-68	-24	11
Boeing	6	80	106	139
CSeries	0	0	0	0
Bombardier	0	0	0	0
C919	0	0	0	0
COMAC	0	0	0	0
MS-21	0	0	0	0
Irkut	0	0	0	0
Total	407	513	463	171

Backlog Development of Minor Aircraft Programs.

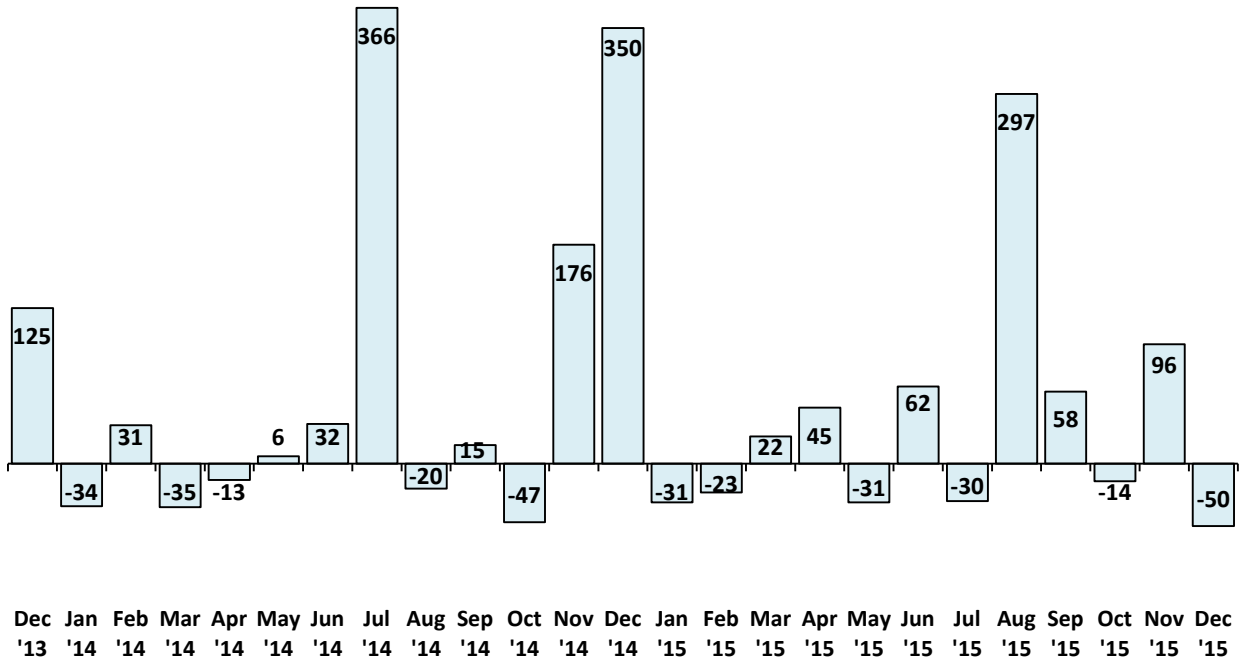
Aircraft Model	Dec 31, 2014	March 31, 2015	June 30, 2015	Sept 30, 2015	Dec 31, 2015
A318	0	0	0	0	0
A319	45	34	24	22	20
A319neo	49	47	49	49	50
A320	911	838	784	715	630
A320neo	2,817	2,847	2,991	3,282	3,327
A321	552	522	507	458	414
A321neo	755	800	826	976	1,094
A330-200	65	64	57	56	52
A330-200F	8	11	10	10	9
A330-300	120	107	109	119	119
A330-800	10	10	10	10	10
A330-900	110	135	135	135	160
A350-800	16	16	16	16	16
A350-900	594	593	591	592	565
A350-1000	169	169	169	169	181
A380	165	161	152	146	140
Airbus	6,386	6,354	6,430	6,755	6,787
737-700	104	95	45	42	40
737-800	1,282	1,208	1,184	1,150	1,096
737-800A	28	25	22	30	26
737-900ER	222	201	171	152	158
737 MAX	2,663	2,715	2,831	2,869	3,072
747-8	24	21	17	15	13
747-8F	12	14	14	8	7
767-2C	4	4	4	4	4
767-300ER	0	0	0	0	0
767-300F	43	38	35	77	76
777-200LR	0	0	0	0	
777-300ER	233	215	209	190	176
777-F	45	46	48	45	42
777X	286	286	306	306	306
787-8	241	229	199	182	162
787-9	463	476	464	440	455
787-10	139	142	140	146	162
Boeing	5,789	5,715	5,689	5,656	5,795
CS100	63	63	53	53	53
CS300	180	180	190	190	190
Bombardier	243	243	243	243	243
C919	350	350	350	350	350
COMAC	350	350	350	350	350
MS-21-200	15	15	15	15	15
MS-21-300	141	141	141	141	141
Irkut	156	156	156	156	156
Grand Total	12,924	12,818	12,868	13,160	13,331

The Backlog Change table is on the next page / ...

Backlog Change - all Minor Aircraft Programs as of December 31, 2015.

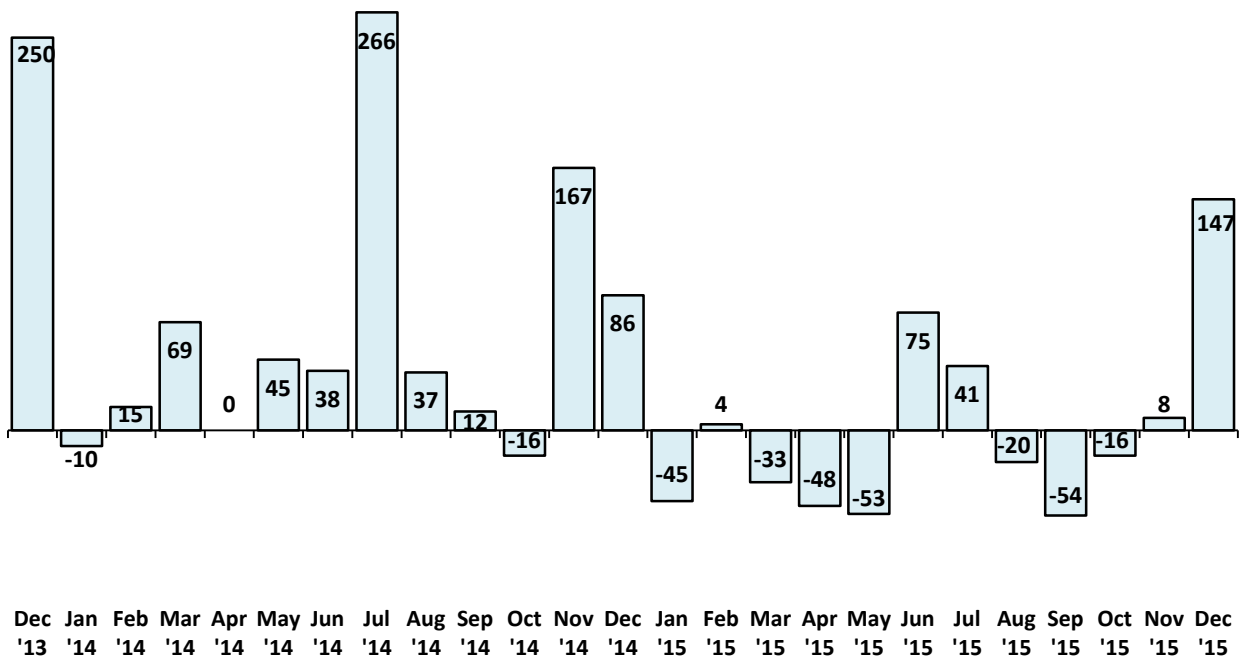
	Change from Dec 31, 2014	Change from Mar 31, 2015	Change from June 30, 2015	Change from Sept 30, 2015
A318	0	0	0	0
A319	-25	-14	-4	-2
A319neo	1	3	1	1
A320	-281	-208	-154	-85
A320neo	510	480	336	45
A321	-138	-108	-93	-44
A321neo	339	294	268	118
A330-200	-13	-12	-5	-4
A330-200F	1	-2	-1	-1
A330-300	-1	12	10	0
A330-800	0	0	0	0
A330-900	50	25	25	25
A350-800	0	0	0	0
A350-900	-29	-28	-26	-27
A350-1000	12	12	12	12
A380	-25	-21	-12	-6
Airbus	401	433	357	32
737-700	-64	-55	-5	-2
737-800	-186	-112	-88	-54
737-800A	-2	1	4	-4
737-900ER	-64	-43	-13	6
737 MAX	409	357	241	203
747-8	-11	-8	-4	-2
747-8F	-5	-7	-7	-1
767-2C	0	0	0	0
767-300ER	0	0	0	0
767-300F	33	38	41	-1
777-200LR	0	0	0	0
777-300ER	-57	-39	-33	-14
777-F	-3	-4	-6	-3
777X	20	20	0	0
787-8	-79	-67	-37	-20
787-9	-8	-21	-9	15
787-10	23	20	22	16
Boeing	6	80	106	139
CS100	-10	-10	0	0
CS300	10	10	0	0
Bombardier	0	0	0	0
C919	0	0	0	0
COMAC	0	0	0	0
MS-21-200	0	0	0	0
MS-21-300	0	0	0	0
Irkut	0	0	0	0
Grand Total	407	513	463	171

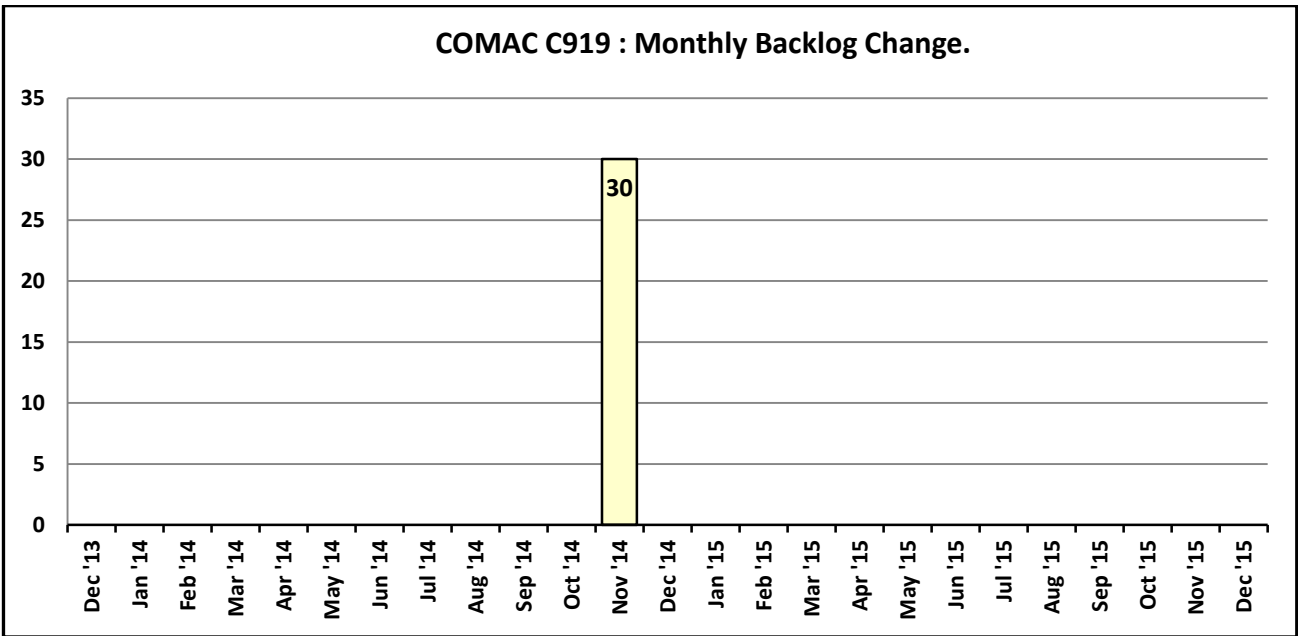
Airbus : Monthly Backlog Change.



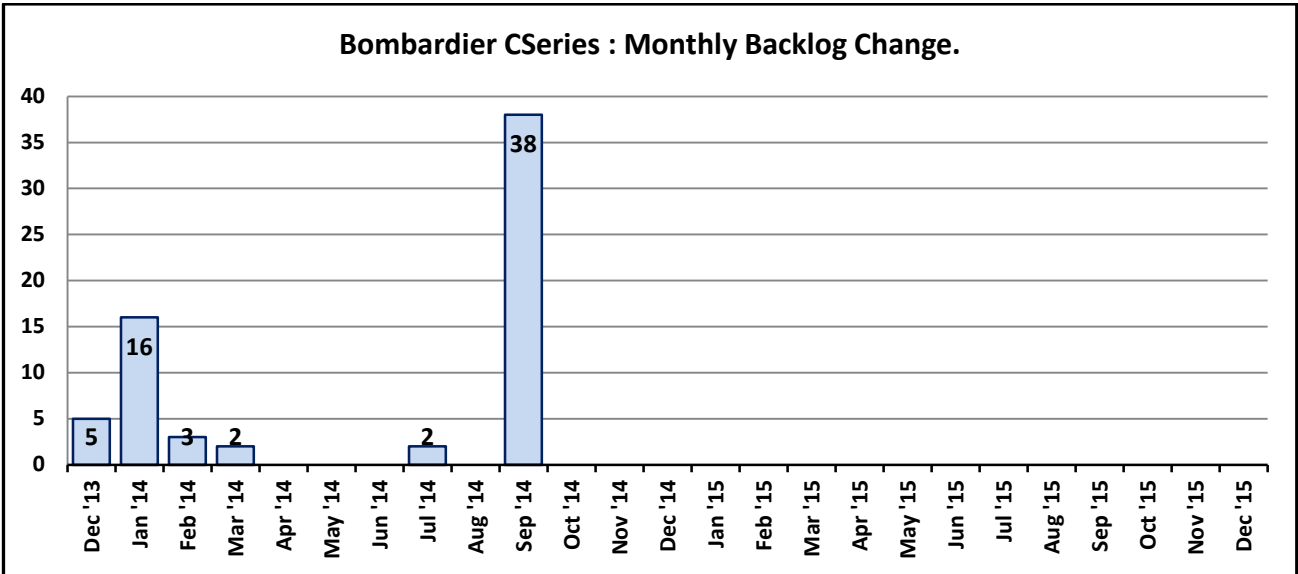
Airbus and Boeing - Monthly Backlog Change: The industry may have been expecting Airbus to have a gain, rather than a fall, in December. However, this was not the first time that the European manufacturer's backlog dropped in the month of December and over the last two years there have been 11 months when the company's backlog dropped. Boeing, on the other hand, had the largest monthly gain of the year in December and that contributed to the company having slightly more aircraft on backlog at the end of the year than at the start.

Boeing : Monthly Backlog Change.

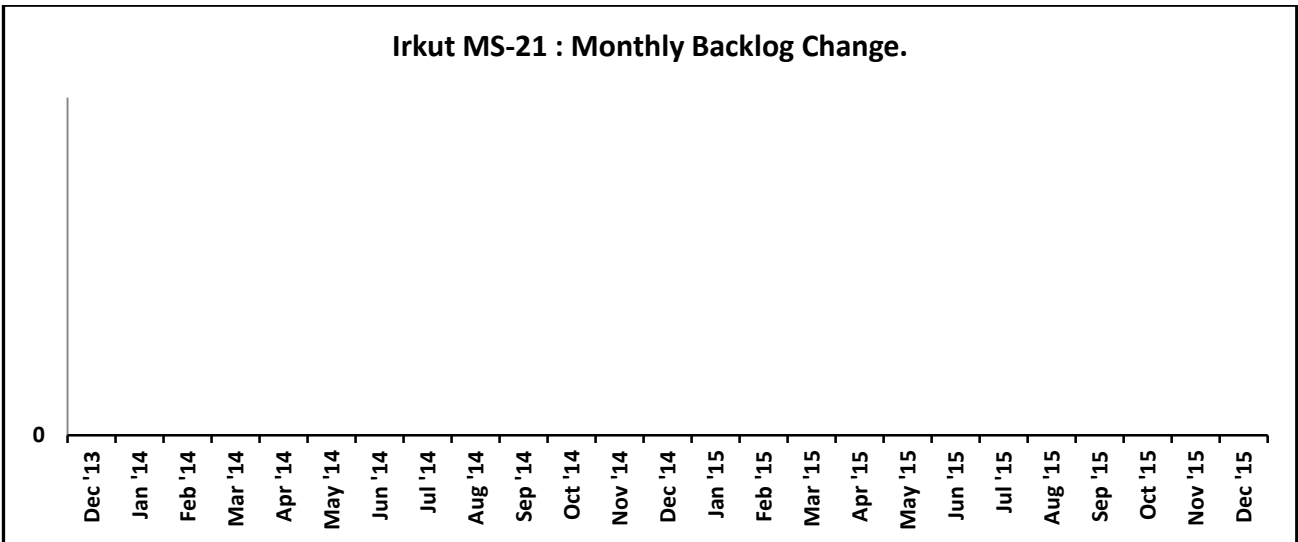




COMAC: The current backlog is 350 aircraft.



CSeries: The current backlog is 243 aircraft.



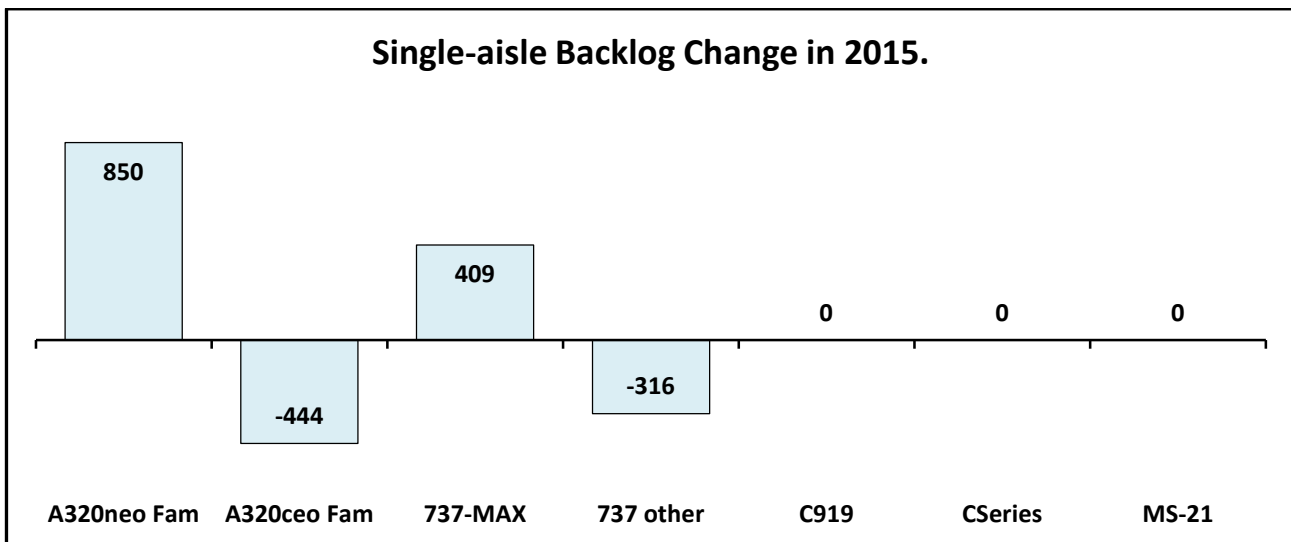
Irkut: The current backlog is 156 aircraft.

The Single-aisle and Widebody Backlogs.

At the end of December, Airbus and Boeing both had more single-aisles on backlog than at the start of the year, but both manufacturers had fewer widebody aircraft on backlog. There was no change to the COMAC, CSeries or MS-21 backlogs in 2015.

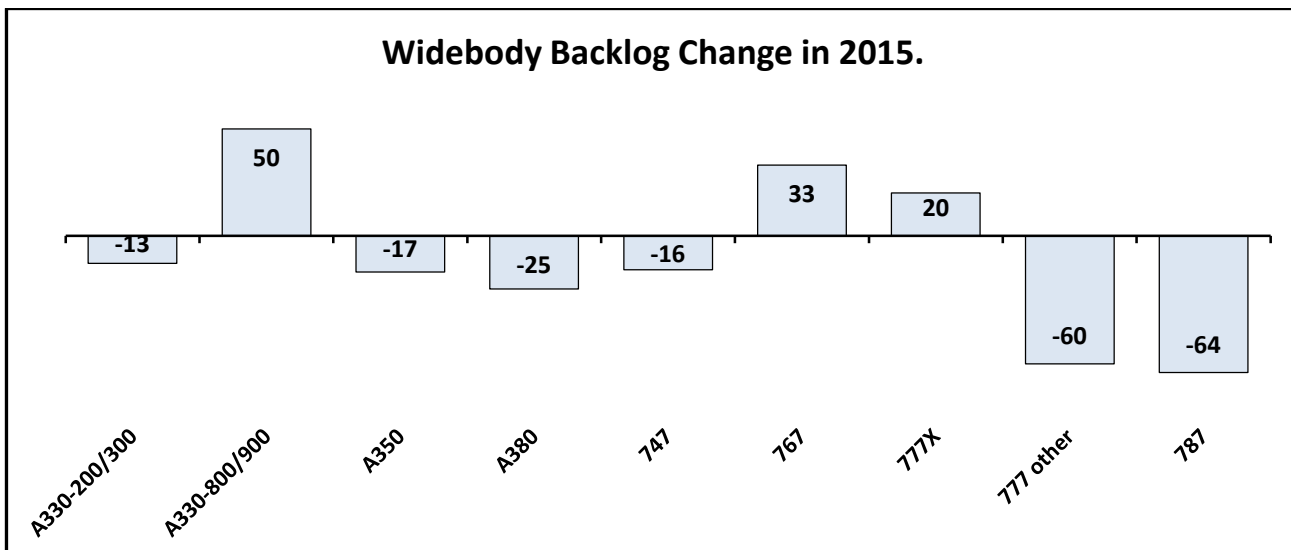
Single-aisle Backlog Change by Manufacturer.

	Airbus	Boeing	Bombardier	COMAC	Irkut	Total
Backlog on Dec 31, 2014.	5,129	4,299	243	350	156	10,177
Backlog on Dec 31, 2015.	5,535	4,392	243	350	156	10,676
Change in 2015.	406	93	0	0	0	499

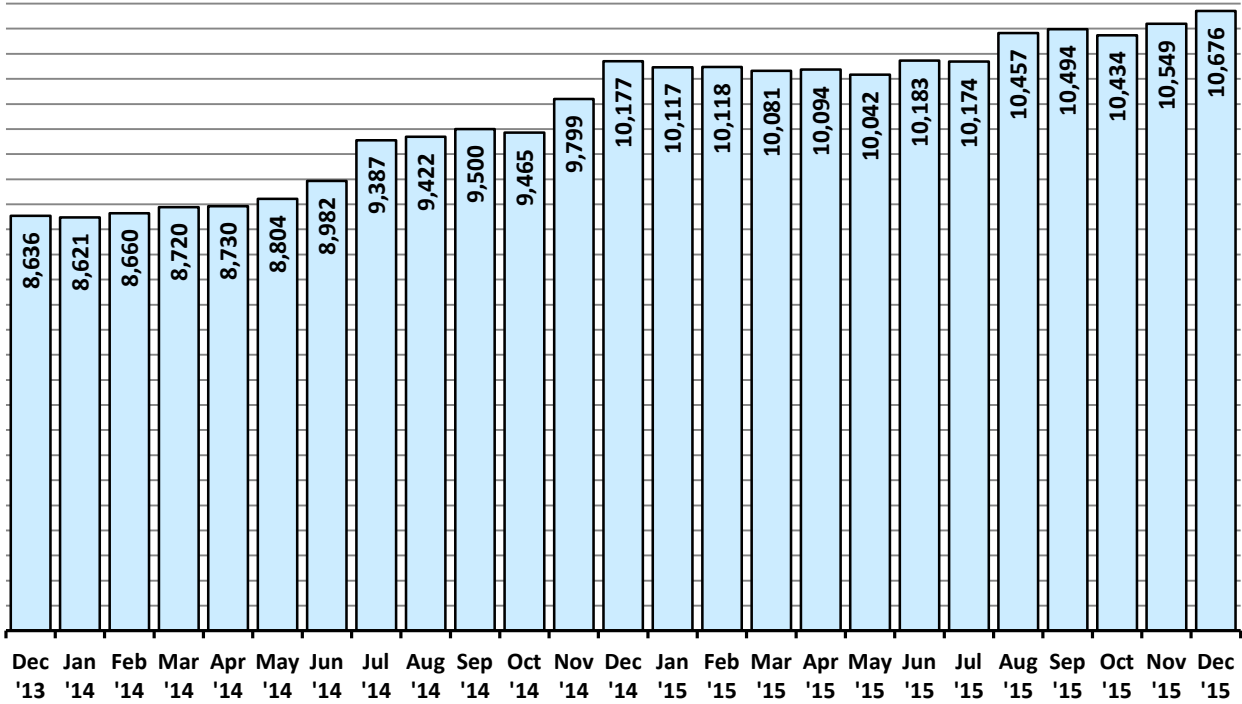


Widebody Backlog Change by Manufacturer.

	Airbus	Boeing	Total
Backlog on Dec 31, 2014.	1,257	1,490	2,747
Backlog on Dec 31, 2015.	1,252	1,403	2,655
Change in 2015.	-5	-87	-92



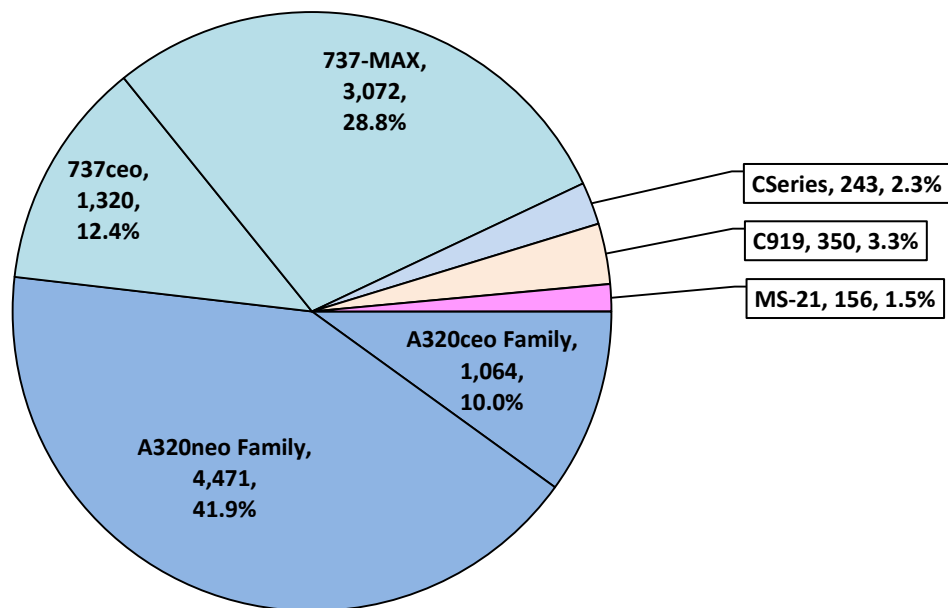
The Single-aisle Backlog.



The Single-aisle Backlog: There was a new single-aisle aircraft backlog record at the end of December. The previous record was set at the end of November. The single-aisle gain last year amounted to 499 aircraft (4.9%) and the gain since the end of 2013 amounts to 2,040 (23.6%). The gain in 2014 was 1,541 aircraft.

The Share of the Single-aisle Backlog.

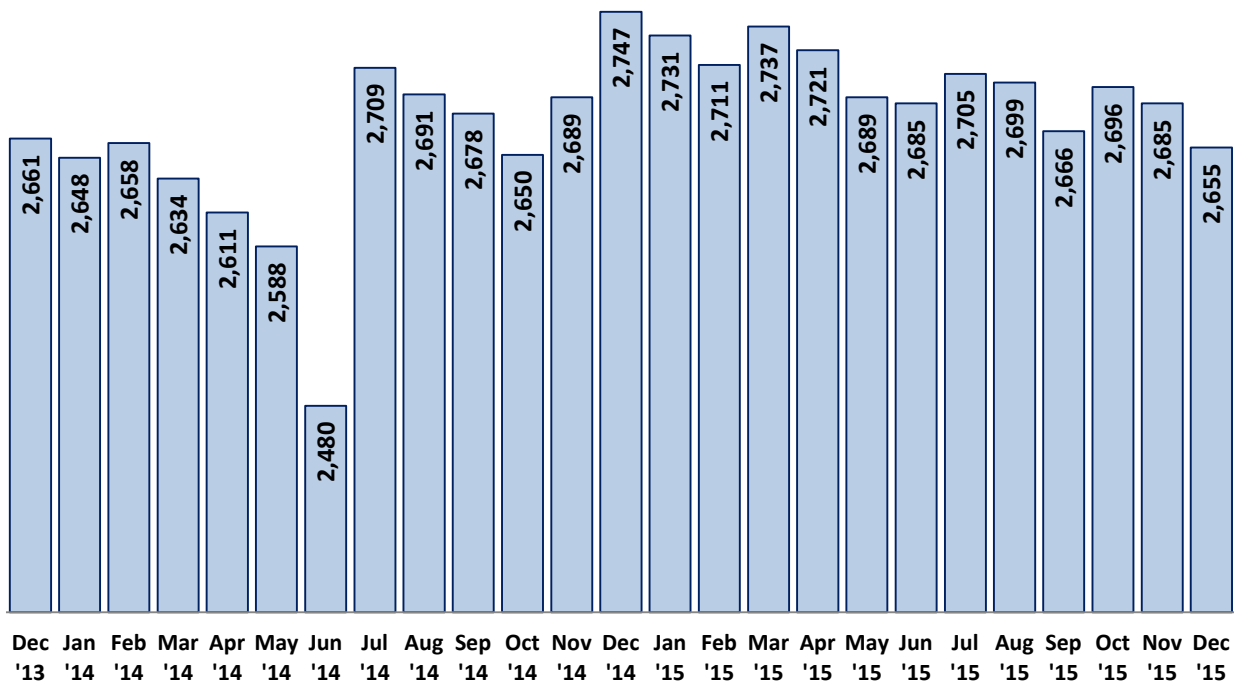
10,676 aircraft on December 31, 2015.



Note : ceo = current engine option, i.e. CFM56 in the case of the 737 and CFM56 or V2500 in the case of the A320 Family.

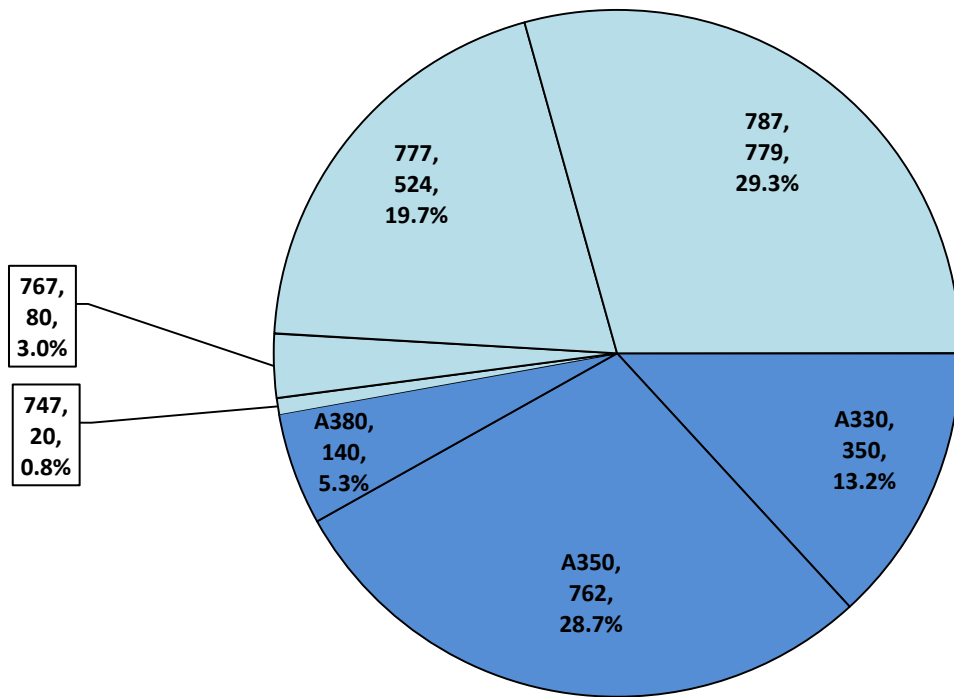
Share of the Single-aisle Backlog: At the end of December, Airbus had 5,535 single-aisle aircraft on firm backlog order. This is a 51.8% share.

The Widebody Backlog.



The Widebody Backlog: The widebody backlog record was set at the end of December 2014 and the current figure is 92 aircraft lower. It is also six aircraft lower than the backlog at the end of December 2013. There is not actually very much difference in either manufacturer’s widebody backlog compared to December 2013; Airbus currently has nine fewer widebodies on backlog than at the end of 2013 while Boeing has three more.

The Share of the Widebody Backlog. 2,655 aircraft on December 31, 2015.



Share of the widebody backlog: At the end of December, Boeing had 1,403 widebodies on firm backlog order which is 52.8% of the total widebody backlog.