Focus on advanced materials

Cutting the cost of aerospace composites

The aerospace industry’s shift from metal to composite as a building material might be increasing structural efficiency and weight savings, but it is also introducing a tough challenge: reducing costs. Nowhere is the global search for low-cost composite processing methods as focused and well-funded as in the US – the destination of a recent DTI Global Watch Mission.

The US spends around $1 billion (£600 million) a year on aerospace composites research and leads the world in the area proving critical to the successful transition to carbon fibre composite structures – low cost manufacturing processes. By visiting organisations in Wichita, Seattle and Los Angeles, the mission team intended to learn from this lead, investigating systems integration and modelling, gaps in current low-cost process developments, obstacles to exploitation and preferred manufacturing routes. While the team will be reporting back to UK businesses in full at a mission seminar to be held on 13 July, the week before the Farnborough Air Show, individual members have given Global Watch their thoughts.

For everyone on the mission, one of the highlights was seeing the sheer scale and innovative tooling approach of Spirit Aerospace’s production facility, where the front section of the all-composite fuselage for Boeing’s 787 will be built. For Sue Panteny, representing the National Composites Network which co-ordinated the mission, the impact of the facility’s lean manufacturing ethos was particularly impressive. ‘Spirit has really thought out where material and components need to be, which has greatly reduced the amount of movement around the facility and increased its efficiency,’ she says.

‘The US industry is still very interested in resin transfer moulding (RTM) which has provided some very neat solutions for the one-piece replacement of small military aircraft components and which, it was suggested, is being considered for Boeing’s 787 pressure bulkhead’

Roger Francombe, Advanced Composites Group
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DTI International Technology Promoter Cliff Young noted how Spirit has been able to take advantage of Wichita neighbour Raytheon’s experience and know-how in the manufacture of composite structures for its business aircraft. ‘Raytheon has been developing composite planes for a decade and seeing the volume manufacture of composite fuselages for its Hawker and Premier fleets was very interesting. Recently Raytheon achieved a significant first – a complete fuselage that didn’t require hand finishing after curing – even so, the company continues to search for new technologies that will bring additional manufacturing efficiencies.’

According to Roger Francombe of Advanced Composites Group, emphasis in the US appears to be on ‘high levels of automation for existing component designs and assembly methods, as opposed to integrated component designs and novel processes which might reduce assembly costs – but which might also introduce risks to the project schedule.’

This is a view confirmed by John Savage of Smiths Aerospace. He says, ‘Companies such as V Systems, which has done some good work in developing out-of-autoclave processes, are finding it difficult to get these processes accepted by the main manufacturers. As a result, more investment is being made in new equipment for traditional methods and there is a growing trend for simple parts to be manufactured in low-wage economies of the Far East.’

One very positive response to this situation is a project initiated by the National Institute of Aviation Research (NIAR) which aims to standardise composite material specifications. ‘At the moment,’ says Cliff Young, ‘manufacturers each have their own approved specifications, which prevents suppliers from undertaking larger, and more economical, runs. NIAR is working with US organisations such as the Federal Aviation Authority and manufacturers to find ways of reducing the number of material specifications, thus easing supply issues and making it easier for composites manufacturers to get involved in future aerospace business.’

‘Companies such as Northwest Composites, which have lost aircraft interior fittings work to the Asia Pacific region, are adapting to survive, adding supporting structures for composite fuselages to their product portfolios’

Cliff Young, DTI International Technology Promoter

The mission team

The UK team, representing Materials in Transport, St Bernards Composites, Williams F-1, Inbis, Advanced Composites Group, BAE Systems, National Composites Network, Smiths Aerospace and accompanied by DTI International Technology Promoter Cliff Young, visited Raytheon Aircraft, Spirit Aerosystems, C&D Zodiac (formally Northwest Composites), the University of Washington, Boeing, Goodrich and V Systems Composites.

Further information

For information about the mission seminar being held on 13 July or to receive a copy of the mission report, ‘HYBRIDMAT 3: Advances in the manufacture of advanced structural composites in aerospace’, please contact Charlotte Leiper

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The report will also be available to download from 13 July by visiting www.globalwatchservice.com/misreps

If you would like to find out more about technology partnering opportunities in performance engineering in the US, please contact Cliff Young, DTI International Technology Promoter

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‘UK industry has to have the confidence to invest in the longer term – composites will be a huge part of future aircraft and if we are to win business we must be ready’

John Savage, Smiths Aerospace

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