

The new generation wide bodied jets like the Airbus A330-200F can save an operator \$2.3M a year at a fuel price of \$2 per gallon or \$4M should fuel prices rise to \$4/gallon
Pic courtesy Airbus

Aerospace market still holding up despite several challenges

There is much apprehension in the aerospace market over what 2010 will bring. Orders for aircraft have dropped and airlines have reported reduced capacity, resulting in a decline in profits. However, the signs are better. Demand for military aircraft has remained strong and there is a large backlog of orders for commercial aircraft. More importantly, the new wide body aircraft being built will use more aluminium than average aircraft despite increased use of composites and titanium. **By Myra Pinkham**

"It appears that the aerospace market is the last prosperous manufacturing sector in the US economy," states Richard Aboulafia, vice president of the Teal Group, Fairfax, Va, which is good news for North American aluminium suppliers to that market.

But there is some uncertainty as to how long that will last as aircraft orders have been declining and aluminium and other aerospace material inventories have been reportedly building up.

Production levels appear to be holding up – at least so far, observes Bill Chadwick, research director for the Arlington Va.-based Aerospace Industries Association of America (AIA). That, according to Aboulafia, is just because backlogs in the commercial aerospace sector – which accounts for the lion's share of all aircraft – remain at record levels. "There are, however, a number of indications that those production levels will not hold up as we don't need anywhere near the number of jets being built," he believes.

"These are challenging times for the whole aerospace sector – both commercial and defence," says Christophe Villemin, president of Alcan Global Aerospace. "However, there is still space for opportunities to be seized, in particular in applications where high performance products are needed. We, as suppliers of advanced aluminium solutions, including newly developed low density alloy, see interesting directions ahead."

Slump

Chadwick says that overall aircraft, parts and navigation equipment shipments were

worth \$200.73bn in 2009, up 2.0% from \$196.78bn in 2008 while orders for new aircraft plummeted 33.1% in 2009 to \$154.54bn from \$231.07bn in 2008, resulting in an order book worth \$355.82bn, which, while still sizeable (just under six years of deliveries) is down 11.5% from \$402.00bn in 2008.

"I think that 2010 will be a little tougher than 2009 for the aerospace industry and aluminium suppliers to the industry," said Bill Sales, senior vice president for nonferrous operations for Reliance Steel & Aluminum Co, Los Angeles.

He noted that the industry will have to work through some inventory build-up due to the delays in deliveries of the Airbus 380 commercial jet liner, exasperated by a two year delay in the Boeing 787 Dreamliner programme and a year's delay of Boeing's 747-8 cargo plane, which is reportedly the largest commercial jet Boeing has built.

However, most of the inventory build-up has already been cleared, says Bob Mraz, vice president of sales for TW Metals Inc, Exton, Pa. "Demand will gradually grow and should be very strong by 2012," he states.

He said it is difficult to generalise about the North American aerospace market as each sector, as well as their drivers, are different. "Commercial aerospace is holding its own. Business jets are very slow. Regional jets are in between the two. And military aerospace is absolutely on fire."

Commercial aircraft

Most attention is centred on the commercial aerospace market, which by far accounts for the biggest piece of the

pie. Klaus Kleinfeld, president and CEO of Alcoa Inc, Pittsburgh, said it is likely orders of commercial aircraft will decline this year.

"We continue to face a challenging market environment," said Jim McNerney, chairman, president and CEO of Boeing Inc, Chicago. "The global recession has clearly affected our airline customers in the form of reduced air traffic growth and resultant capacity reductions. While consumer sentiment appears to be improving, we believe it will take some time for economic indicators to rebound significantly," he said.

Teal's Aboulafia agrees, noting the air traffic numbers are currently down 5-6% from where they were when the bad times began in 2008 and a double digit decline from where they should have been if growth had continued, as was originally forecast. "It could take years for passenger traffic to get back to where it was," he said. Kleinfeld agrees that airlines continue to be challenged, noting that they were projected to lose a total of \$11bn in 2009 and another \$6bn in 2010.

But on the plus side, both Boeing and Airbus have large backlogs. "Unlike in the last aviation cycle, production has not been ramped up, so many analysts believe this backlog can tide the companies over until the orders recover," Kleinfeld says. Even with a 20-30% cancellation of orders – which is typical during a recession – backlogs would still remain healthy, Lloyd O'Carroll, senior vice president of research for Davenport & Co, Richmond, Va, states in Davenport's fourth quarter Quarterly Aluminum Outlook report.

Ramp up

He said aluminium suppliers to the aerospace industry will also benefit from the types of aircraft Boeing and Airbus are expected to build. Wide-body production is expected to increase 12% in 2010 and 32% in 2011 while narrow bodies should be down in both years. He expects that after falling 5.5% in 2009, aluminium shipments to the industry should increase by 10% this year due to restocking of inventories, an anticipated 5% increase in aircraft deliveries in 2011 and the ramp-up of the Boeing 787 and A380, two wide body aircraft that use more aluminium in total than smaller aircraft.

There is another aircraft being ramped up – the Boeing 747-8 – that will also use more aluminium than the average aircraft. It is a high capacity version of the 747 that Boeing says will offer airlines the lowest operating costs and best economics of large passenger or freighter aircraft, as well as providing enhanced environmental performance. The freighter version of the plane, which is 76.3m long – 5.6m longer than the 747-400 Freighter – had its first flight test on 8 February. Boeing expects to deliver the first 747-8 freighter at the end of this year and the first passenger variant in the fourth quarter of 2011.

According to Aboulafia, similar to the 747-400, the aircraft is mostly constructed of aluminium alloy – 81% by structural weight – with limited use of composites (about 1% by structural weight) and advanced aluminium alloys. The passenger variant is to be basically the same plane without a cargo interior and without other necessary modifications (including windows and changes to the landing gear).

The first flight of the 787 after a two year delay is seen as good news for Boeing and its aluminium suppliers. Boeing calls the aircraft – the first of which is to be delivered late this year with production being ramped up to 10 planes a month by 2013 – “a game-changing product that has a level of technological advancement not seen since the 707.” Aboulafia, however, warns, “There are no guarantees for the 787. We still don’t know how it will perform. While it looks more optimistic for the aircraft industry, there have already been so many surprises.”

Alcan’s Villemin said that while he believes that this accomplishment “materialises the dynamism of the aerospace industry and its capacity to respond to new challenges,” he feels some people applauding the 787 “are suffering from a lack of understanding of the real behaviour of carbon fibre reinforced polymers (CFRPs).”

Composites

Villemin maintains that the composite technology is not yet mature or fully

	2004	2005	2006	2007	2008	2009P	2010E	2011E
Al Shipments (Mlbs)	520	591	645	667	658	622	684	737
(kt)	235.8	268.0	292.5	302.4	298.3	282.0	310.	334.2
% change	17.6	13.7	9.1	3.4	-1.3	-5.5	10.0	7.7
Airline Monitor Forecast								
Total jet deliveries	897	918	1007	1068	1077	1160	1130	1130
% change	2	0	10	6	1	8	-3	0
Boeing & Airbus	600	663	820	888	852	960	970	1020
All other	297	255	187	180	225	200	160	110

Source: Airline Monitor, Davenport & Co LLC E = Estimate, P = Provisional

Table 1 Aluminium shipments to world aircraft industry

Airplane Deliveries	2006	2007	2008	2009P	2010E	2011E
Boeing & Airbus						
Narrow Bodies*	655	709	680	777	765	750
% change	23.6	8.2	-4.1	14	-2	-2
Wide Bodies**	165	179	172	183	205	270
% change	24.1	8.5	-3.9	6	12	32
Total	820	888	852	960	970	1020

Source: Airline Monitor, Davenport & Co LLC E = Estimate, P = Provisional

*Narrow Bodies A320 & 737 families; **Wide bodies A330-340, A350, 747, 777, 787 etc

Table 2 Aircraft deliveries



Large plate stretcher at Alcan Aerospace Ravenswood, USA
Pic courtesy Rio Tinto Alcan

validated leading, inevitably, to on-going adjustments to try to reduce the gap versus the target in terms of weight reduction, for example. He states: “There is no understanding that future programmes’ technology will be solely composite driven, in particular for single aisle planes, where ramp up, capacity to respond to high build rates and reliability with aluminium has already been demonstrated.”

AIA’s Chadwick says there are varied opinions about this. “One school of thought is that with any new process

there will be problems and you should expect delays and complications. But everything learned during that time should act to open the door to more use of composites in the future. Meanwhile, other people say they do not want to fool around with new materials as the conventional materials are good enough.” He believes there will always be a need for aluminium. “While there will be some loss of the amount of aluminium per plane from additional use of titanium, there will be more planes built, which could mean an increased need for aluminium.”

Boeing's 747-8 freightliner has a payload of 140t and 16% lower operating costs than the 747-400

Pic courtesy Boeing



Reliance's Sales explains that the problem in using aluminium with composites is that it could lead to corrosion issues. "Because of that with increased use of composites there also tends to be increased use of titanium for certain structural members, which could also displace some aluminium," says TW Metals' Mraz.

But even on the 787 and other aircraft with increased composite content, there is still a tremendous amount of aluminium being used, Mraz declares. "Most of the displacement by composites is for sheet metal, not the heavy cross members in the aircraft. There is still a significant amount of castings and forgings in the aircraft."

Kleinfeld agrees, observing that when it comes to the 787, "There is no other plane that has more Alcoa in it."

Mraz says a new technology preserving a lot of aluminium consumption in commercial aircraft is increased use of monolithic aluminium structures, which combine many of the aircraft's components into one large structure. This has increased the amount of plate being used.

One concern has been a build-up of materials inventories, including aluminium, at the airframe makers. As a result, Kleinfeld says there could continue to be destocking across the supply chain. Boeing's McNerney says that while the supply chain has begun to settle down, he does expect continued inventory build-up this year. That should begin to be worked down in 2011. Deliveries of the 787 are expected to accelerate once Boeing's second 787 production line comes on-stream in North Charleston, SC. McNerney says he anticipates some production starting there in 2011 with the first deliveries slated for the first half of 2012.

Military aircraft

"With the global instability, defence aerospace is not in danger," declared Aboulafia, although he noted that the amount of aluminium per aircraft might not be that high, as most modern fighters contain a lot of composites. But while

these aircraft tend to use a lot of speciality alloys, composites and titanium, it is not the same for commercial aircraft, said Reliance's Sales.

"There were concerns that the new US administration would make defence budget cuts, but that has not happened," Chadwick said. Mraz attributed this to the fact that the world is not a safer place than it was, but Lockheed Martin Aeronautics, Fort Worth, Texas, said aircraft tend to be procured many years in advance so is not connected to current military conflicts.

Rod Hogan, senior manager of airframe procurement, says the military contractor's demand is fairly flat, with its F-35 Joint Strike Fighter (JSF) and C-130 cargo plane currently ramping up while its F-22 is ramping down. He admits that almost all new designs contain more composites and titanium and less aluminium per plane but believes there will be continued demand for aluminium in military aircraft for several years.

Linda Zimmerman, Lockheed Martin's director of airframe procurement, said the JSF, while having a lot of composites and titanium, also contains a lot of aluminium. The JSF recently completed its system development demonstration phase and is now entering the initial production phase. More than 3000 JSFs are to be produced over the life of the programme.

Zimmerman says production of the all-aluminium C-130 cargo plane is being increased from 24 a year to 36 a year.

"The business jet market is probably the worst," observed Sales, who predicted it would take a long time for that market to recover. The recession is a major factor combined with the fact that business jets are not viewed positively in an economic downturn.

"They are being associated with fat cats," says Chadwick, who states that this 'bad rap' was made worse during the Congressional hearings on the bailout of the automotive industry. "It is a tough sell, but these days business jets are a part of doing business. While some could be

AIA Aero Statistics

Total Aerospace Sales

2007 \$201.8bn
2008 \$205.7bn
2009(P) \$214.1bn

Profit

2007 \$18.7bn
2008 \$14.6bn
2009(P) \$15.6bn

Foreign trade

2008
Exports \$95.1bn
Imports \$37.7bn
Trade Balance \$57.4bn

2009 Estimates

Exports \$84.5bn
Imports \$26.8bn
Trade Balance \$57.7bn

Aerospace shipments, orders, backlog 2008

Net new orders \$231.1bn
Shipments \$196.8bn
Backlog \$402.0bn

2009 Estimates

Net new orders \$154.5bn
Shipments \$200.7bn
Backlog \$355.8bn

Aerospace Industry Employment

Annual 2008 657100
September 2009 627,600
(down every month since December 2008 with 4% annual decline from 2008)

considered luxury goods, they are mainly something that business executives need to conduct business efficiently."

Mraz believes that as global economies improve and developing nations increase their higher net worth individuals, demand for business jets should grow. "This sector is just regrouping for a spectacular future from 2011 on."

Regional jets have also been hit hard, says Teal's Aboulafia. This is partly because of the economies involved with having fewer seats than commercial airliners. Chadwick predicts that they will pick up faster than business jets "because they don't have the same perception problem."

There is a lot of apprehension about what 2010 will bring. "Order reductions made public by OEMs pre-announce another challenging year," said Villemin. "We remain cautious as these are still early days before we can speak of sustained improvement in the market."

Sales agrees, saying 2010 will definitely be down from 2009 as the aerospace industry works through inventory issues. "But I think it will start to pickup in 2011 with the ramp up of certain aircraft like the 787 and the 747-8." ■