The United States and China are generally regarded as being two of the most difficult markets in the world for British companies to crack. However, a small Manchester company, making training equipment for civil and military aircraft, has done just that. **Alan Dron** *reports.*

EDM OPENS THE DOOR TO A NICHE MARKET

When airlines and air forces take delivery of their shiny new aircraft, it's often forgotten by the outside world that they have to train their cabin crews and maintenance personnel in how to operate them.

As airlines frequently remind us, cabin crew are employed primarily for safety reasons, not serving refreshments. That means they have to be trained to be able to deal with emergencies. Using real aircraft for such training is not practicable due to the costs involved in taking an airliner out of service, so other means have to be found.

It is this market in which Manchester-based EDM has carved a substantial niche. It manufactures a series of door trainers – being able to close and open the aircraft doors in all situations is an absolute requirement of basic cabin crew training – and cabin trainers, full-scale representations of the aircraft in which personnel will work.

EDM was not always in this market. Set up in 1971, its founders were in the precision engineering business.

Their first foray into providing mock-ups came with a 20-year involvement at Barrow as part of the Upholder, Trafalgar and Vanguard-class submarine programmes. EDM provided full-scale models of sections of the submarines so designers could visualise how and where components might fit.

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"The guys realised at the time that this might be good business," explained Mick Bonney, EDM's director of sales and business development.

Manufacturing highly detailed models of ships was also part of EDM's initial repertoire, but following a management buy-out in around 1996, it increasingly moved into the aviation sector.

Although manufacturing simulators now forms by far the greater part of the company's workload, Bonney said: "We still do a small percentage of precision engineering and it's very important to us. It spins off into our other products."

When customers for cabin or maintenance trainers see this high-level design capability underpinning EDM's work, it adds to its credibility.

That precision engineering background particularly comes to the fore in the military training field. EDM is licenced by ejection-seat specialist, Martin-Baker, to produce high-fidelity replicas of its seats. These can be fitted with electric actuators and gearboxes to impart some sensation of G-forces to pilots.

It is in this field that EDM has won

Loading up: A weapons loader trainer for the new Lockheed Martin F-35 Lightning II is put through its paces.

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business that holds huge promise for the coming years. In 2007, it beat off competition from more than 200 contenders to win a contract from US defence behemoth Lockheed Martin to produce replicas of training equipment for ejection systems and weapon loading systems for the F-35 Lightning II. This aircraft will form the backbone of US and western air arms, together with other allied forces, for the next 30 years.

Low-rate initial production of the F-35 is now under way and EDM is in prime position for contracts for not only US-operated aircraft but also all those ordered by allies.

"The F-35 work just catapults us as production starts ramping up and air forces start to receive the aircraft," said Bonney. "It will take us to another level."

So big is the potential workload that EDM is expanding its existing 100,000sqft factory in Newton Heath, with a 50,000sqft extension that is in the advanced planning phase for completion by the end of this year.

The scale of the F-35 work will mean that EDM will be able to set up a full-scale production line, as the equipment will be standardised (unlike most of its airline products, which are invariably customised for individual companies).

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Working with the US military brings not only benefits but also complications, including the extremely strict International Traffic in Arms Regulations (ITAR) export requirements. Part of the existing factory is already cordoned off for this military work. Additionally, anyone working on the F-35 contract will require security clearance.

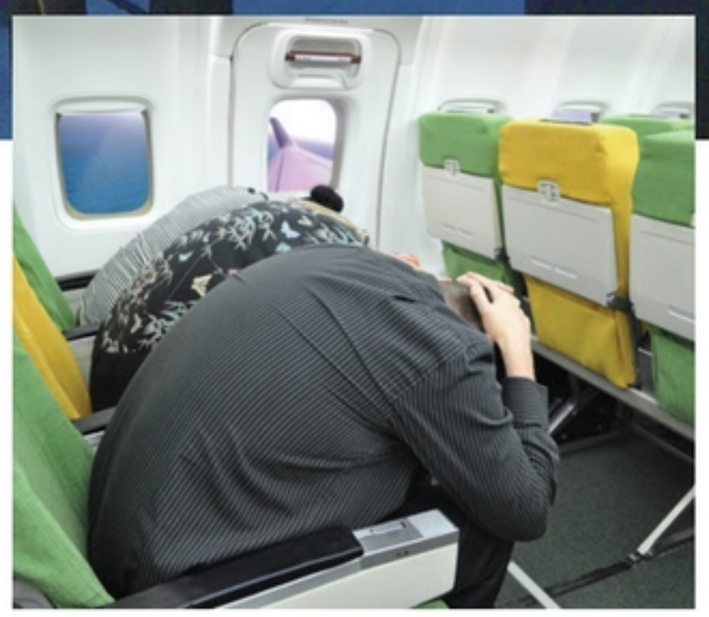
As well as the F-35 contract, EDM also builds ground crew training systems for the Eurofighter Typhoons, and replica cockpits for the latest-generation BAE Systems Hawk T2 advanced jet trainer and the export-model T-165 and T-166 variants of the aircraft.

The more sophisticated nature of the military work means that it accounts for around 70% of EDM's turnover. In workload terms, however, the military-civil split is roughly 50-50.

EDM is licenced by Boeing, Airbus and others to receive computer-aided design (CAD) data, from which it can construct exact replicas of fuselage sections, which are then fitted out to each airline's requirements.

There are, said Bonney, only around another eight companies worldwide in this field: one in the UK, two apiece in the US, Germany and China, plus one in the Middle East. Competition is incessant – "We don't get airlines coming straight to us" – which means the Manchester company has to stay one step ahead of the game.

Among its methods of making cabin trainers a more realistic environment for airline personnel is the addition of both movement and audio-visual effects to the large fuselage sections it produces.



Sitting pretty: Replicas of ejection seats – such as this one from a US Air Force A-10 ground attack aircraft – are another of EDM's product lines. Left: EDM's SEPTRE system provides an audio-visual backdrop to increase the realism of events in its cabin crew trainers.

It uses hydraulic or electric motion systems to provide three to six axes of movement on its trainers. While not as sophisticated as the six-axes flight models used in pilots' simulators, these provide sufficient movement to replicate events such as turbulence, undercarriage collapses and ditching. EDM buys in its movement systems from the Netherlands but writes its own software for all the scenarios.

Linked to the cabin's movements is imagery projected on to the cabin's windows and complementary audio effects piped into the trainers via speakers. "We've got a very good sound system. We used an ex-BBC guy who apparently used to work with Jimi Hendrix and who developed a cinema-style sound system for us," said Bonney.

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"Airline feedback has been great. It really stresses the crews when the nose undercarriage 'collapses' and the front of the cabin suddenly drops by 18 degrees!"

But technology is not everything. One of the two Chinese companies in EDM's field, Xian Feibao, is a partner of EDM and has helped hugely in getting it into a notoriously opaque market.

"The number one point I make in any presentation I give is 'Find yourself a partner'. The odds are really stacked against you if you try to go out there and do it as a start-up yourself; it's a really challenging business environment," said Bonney.

EDM has worked with Xian Feibao for almost seven years and scored a major coup in 2009 when it won a contract to build a fuselage mock-up of China's forthcoming COMAC C919 single-aisle twinjet.

COMAC is building a vast training centre in Shanghai for when the C919 enters service around late 2018 and EDM potentially stands to supply all cabin crew trainers for the type.

In the interim, it won a major order last year to supply Cathay Pacific with a range of cabin trainers – which will need to be craned into Cathay's seventh-floor training centre through a window – "and we've just bagged another big job in China with China Southern, which has ordered Airbus A330-300s.

"We're dealing with eight or nine airlines in China and we're still only scratching the surface."

Scratching the Chinese market or not, EDM is doing well: "The company is moving very, very quickly," said Bonney. "The order book is full for 2017."

Turnover, which was £4 million in 2011, is £15 million today and could double to £30 million by the end of 2017.

EDM is now grappling with that well-known problem of success, finding enough suitable staff.

A workforce of 165 must expand to 200 just to handle the F-35 work and the all-too-common British problem of insufficient skilled engineers is making itself felt. This is exacerbated by the vetting required for personnel working on military projects. ■