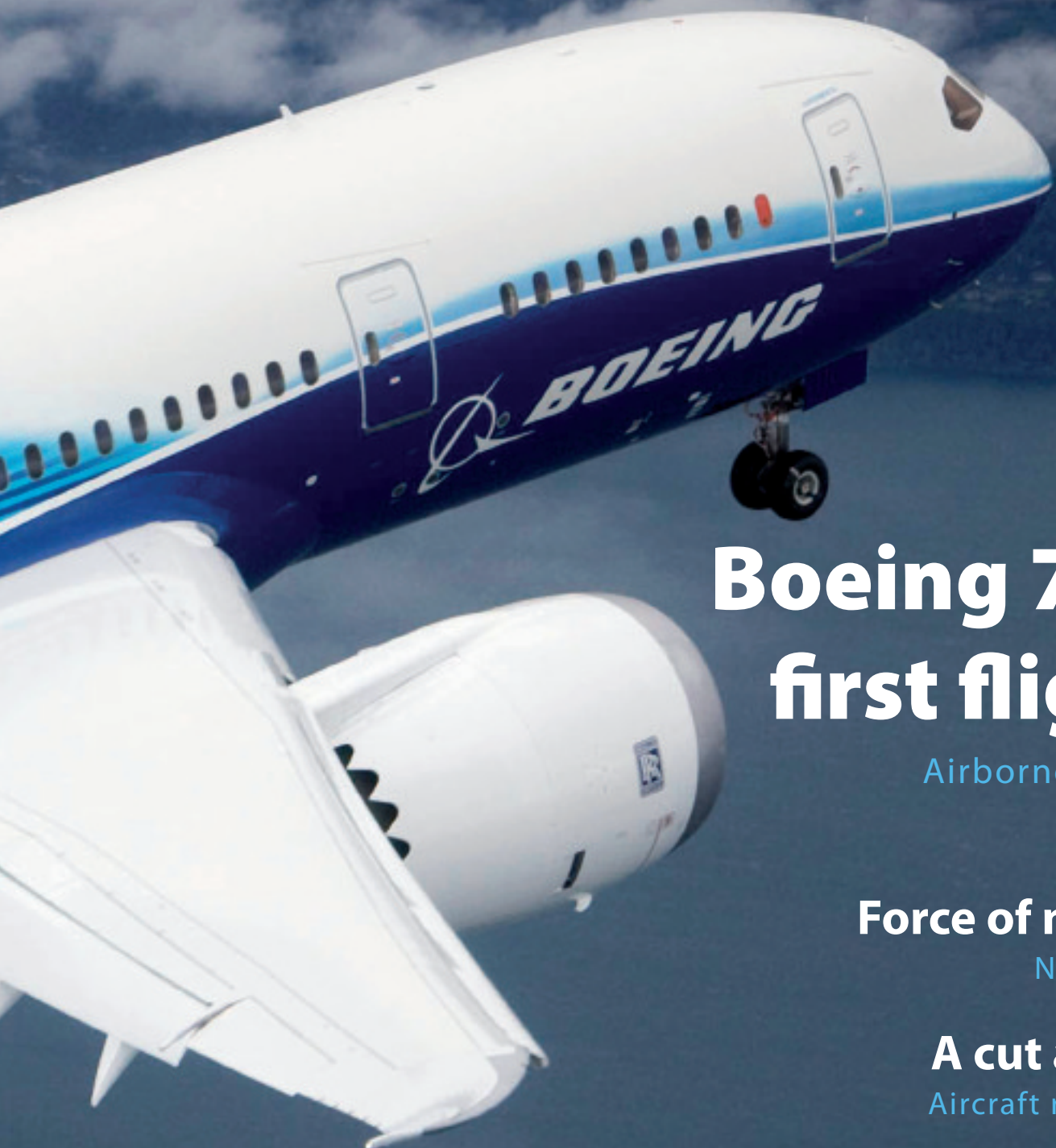


GreenSky[®]

Aviation and the Environment

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Boeing 787 first flight

Airborne at last

Force of nature

Nature Air

A cut above

Aircraft recycling



(all photos: Ian Harbison)

A cut above

In three years, the Aircraft Fleet Recycling Association has made substantial progress in developing procedures to deal safely and profitably with the problem of elderly aircraft disposal. **Ian Harbison** attended a demonstration at Châteauroux



Sting in the tail – the horizontal stabiliser of this Boeing 737-200 is severed by a circular saw

In 2005, 11 organisations from various sections of the aircraft industry agreed to work together to develop a code of conduct and best management practices for aircraft dismantling and materials recycling. At a meeting at the Châteauroux Air Centre in France, they formed the Aircraft Fleet Recycling Association (AFRA). The original 11 members were Air Salvage International, Adherent Technologies, Bartin Group, The Boeing Company, Châteauroux Air Centre, Europe Aviation, Huron Valley Fritz, Milled Carbon, Rolls-Royce and WINGNet.

AFRA has grown by 360% from its founding 11 members to 40 members from 10 countries (see Table 2). The association now has 100 years of combined aircraft recycling experience, including

stakeholders from all the different sectors of the aircraft dismantling and recycling community – from aircraft manufacturers, engine makers and aircraft dismantlers, to parts distributors and materials recyclers. In addition, other companies and the academic community are working to develop new recycling technologies.

One of AFRA's key accomplishments to date has been the development of its Best Management Practice (BMP) Guides. The first BMP Guide, Version 1.0, was published in August 2008 and dealt specifically with the best practice and minimum performance standards around airframe dismantling. The Guide has 45 separate best practice elements covering a whole range of dismantling and recycling issues. It was drawn

together by an AFRA working group both from documented evidence and practical experience in areas such as the location, management processes and security of dismantling facilities, through to the keeping and maintenance of reference manuals and records, ending at the tagging and shipping of the recovered parts and the proper management of recycled material. >>>

Table 1: 5,900 aircraft for disposal by 2028

| By configuration | | By region | |
|------------------------|-----|---------------|-----|
| Single-aisle passenger | 48% | North America | 40% |
| Twin-aisle passenger | 20% | Europe | 22% |
| Regional jet | 18% | Asia Pacific | 15% |
| Freighter | 15% | Rest of world | 22% |

(source: Boeing)

Version 2.0 of the BMP Guide was published in May 2009 and has added engine dismantling. There is also a clear definition of an 'airworthiness event', setting out in detail the circumstances under which the industry feels it is appropriate to convey information about the past history of parts.

Following the BMP Guide is a key part of acquiring AFRA accreditation, which is currently held by 11 members (Air Salvage International,

“Carberry stresses that it is an open democracy, with no bar to membership. There is no Airbus versus Boeing attitude in the organisation”

Bonus Tech, Europe Aviation, Evergreen Trade, Orange Aero, P3 Aviation, Southern California Aviation and Volvo Aero Services), with a number of other organisations currently in the process of being accredited. Accreditation is increasingly producing added value as asset owners are actively seeking out AFRA accredited members due to their reputation for environmental excellence, says Martin Fraissignes, Executive Director of AFRA and General Manager of the Châteauroux Air Center.

Of the 400 to 450 aircraft that are scrapped and disassembled globally each year, around one third are parted out and disassembled by AFRA member companies, which also holds around half of the legally parked (not dumped) aircraft at its facilities. The AFRA members' work produces more than 30,000 tons of aluminium

This 747SP is without its engines and all valuable spare parts, but its destruction will not go ahead until there is a rise in the price of scrap aluminium

and 1,800 tons of other speciality alloy metals for recycling each year, as well as 600 tons of parts.

According to Bill Carberry, Strategy Analyst/Project Manager at Boeing, and generally acknowledged as one of the founders of AFRA, there are 5,900 commercial aircraft to be retired before 2028 (see Table 1), while consultancy firm Ascend reckons there are 2,700 already grounded. With a total of 8,000 to 10,000 aircraft to be disposed of in the next 20 years, there is clearly a pressing need for the facilities and technologies to be available to allow them to be recycled efficiently.

However, it is not just old aircraft that are being recycled; Carberry explains that the first pre-production Boeing 787 barrel has been dismantled and the material distributed to a number of recyclers. Some of the material has been reused in a proof of concept moulded armrest (for demonstration purposes only, not for flight). Work is in hand to develop technology that will align the recycled fibres to give the required density and structural strength in a project between AFRA members Milled Carbon and the University of Nottingham.

As interiors make up 30% of an aircraft's weight, recycling these materials could provide valuable weight saving (and consequently, a reduced fuel burn) in the future. It would also avoid the fate of most scrapped interior items at the moment. Made out of fibreglass, they have no commercial resale value and generally end up in landfill.

He comments that the use of exotic materials is increasing in airframes and engines as well as interiors and some recycling will be difficult in the future. In the meantime, Boeing has a number of projects that will see carbon fibre recycled from different facilities, and this is set to increase.

Other development programmes include the high-speed processing of aluminium scrap, with a laser pulse producing vapour from the metal that can be analysed to determine the make-up of the alloy. With a scanning system registering the position of each piece of metal as it passes on a conveyor, it can be pushed off the belt into the correct bin. Removing the metal from an aircraft's complex wiring system is also being considered.

These initiatives could help push the recovery of materials from the current 60 to 65% towards the AFRA target of 90 to 95% by 2016.

As the venue for the first AFRA meeting, it was appropriate that Châteauroux was the venue for a briefing and demonstration on aircraft dismantling and recycling. Europe Aviation has a maintenance base on the airfield with one of the hangars being used to start the dismantling process. When the aircraft has been stripped of useful parts, it is towed to a secure area on the other side of the runway where it is reduced to scrap metal. So far, it has processed over 30 aircraft.

At the time of *GreenSky's* visit, a 28-year old Boeing 747-200 freighter had just arrived and was on the first day of the process. It will take the partners at Châteauroux (Europe Aviation, JMV Aviation and Bartin Group) around three weeks to recover all of the useful components and four weeks to break it up. Included in this is the removal and safe disposal of all hazardous items, whether chemical, pyrotechnic or material.

Karl Rickard, VP Sales & Marketing for JMV Aviation, said that plenty of older aircraft, particularly early model Boeing 737s, were



available, but there were also some newer models coming onto the market as a result of the industry's financial problems. Indeed, many of the aircraft parked around the Europe Aviation hangar were on care and maintenance contracts, waiting to return to service with their owners or with leases to new customers.

While the spares business may be profitable, not all of the recycling business is in good shape at present. One holding factor is that the scrap price for aircraft standard aluminium fell substantially in 2008. When a 747 can produce 100 tons of metal and a McDonnell Douglas DC-10 renders up 75 tons, this becomes an important issue. As a result, several aircraft on the site had been stripped but were now in storage until such time as it became economically viable to complete the process. One such example was a 34-year-old 747SP.

At the disposal area, the rear fuselage of a 737-200 was lying on the ground as the horizontal stabiliser was removed by a large circular saw attached to the arm of an excavator. This aircraft, built in 1968, had already had the front fuselage removed some time ago. It was shipped to Chichester College in the UK as a cabin crew trainer. On its last legs, before they were removed and shipped to a foundry to be melted down, was a forlorn looking DC-10-30, delivered from the factory in 1974. Scattered around were piles of seats, tyres and undercarriage legs from previous victims of the saw. While there were a few engines, including a set of Pratt & Whitney JT4s from a Boeing 720 that may be refurbished by Europe Aviation for museums, Rickard says many aircraft have their engines removed upon arrival and returned to service.

While it is sad to see aircraft being cut up, a view shared by many people in AFRA it seems, the organisation has proved in a short space of time that it is leading the way in recycling. Carberry stresses that it is an open democracy, with no bar to membership. There is no Airbus versus Boeing attitude in the organisation, he says, acknowledging that Airbus has its own Tarmac project at Tarbes in southwest France, which has a different philosophy to AFRA. However, Airbus may become involved with AFRA members on another project outside AFRA.

To really establish AFRA, the organisation is working towards FAA and EASA approval for its BMP Guide. This would give an international standard for safe, environmentally friendly and profitable disposal of an increasing number of elderly aircraft. ■

Table 2: AFRA members

| France | |
|------------------------------------|---|
| Bartin Group | Aircraft disassembly and metals reclamation |
| Châteauroux Air Center | Aircraft storage |
| Europe Aviation | Aircraft maintenance |
| Safran Group | Aircraft engine manufacture |
| Italy | |
| Società Generale Servizi e Appalti | Consultancy and disassembly |
| Luxembourg | |
| JMV Aviation | Commercial dismantling and recycling |
| Netherlands | |
| Aircraft End-of-Life Solutions | Consultancy, disassembly and parts management |
| HKS Scrap Metals | Metals reclamation and processing |
| South Africa | |
| Universal Recycling | Metals reclamation and processing |
| Switzerland | |
| The Green Airliner | Full service salvaging and recycling |
| United Kingdom | |
| Air Salvage International | Aircraft salvage, recovery and disposal |
| GJD Services | Aircraft decommissioning, asset recovery, scrap recycling and hazardous material disposal |
| Kemble Airport | Air centre |
| Milled Carbon | Carbon composite recycling |
| University of Nottingham | |
| Orange Aero | Engine components |
| P3 Aviation | Aircraft parts and aircraft dismantling |
| Robert Gibbs Company | Scrap metal processing |
| Rolls-Royce Civil Aerospace | Aircraft engine manufacturing |
| WINGNet/Begbroke | |
| Oxford University | |
| US | |
| Adherent Technologies | Carbon composite recycling |
| Aero-Marine Technologies | Aircraft parts distribution and disassembly |
| AeroTurbine | Aircraft engine and parts sales |
| Aircraft Recycling Corporation | Aircraft dismantling and metal recovery |
| Boeing | Aircraft manufacturing |
| BonusTech | Aircraft engine disassembly |
| ELG Metals | Alloy reclamation |
| Evergreen Maintenance Center | Aircraft storage, resale, parts and maintenance |
| Honeywell Aerospace Trading | Pre-owned Honeywell avionics, APUs, wheels/brakes and mechanical components |
| Huron Valley Fritz West | Metals reclamation |
| Magellan Aviation Services | Aircraft aftermarket services |
| The Memphis Group | Aircraft spare parts |
| Pratt & Whitney | Aircraft engine manufacture |
| Source One Aircraft Repair | Recovery, evaluation, repair and modification |
| Southern California Aviation | Aircraft storage, disassembly and parts |
| Stewart Industries | Heavy aircraft services |
| TriRinse | Environmental and demil contractors |
| Turbo Resources International | Aircraft disassembly and parts |
| Universal Asset Management | Distressed aviation asset management, aircraft recycling and sales of related inventory |
| Volvo Aero | Aircraft aftermarket services |