



European Fighter Aircraft

Many employees will know that over the last few years discussions have been taking place between various European governments, air forces and aircraft manufacturers about producing a new European Fighter Aircraft (EFA). We thought that you would be interested to know the latest news about this project because it has the potential to be Dowty Rotol Limited's biggest single programme between now and the start of the next century.

It is estimated that 1000 of the fighters will be required for the air forces of Britain, Germany, Italy and Spain with the probability of the Norwegian, Danish, Dutch, Belgian and other air forces taking the total much higher. Dowty Rotol Limited is already actively preparing for the bidding competitions due to commence later this year, after which there will be an intense period of design and development to meet the target of a prototype flying by the end of 1989. EFA production will start in mid-1991 and the first production aircraft is due to start flying by 1994.

The following is a brief history of the EFA project. In 1981, British Aerospace worked on the P110 private venture fighter and Dowty Rotol Limited was selected for three systems. By 1983 the project had developed into a collaborative effort with the Germans and Italians and renamed the ACA. The governments of these countries withdrew their backing for the ACA but our German and Italian industrial partners remained in the programme which was renamed the EAP.

The BAe Experimental Aircraft Programme (EAP) has Dowty Rotol landing gear, hydraulics, secondary power gearbox and leading edge flap system all configured for this advanced combat prototype

The EAP which will fly by this summer and at Farnborough, incorporates the following Dowty Rotol systems, some of them in collaboration with European partners:-

- * Main and nose landing gear with hydraulics
- * Leading edge flaps
- * Secondary power gearboxes
- * Automatic bleed valves
- * Airbrake jacks

Although we are involved in producing these systems for the EAP, it does NOT follow that we shall be selected automatically for the EFA programme which is the one that really matters. At the most we can expect some account to be taken of our present efforts, especially where the engineering design on the EAP also applies to the EFA. The new plane will have new systems and because of the high volume of orders expected many companies both in the UK and Europe will be fighting very hard to secure a share of this business. In order to ensure that we succeed with our bidding in the next few months, a special EFA Office has been set up at Dowty Rotol in what was the Board Room. The EFA Office will co-ordinate and control the entire inputs of Dowty Group companies throughout the pre-proposal and bidding phases of the programme.



Stuart Russell, Programme Manager EFA

There is an EFA co-ordination team at Dowty Rotol and representatives have been appointed at all the Dowty companies concerned to ensure swift and accurate response to EFA requirements. The entire exercise is being masterminded by Stuart Russell, DR Sales and Marketing Manager, with special appointment as Programme Manager EFA. He has already carried out three months market research work and planning on the forthcoming EFA programme.

He has collected and studied every relevant document, visited our potential customers and collaborators and assembled the Dowty Group team. So Stuart is best able to comment on the EFA effort as he sees it. He says,

'The most important element in the programme will be that of collaboration. Each of the systems with which Dowty is interested — landing gears, flying controls, flaps, gearboxes, hydraulics, electrics and electronics — will involve close collaboration both within Group companies and among our European partners. We can only succeed through collaboration. I cannot stress this too strongly.

'Secondly, after systems responsibilities have been established, we shall have to make supreme technical efforts to meet the weight and reliability targets which are being set.

'Thirdly, the importance of on-time deliveries must be recognised although we shall be caught in the middle of a demanding and changing situation. By this I mean that whilst the EFA key delivery dates are already set, the aircraft role, weight and configuration are still far from settled. Discussions are taking place between the British, German, Italian and Spanish teams at the EFA Headquarters in Munich to reach agreement. Therefore we shall have difficult build and tight delivery problems ahead of us, but we must overcome this challenge.'

Current Performance

Sales turnover

The regular update on our Sales turnover is shown below. As you can see, after a disappointing October performance, we exceeded our target in November and December.

	Target	Achieved
October 1985	£8,579,000	£6,206,000
November 1985	£8,805,000	£9,158,000
December 1985	£6,669,000	£7,175,000
January 1986	£8,043,000	£8,051,000
4 months total	32,096,000	30,590,000
10 months total	78,548,000	76,993,000

As a result of the shortfall in October we are £1.5m behind target for the 10 months forecast and it will be a difficult, but not impossible task, to meet the end of year target of £95m.

Order book

	Orders received	Total outstanding
October	£10,958,000	£144,521,000
November	£ 8,026,000	£143,389,000
December	£ 5,129,000	£141,343,000

There was an increase of £1.6m in the order book compared to the end of the last quarter and some of the major orders released are shown below.

- 17 sets of BAe ATP landing gear
- 20 sets of Fokker 100 landing gear and hydraulics
- £800,000 of marine hydraulics
- £2.9m of AV-8B landing gear

In addition a further £7.4m of orders were received for detail spares from customers throughout the world with the largest orders being received from the UK, USA, India, Germany, Philippines, Japan and Spain.

We are also pleased to report that the orders received in January amounted to £18,881,000 leaving an outstanding order book of £152,173,000 at the end of that month.

The majority of our business is of course within the aerospace industry, but it may interest you to know that we also make equipment for submarines, power stations, tanks and howitzers. In the case of equipment for tanks and howitzers, it is only development work at this stage although it could be a very good business if we obtain the contract. The power station equipment for which we have just received an order for £100,000 is business which dates back to 1977 when Stuart Russell identified an opportunity to use our expertise in blade manufacture in a non-aerospace industry. The original contract was won from Westinghouse Electrical Corporation who produce high speed variable pitch fans for the extraction of waste gases and ash from coal fired power stations. The fans, which each have 22 blades, have to work continuously in high temperatures and have to resist the corrosive effects of waste products. We won the contract to supply the fans' blades due to the efforts of our Sales and Commercial Departments and our success in resolving the corrosion problem. The market has not developed as we would have hoped but the project is an example of how we can use our skills and expertise in other industries and on other products.

Fokker visit — A day to remember

Report by Doug Grazier



Dowty Rotol visitors inspect Fokker 50 mock-up

Saturday, 8 February proved to be a memorable occasion for a group of 21 Dowty Rotol employees. In conjunction with colleagues from other Group companies and from Rolls-Royce, East Kilbride, we were invited to be the guests of Fokker bV, the famous Dutch aircraft manufacturer. Our party flew from Birmingham Airport in an NLM City Hopper F.28 aircraft to Schipol Airport in Amsterdam where Fokker's main factory is situated.

The invitation was made by Fokker to celebrate their long association with Dowty and Rolls-Royce. On arrival we were met by Alexander Nienther, Vice President — Materials Management, who reminded us that Fokker has been a customer of ours since before the second world war.

Our visit began with a presentation of the Fokker 50 and 100 aircraft. The climax to this was a magnificent use of special effects. We were watching the finale of a wide screen film on the Fokker 100 complete with stereophonic sound when suddenly the whole of the right hand side of the theatre opened up to reveal a large display area in which the Fokker 50 and 100 mock-ups were staged. On display also were a Rolls-Royce Tay engine, a Pratt and Whitney engine and a Dowty Rotol six-bladed propeller. We were then able to view the seating arrangements in the mock-ups, sit at

the flight deck controls and meet Fokker colleagues responsible for the design, assembly, procurement and testing of these new aircraft.

Following lunch we were given a tour of the Schipol plant which included seeing the Fokker 50 and 100 prototype aircraft, the F.28 assembly line and the last five F.27s under construction.

At the conclusion of the tour, Sandy MacFarlane of Rolls-Royce and myself were presented with twenty silk screen prints of aircraft old and modern which in the near future will be seen within the company.

All concerned found the visit to be an interesting and memorable one and our thanks go to Fokker for their wonderful hospitality; they gave a new and more favourable meaning to the phrase 'going Dutch'.

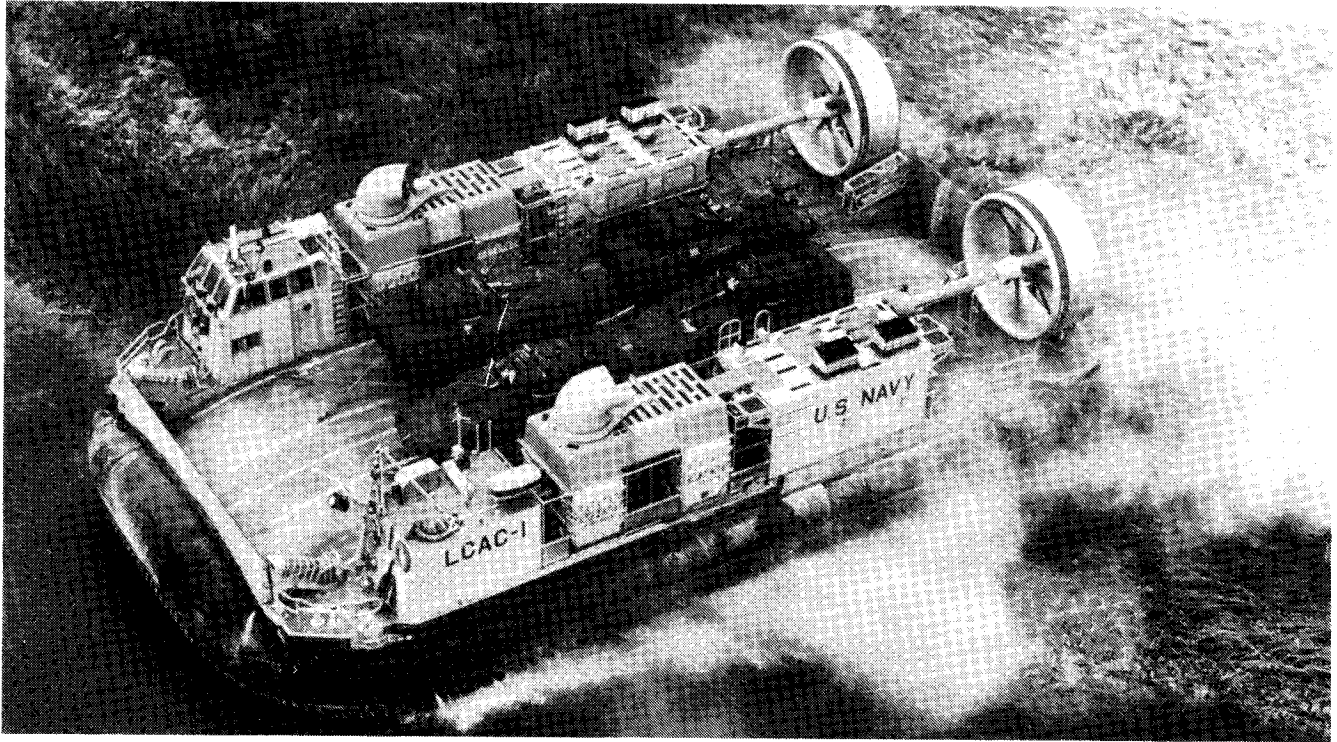
Composite Blade Shop

Many of you will be aware that there is a shortage of work in the Composite Blade Shop which has led to 20 people being transferred to other jobs within the company. There are number of reasons for the problem. All highlight the difficulties which can arise in new product development. They serve also as a reminder to us that our success is dependent on our customers' success. A brief explanation of the current situation on each of our composite blade projects is given below.



SF340

The SF340 is a 34-seater, twin engined commuter aircraft with two four-bladed Dowty Rotol composite propellers. The aircraft has been beset by teething troubles, none of which is due to the propeller. Before the aircraft was certificated, it was realised that its performance was not good enough for hot climates, so Saab asked us to develop a new propeller blade three inches longer than they had previously specified. Then, due to weather conditions, the engines suffered from icing which caused the plane to be grounded for a short while. All this means that the rate of aircraft build up for passenger service has been slower than expected. Therefore Saab have not needed propellers as fast as we had planned. Fortunately the problems are being resolved and we expect the aircraft — and our propellers — to sell well.



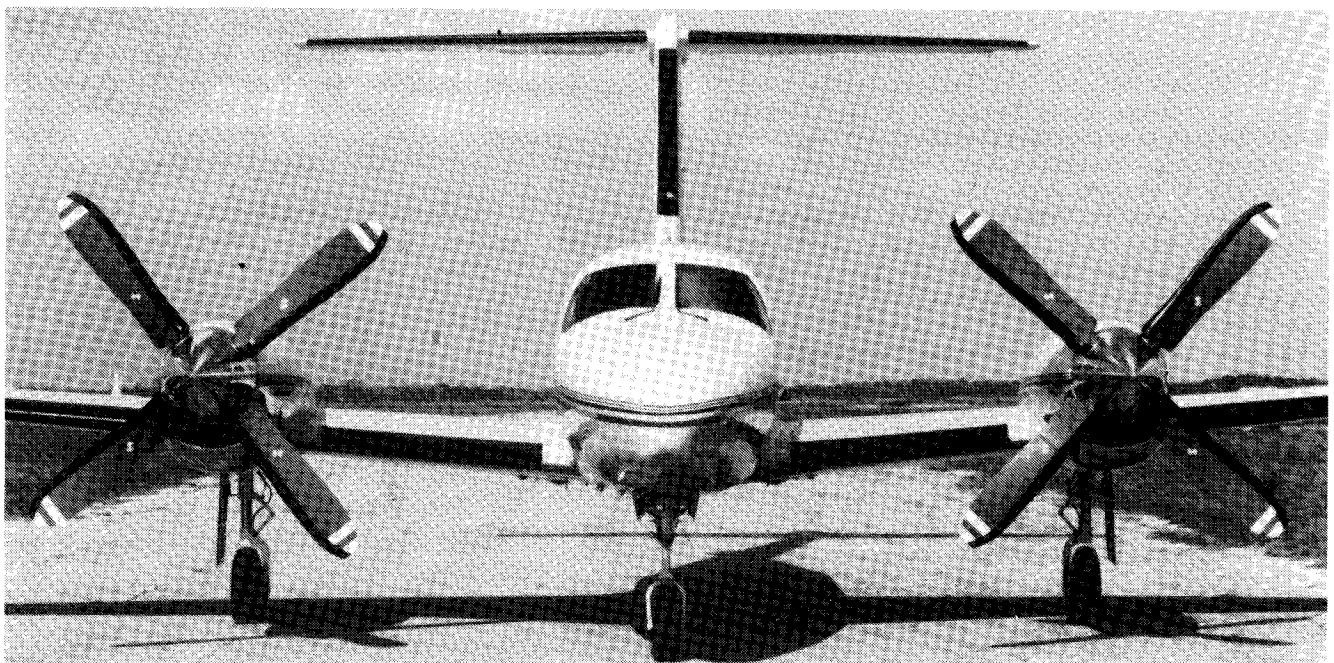
Bell LCAC

The Bell LCAC (Landing Craft Air Cushion) is a hovercraft being built for the US Marine Corps, which is powered by two four-bladed Dowty Rotol composite propellers. The forerunner to this craft was originally powered by Hamilton Standard propellers but we won the contract because Bell were unhappy with the product and service they were receiving from Hamilton.

The programme was an especially tight one but by dedicated team effort from Manufacturing and Engineering we delivered the first units on schedule. Since then a design problem with the blades emerged but it was the sort that could only be identified on the craft — so we had to make some more. After that we had a quality problem with the foam filling. We are still learning how to make blades consistently, but now the propeller is working well and meeting the specification. The US Navy, however, has still not made up its mind whether to buy large numbers of the craft — a recent visit from the US Government officials to Dowty suggests they will — time will tell.

Piper

The Piper, a twin-engined high speed executive aircraft with two four-bladed Dowty Rotol propellers, is being built to compete in the executive jet market. Our original propeller design did not quite meet the performance standards required and we had to re-design the 'root end' of the relevant blade. This cured the problem. However, there are now very serious doubts about the overall project success. The Piper Corporation have failed to sell many aircraft because the executive aircraft market, particularly in the United States, has collapsed. In consequence, Piper are having difficulty supporting the project financially. Again we are in the hands of the aircraft constructor and his market.



Fokker 50

The Fokker 50 project has been described in this and previous NEWSLETTERS. It represents an important part of the company's future order book. The aircraft flew for the first time on 28 December and the test pilots highly commended all Dowty's equipment. Meanwhile in Canada we have been flying a propeller on a test aircraft and this has highlighted that the propeller blade is not quite attuned to the engine from vibration considerations. It is likely we will have to alter the blade design or possibly the way the engine is controlled. Above all it is a problem Dowty can solve as we believe we have a good product and the Fokker 50 will be a winner.

Dowty Rotol is one of two major propeller companies in the world. We produce a superior design of composite blades and we are introducing new concepts of construction. It is difficult to achieve a totally faultless design and we shall, of course, experience manufacturing snags when producing blades in large quantities. We are however learning from our mistakes. Both design and manufacturing techniques have

improved with a better understanding of the quality required.

Today the company's propeller business is not making sufficient return on substantial investments. With patience and continued hard work it can increase and it is a business with a good future for Dowty Rotol Limited.

Fokker 50 prototype takes to the air

On 28 December, the prototype of the Fokker 50 made its maiden flight — the culmination of over five years discussions between the Amsterdam based company and members of Engineering and Commercial Departments of Dowty Rotol.

You will recall that it is our intention to follow the story of the Fokker 50 on its path through the company.

Engineering

The relationship with Fokker meant that discussions on a technical level began long before any formal contractual negotiations. Originally the specification was for a four-bladed propeller. The Performance Department used simulations to predict the performance of the various propeller options and general design schemes were prepared for Fokker by the Design Office.

Fokker analysed this data and decided to opt for a six-bladed propeller, essentially due to the substantial reduction in noise, even though this propeller was heavier and cost more than that of four blades.

The technical discussions did not centre entirely round the propeller. The aircraft was originally designated as the F27RE (Re-engine) and it was the F.27 that provided the basis for the main landing gear. The nose unit was to a different design using a telescopic gear and 'pressure-on' steering system to lessen the effect of shimmy. This is an effect that most of us would recognise when the steering wheel of a car wobbles due to wheels being out of balance.

Performance calculations on shock absorption and steering, stress analysis and design schemes were

necessary. During the meetings with Fokker, there was an input on reliability and non-destructive testing features to enable both the customer and Dowty Rotol to understand the specification before detailed negotiations began.

Commercial

The commercial story began when Fokker submitted a Request for Quotation in 1983. Close liaison between Engineering, Pricing, Product Support and Contracts Sales Department, culminating in our 'Best and Final Offer'.

The negotiations on all aspects of the major contract for the propeller were highly detailed. They entailed close scrutiny and individual discussion of every term from a weighty document running to some 275 pages. Fifty pages of what are called 'side letters' were then drawn up for components other than the propeller. These detailed the price and technical specifications and referred to the general terms on warranties, guarantees and product support capabilities agreed within the contract.

After we were selected and the details of the contract finalised, the Contracts Department circulated the document to other departments to advise them of our obligations. The document detailed the agreement under which Fokker would order components from the company. We shall look at both the administration of the contract and the detailed technical work in the next issue of the NEWSLETTER.

Appointments

Norris Turner
Chief Design Engineer

Norris joined the company in the middle of November having previously worked for Rolls-Royce and most recently, Pratt and Whitney in Canada.



Peter Redhead
Deputy Works Engineer

Peter joined us at the start of the year having previously worked as an electrical engineer and works engineer for organisations both in this country and overseas. His career has taken him to such exotic locations as Harrow, Sidcup and Fiji!



We would also like to welcome all the other new employees who have joined the company over the last three months.

Promotions

Congratulations to everyone who has been promoted recently and in particular to:-

Stan Ristic promoted to Section Supervisor in the Estimating Department.

Kelvin Tustin promoted to Progress Controller in Tool Control.

Paul Wilcox promoted to Foreman in No. 1 Machine Shop.

Bernard Morgan promoted to Foreman in No. 1 Machine Shop.

Geoffrey Purveur promoted to Foreman in the Maintenance Department.

Alan Kimberley promoted to Section Leader in the External Progress Department.

Rotol Employee wins Group Suggestions Award

Our congratulations go to Tony Russell from the Metal Blade Shop who was awarded the first prize of £500 at a recent meeting of the Dowty Group Suggestions Committee. The committee is made up of representatives from each Group company and decides upon the best suggestion received throughout the Dowty Group in the preceding 12 months.

Tony's idea concerned the manufacture of over-shoes and was featured in the first issue of the NEWSLETTER.

DOWTY