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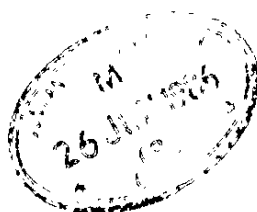




# ROLLS-ROYCE LIMITED



COMPANY NUMBER  
1003142



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## CONTENTS

Notice of Annual General Meeting - 1
Chairman's Statement - 2
Financial Commentary - 4
Review of Activities - 6
Personnel and Employee Involvement - 24
UK Locations and Numbers Employed - 25
Report of the Directors - 26
Board of Directors - 27
Accounts for 1985 - 28
Report of the Auditors - 47
Five-year Review - 48
Principal Subsidiary and Related Companies - 49

## COMPANY PROFILE

Rolls-Royce is one of the three largest aero-engine companies in the western world. Its engines are in service with more than 270 airlines, 120 armed services and 680 corporate operators.

The Company also has over 170 industrial customers and produces gas turbines for power generation, gas and oil pumping and other industrial duties. Its gas turbine engines power warships for 25 navies and its subsidiary, Rolls-Royce and Associates Limited, is responsible for the nuclear steam-raising plant of the Royal Navy's nuclear powered submarine fleet.

Rolls-Royce employs 41,700 people worldwide, of which over 90 per cent work in the United Kingdom. The parent Company, Rolls-Royce Limited, is organised into three main business groups - Civil, Military and Industrial and Marine - responsible for the management and profitability of their respective areas of business and supported by the Corporate Engineering and Supply Groups.

The Company's business dates back to 1906 and aero engines were first produced in 1915. Today its leading civil engines are the RB211, which powers Boeing 747, 757 and Lockheed TriStar airliners and the new Tay for the 100-seat airliner and executive jet market. The Company is also a member of a major collaborative project - the five-nation V2500 (due to enter service in the 150-seat Airbus A320 in 1989) in which Rolls-Royce has a 30 per cent share. Under an agreement with General Electric (USA), Rolls-Royce also participates in the CF6-80C2 programme and GE in the RB211-535E4 programme.

On the military side the main engine programmes are: the RB199 for the tri-national Tornado strike and air-defence aircraft; the Adour for the Hawk and Jaguar; the Pegasus for the Harrier and AV8B; the Viper for trainer and strike aircraft; the Gem, Gnome and RTM322 for helicopters; and a new engine for the proposed four-nation European Fighter Aircraft for the 1990s.

The wide range of applications for Rolls-Royce products is displayed on pages 14 and 15 of this Report.

*Front cover: Concorde (top) and the Tornado - powered respectively by Olympus 593 and RB199 engines.*

## NOTICE OF ANNUAL GENERAL MEETING

Notice is hereby given that the fifteenth Annual General Meeting of Rolls-Royce Limited will be held at 65 Buckingham Gate, London SW1 on Tuesday, May 20, 1986 at 12.30 pm for the following purposes:

1. To receive the Report of the Directors and the audited accounts for the year ended December 31, 1985.
2. To re-appoint Coopers & Lybrand, the retiring auditors, and to authorise the directors to fix their remuneration.

By order of the Board

Anthony Warrington, Secretary  
April 22, 1986

A member entitled to attend and vote at the above meeting is entitled to appoint a proxy to attend and, on a poll, to vote in his stead. A proxy need not be a member of the Company. To be effective, proxies must be received at 65 Buckingham Gate not less than 48 hours before the time fixed for holding the meeting.



Rolls-Royce Limited

1985 saw further progress in the Company's return to sustained profitability.

The upturn in business, which began to emerge in the second half of 1984, continued throughout 1985 with turnover reaching a record level of £1.6 billion, up 1.4 per cent on 1984.

Operating profit at £211 million showed a 30 per cent increase over 1984, while profit before tax more than trebled at £81 million.

Much of the growth in 1985 has come from the civil airline sector where world traffic rose at an annual rate of about 10 per cent, but where de-regulation in varying degrees is causing changes in the pattern of aircraft procurement; this adds yet another variable to the effects of falling oil prices and environmental considerations. However, the Company's policy of developing a wide product range, designed either wholly within Rolls-Royce or in association with other engine manufacturers, has enabled us to win new business in all market sectors.



Sales of equipment to military customers were at a similar level to 1984, and largely reflect the ongoing programmes for the RB199, Pegasus and Adour.

During 1985, the RB199 and Adour programmes received a further boost with the decision by Saudi Arabia to place a substantial order for Tornado and Hawk aircraft. This, together with the agreement of Britain, Germany, Italy and Spain to proceed with the new European Fighter Aircraft programme, should bring considerable stability to our future military workload. In the short-term, the same cannot be said about our helicopter engine business, but prospects for the new RTM322 engine in the medium to long-term

are excellent and we look forward to a number of applications from derivatives of this engine.

In the Industrial and Marine area, sales continued to be affected by the depressed power generation market, but there were signs of some recovery during the year and our recently established joint venture company with GEC secured business totalling £40 million.

The increased output in 1985 was achieved with manpower numbers at broadly the same level as at the end of 1984 (and 33 per cent less than in 1980), with an improved ratio of direct to indirect workers. This reflects the productivity benefits of investment in new technology in advanced machining techniques, in our testing facilities and in providing powerful computing support throughout our operations. Our advanced integrated manufacturing system (AIMS), one of the most automated production facilities in Europe, was formally opened by the Prime Minister on January 29, 1986.

We are committed to continuing improvements in productivity and to an investment programme which supports this objective. The Review of Activities (pages 6-23) describes a number of the facilities which are already in operation or well advanced towards implementation.

Research and Development is vital to our future, and in 1985 our gross spend amounted to £234 million with £100 million being funded entirely out of our own resources. Great strides have been made in managing this large investment effectively, resulting in our ability to meet technical objectives at lower cost while maintaining a high confidence level. Our policy of placing greater emphasis on advanced demonstration work and computer modelling, prior to the full development phase of a new project, is already proving its worth.

The quality of our engineering was recognised in February 1985 by two major Design Council awards in the engineering products and components categories. The awards were made for the RB211-535 engine with its outstanding reliability, and for the wide-chord fan blade with its unique lightweight design concept.

A team of engineers from the Company also received the 1985 MacRobert Award for their work on the X-ray examination of running engines. This work has led to substantial export orders for the specialised equipment developed by us in collaboration with British manufacturers.

One of our most significant engineering successes in 1985 was the first flight, in September, of the Tay engine in the Gulfstream IV, only 12 months after its first test-bed run and three months ahead of schedule. Orders for this engine, which incorporates the new wide-chord fan design, already exceed 520, despite the fact that it will not enter commercial service until 1987. The recent announcement by the Dee Howard Corporation that the Tay has been selected to re-engine the BAC 1-11 adds a third application for the engine in addition to the Gulfstream IV and Fokker 100.

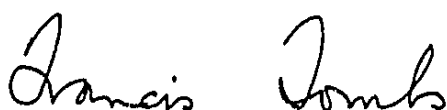
The V2500 five-nation programme, in which Rolls-Royce has a 30 per cent interest, continues to make good progress with the first engine-run having taken place in December 1985, three months ahead of the original scheduled date. The first application for this engine is in the Airbus Industrie A320 aircraft, and substantial orders have already been received for the engine by the consortium company, International Aero Engines.

The agreement with General Electric (USA) – under which Rolls-Royce participates in the CF6-80C2 programme and GE in the RB211-535E4 programme – is gaining momentum, with the first CF6-80C2 engine to be delivered to Derby successfully completing its initial test-run in October 1985.

The RTM322 helicopter engine, being developed jointly with our French partner, Turbomeca SA, is making excellent progress on its ground-running phase, and will commence flight testing in 1986. The engine has been licensed to United Technologies Corporation for sale in the North American market, and there is considerable interest in its potential development for both helicopter and fixed-wing applications.

In November 1985, Mr. Geoffrey Pattie, Minister of State for Industry and Information Technology, confirmed that it was the intention of Her Majesty's Government to return Rolls-Royce to the private sector within the term of the present Parliament. I said then that I was delighted with this first step towards achieving our objective of financial independence, and the results for 1985 confirm my belief that the Company is progressing satisfactorily in that direction.

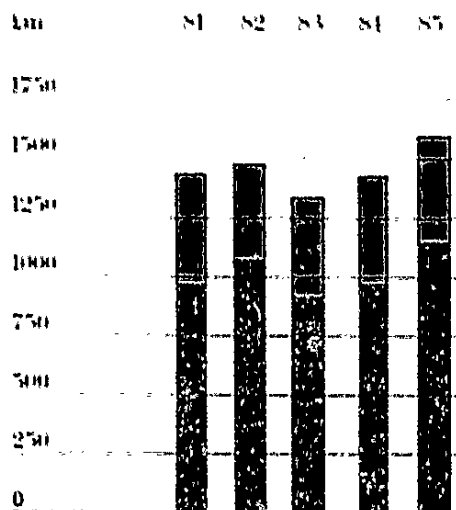
The achievements of 1985, and our confidence for the future, are the outcome of several years of development which owe much to the dedication and loyalty of our employees at all levels of the organisation. I take this opportunity of expressing my thanks, and those of my Board colleagues, to them all.



Sir Francis Tombs  
April 10, 1986

#### TURNOVER 1981-85

■ UK  
■ OVERSEAS



#### Turnover

Turnover expanded in 1985 to £1,601 million, an increase of 14 per cent over the 1984 figure of £1,409 million.

The major part of the growth arose in the civil business sector, where sales increased by 29 per cent to £577 million, with both engines and spare parts output contributing to the higher level of activity. Deliveries of RB211 engines for installation in Boeing 747 and 757 aircraft were double the 1984 figure and, while Spey sales were down on the previous year, this merely reflected the phasing out of the Gulfstream III and Fokker F28 aircraft programmes which are to be replaced by the Tay-powered Gulfstream IV and Fokker 100. Firm orders for the Tay engine already exceed 520.

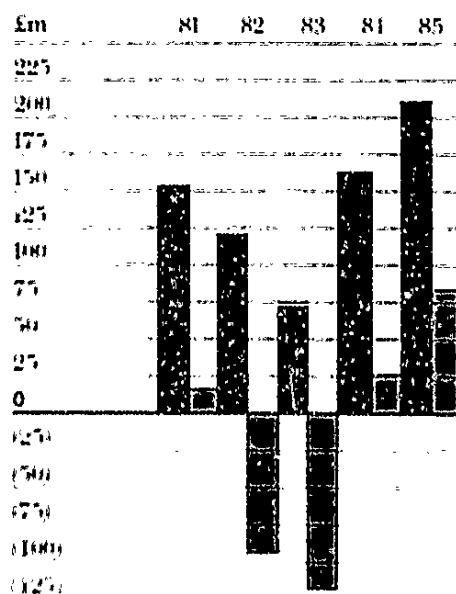
Sales to the Ministry of Defence and overseas military customers amounted to £735 million, a similar level to that achieved in 1984. The RB199 for Tornado and the Pegasus for the AV8B/Harrier represented the major engine programmes, but important contributions were also made by the Adour, Viper, Gnome and Gem projects.

Industrial and Marine business at £143 million showed an increase of £21 million over 1984, despite the weak state of the power generation market.

Overseas business accounted for 71 per cent of sales, compared with 70 per cent in 1984.

#### PROFITS (LOSSES) 1981-85

■ OPERATING PROFIT  
■ PROFIT (LOSS) BEFORE TAX



#### Profits

Operating profit at £211 million increased by 30 per cent over 1984; the margin on sales also improved from 11.5 per cent to 13.2 per cent, indicating a continuing improvement in overall productivity.

The main contribution to increased profit came from the civil aero business which showed an 87 per cent improvement over 1984 (up from £39 million to £73 million). Industrial and Marine business also showed much better results; higher profits from North American activities, a beneficial sales mix and lower provisions all contributed to the improvement in 1985 (see note 2 to the Accounts).

With the exception of non-perishable production tooling costs, which are written off over five years, all expenditure (including net research and development) associated with the launch of new civil engine projects has been written off as incurred.

Interest charges reflect the reduced average level of borrowings during the year, a continuation of the improving trend experienced over the previous two years.

Profit before tax at £81 million represents a substantial improvement over the 1984 figure of £26 million.

## Research and Development

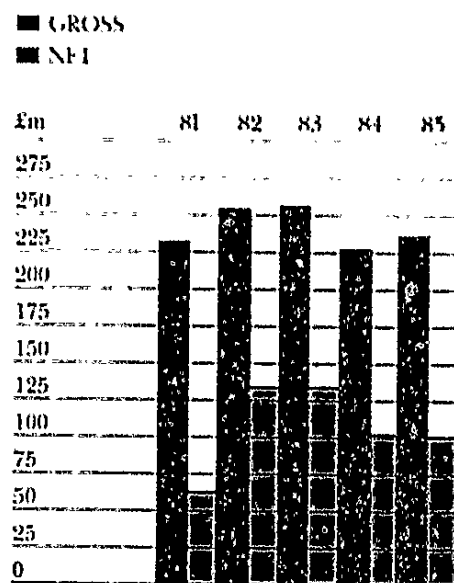
Substantial investment continued to be made in research and development, with gross spend in 1985 amounting to £231 million; this compares with a spend of £227 million in 1984.

The net research and development cost of £100 million represents the balance of expenditure borne by the Company after allowing for funding received under Her Majesty's Government (HMG) defence contracts and shared advanced engineering programmes, and after deducting launch aid received from HMG under the provisions of the 1982 Civil Aviation Act. In 1985 launch aid was received for both the RB211-535E4 and V2500 engine projects, and was subject to normal repayment arrangements under which the Company pays an agreed levy to HMG on future sales arising on the projects. (Note: Levies paid to HMG in 1985 in respect of past launch aid support for civil engine projects amounted to £17 million, and were charged to cost of sales).

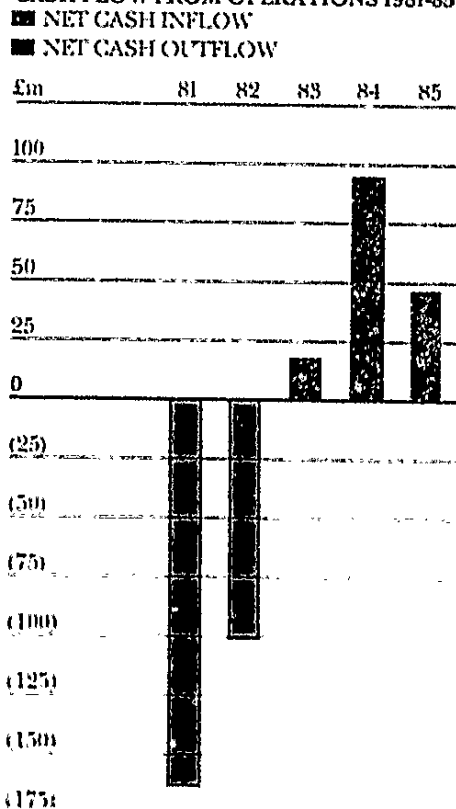
## Cash Flow from Operations

Net cash inflow in 1985 amounted to £47 million, resulting in a further reduction in net borrowings from £256 million to £209 million. This is the third year in succession in which cash flow has been positive, despite substantial investments in fixed assets (£48 million in 1985) and working capital demands associated with a higher level of manufacturing to support the growth in sales.

RESEARCH AND DEVELOPMENT 1981-85



CASH FLOW FROM OPERATIONS 1981-85





The improved level of airline profitability which emerged in 1984 continued to strengthen during 1985. World airline traffic grew at an average rate of around 10 per cent, fuel prices stabilised or declined and, despite interest rates remaining at relatively high levels, many operators were able to make substantial inroads into their total operating costs.

Against this background and a promising outlook for continued traffic growth, major orders were placed for new civil aircraft, particularly short and medium-range types.

As a result of earlier actions taken to develop a full range of highly competitive products, Rolls-Royce has benefited from important orders for the Tay, V2500 and the RB211 family of engines.

Continued emphasis on reliability, low ownership costs and good environmental characteristics through the application of advanced technology will ensure that the Company is well placed to take advantage of the upturn in the market and so maintain its position among the world leaders in the civil aviation industry.

#### Tay

Excellent progress has continued on the development of the new Tay engine for the Gulfstream IV executive jet and the Fokker 100 airliner. Most certification tests have now been completed and the engine remains well on schedule for approval by the airworthiness authorities in June 1986.

Following the Swissair launch order for the Fokker 100 in July 1984 the programme received a further boost in May 1985 when KLM Royal Dutch Airlines ordered ten of these advanced airliners with options for five more. In July a firm order for 20 aircraft and options for 20 more – powered by an updated version of the Tay – was placed by the American

airline USAir, thus establishing the Fokker 100/Tay combination in the very competitive US market.

Total orders for this aircraft now stand at 38 firm with 31 options and many airlines around the world are showing considerable interest in it.

The highlight of the year for the Gulfstream IV was the aircraft's first flight in September, followed by its appearance at the National Business Aviation Association Convention in New Orleans. Rolls-Royce contributed to this outstanding Gulfstream achievement by delivering two flight-cleared engines for the aircraft three months ahead of schedule. Aircraft certification is planned for September 1986 with initial production deliveries starting shortly afterwards. By the end of 1985 firm orders had been placed for over 80 Gulfstream IV aircraft with more than 20 under negotiation.

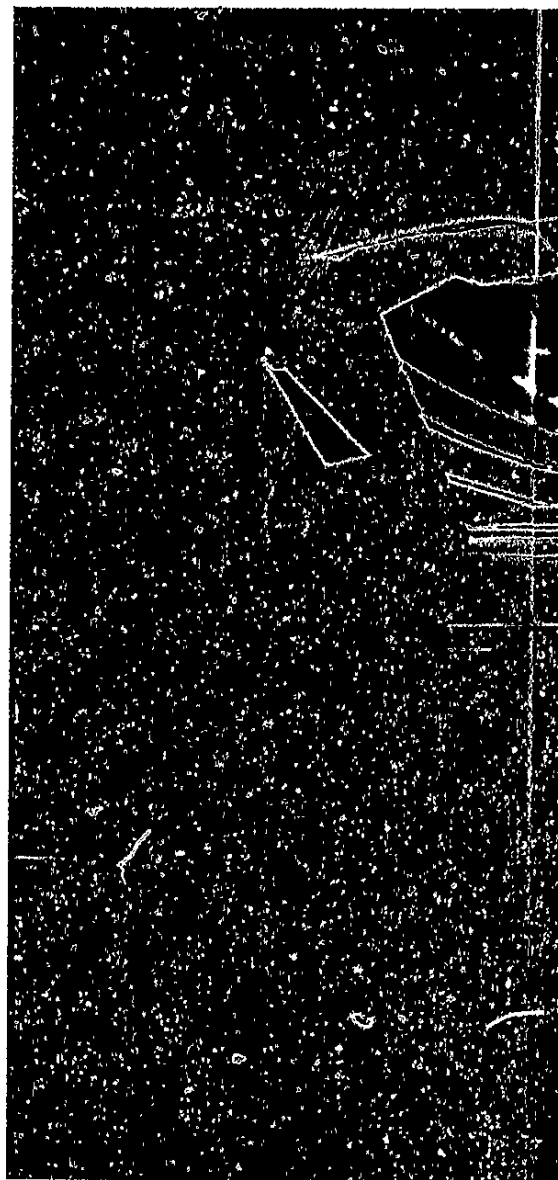
In February 1986, Gulfstream Aerospace placed a further order for 200 engines and Rolls-Royce was able to announce that the Tay will be purchased by the Dee Howard Corporation of San Antonio, Texas to re-engine the BAC 1-11-400 for corporate aircraft – the third application for this engine.

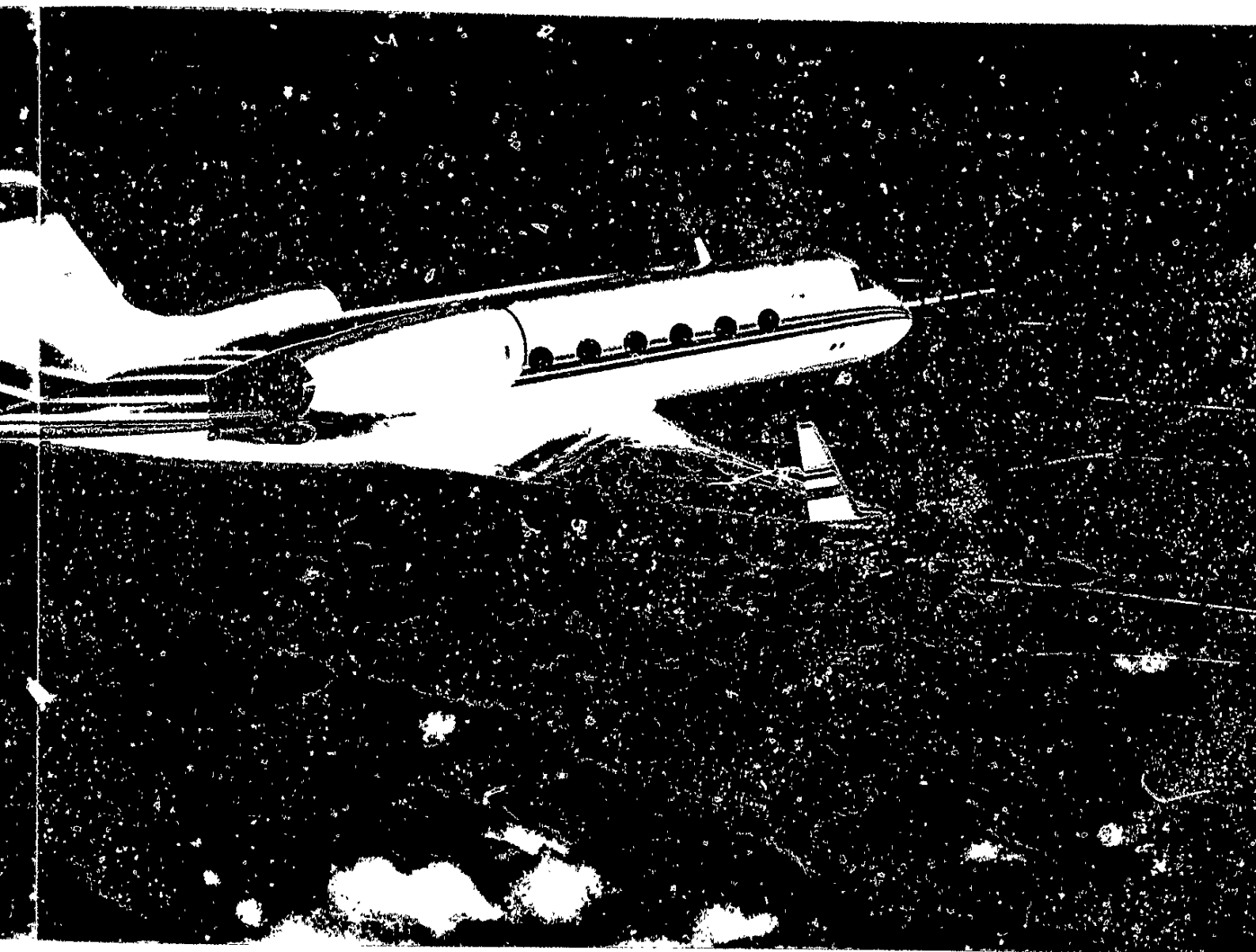
The success of the Tay development programme and the continued sales of the aircraft it powers give great confidence for the future of this engine.

#### RB211-535

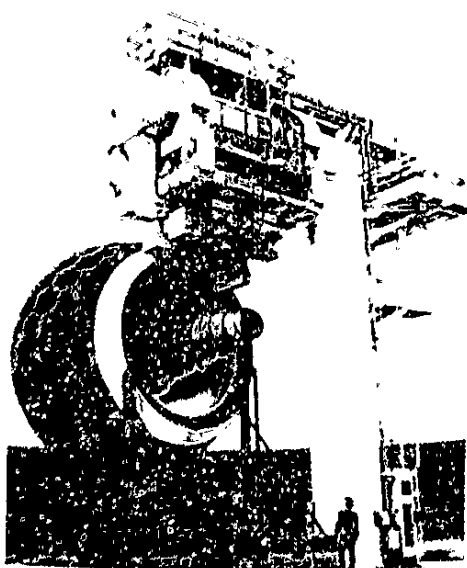
The -535C continues to demonstrate that it is the most reliable turbofan ever developed by any manufacturer. The engine entered service in January 1983 in the Boeing 757 and has now accumulated some half million operating hours in service with Eastern Air Lines, British Airways, Monarch Airlines, Air Europe and LFS.

The higher-thrust -535E4 is a further derivative of the RB211





The Flying Fortress - B-29  
 Superfortress - 1944  
 R - R



The Flying Fortress - B-29  
 Superfortress - 1944  
 R - R

family. Based on the -535C, it incorporates high-technology improvements including the unique Rolls-Royce designed wide-chord fan blade. The engine is now in service with Eastern Air Lines, Monarch Airlines and Republic Airlines and has improved the fuel consumption of the Boeing 757 by approximately 10 per cent at the same time as maintaining the excellent reliability of the -535C. Because of the quietness of this engine, the Boeing 757 with -535E4 engines is the only airliner of its size to meet the stringent noise limits for night-time operations at Washington National Airport.

The highlights of the year were the selection of the -535E4 by Republic Airlines in the US and Royal Brunei Airlines. Both orders were obtained in the face of strong competition.

General Electric (USA) also has a share in the -535E4 programme and during 1985 bench running of the engine began at the GE facility in Ohio as part of its development.

#### **RB211-524**

The RB211-524 is in service in the Boeing 747 and Lockheed L1011 TriStar aircraft and during the year further orders were received for engines and conversion kits valued at \$300 million. These included engines for the latest -300 version of the 747 aircraft ordered by Qantas and Cathay Pacific as well as conversion of the British Airways fleet of RB211-powered 747s to the D4 Upgrade standard of engine.

Since the introduction of the -524D4 in 1981, Rolls-Royce has won a significant share of the vital 747 market.

New D4 Upgrade engines which came into service in 1984 are producing levels of fuel economy even better than predicted and this supports the Company's confidence that

future improvements to the engine in the form of the D4C and D4D variants will ensure that the Rolls-Royce engine remains the most fuel-efficient option on the 747. The latest planned version, the -524D4D, which is due for certification in 1988, will produce 56,000 lb of thrust and an eight per cent improvement in fuel economy over the basic D4 standard.

The continuing RB211-524 programme is also opening up additional opportunities for the sale of new engines to replace RB211-22B engines in earlier Lockheed L1011 aircraft and in the provision of conversion kits to improve the performance of earlier -524 engines. An example was the decision by Delta Air Lines during 1985 to improve the payload and range capabilities of six L1011s by retrofitting -524B4 Improved engines; similar orders are expected to follow from other operators.

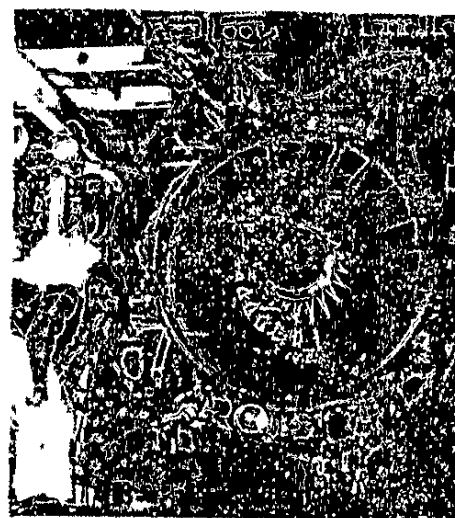
#### **CF6-80C2**

Under an agreement with General Electric (USA), signed in 1984, Rolls-Royce and GE participate reciprocally in the -535E4 and CF6-80C2 engines.

The CF6-80C2 was certificated in June 1985 and later in the year testing of the engine began at Rolls-Royce facilities in Derby. Initial orders for this engine were placed by Thai International Airways and Lufthansa Airline during 1985.

#### **V2500**

With 30 per cent workshare, Rolls-Royce is a joint principal shareholder with United Technologies Corporation in the five-nation consortium producing the 25,000 lb thrust V2500 turbofan. Other participating companies are Japanese Aero Engines Corporation (JAEC), Motoren- und Turbinen-Union (MTU) and Fiat Aviazione.

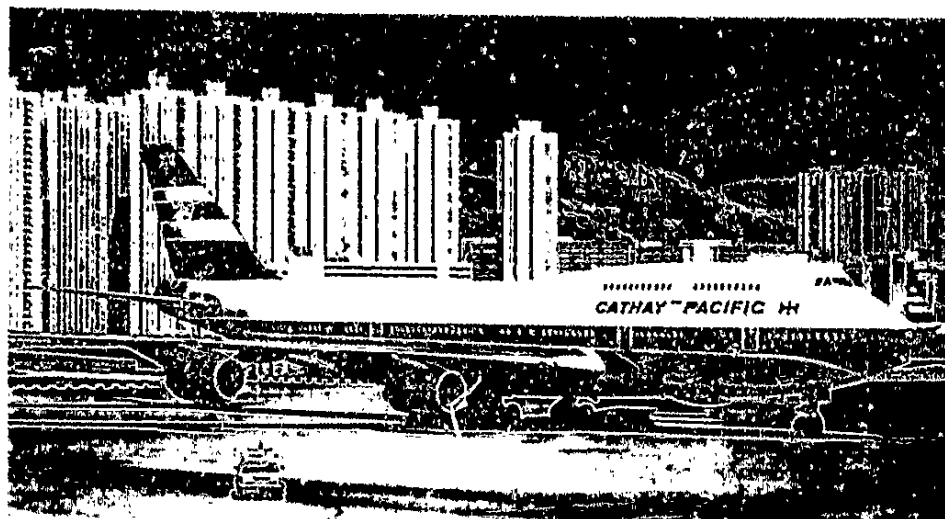


During the year major sales of the V2500 were obtained in the Airbus Industrie A320 aircraft, the first application for this engine. The V2500 has already established itself as the leading powerplant for this airliner by securing more than 90 per cent of the engine orders placed during 1985. Pan American World Airways, Cyprus Airways, Yugoslavia's Inex Adria Airways, Lufthansa, Indian Airlines and Trans Australia Airlines have all selected V2500-powered A320 aircraft generating a requirement, including options, for some 350 engines.

Good progress is being made by all partners towards V2500 airworthiness certification planned for April 1988 and service entry early in 1989. A significant achievement during 1985 was the first run of the engine in East Hartford, USA, approximately three months ahead of the originally planned date.

Rolls-Royce experience has contributed features such as the high efficiency wide-chord fan, the latest aerodynamic technology for the HP compressor and the nacelle which incorporates a low-noise integrated final nozzle. These will all help the V2500 to attain optimal levels of reliability and performance while meeting all anticipated environmental regulations.

*Left: The new nation A2500 has already been ordered in quantity for Airbus A320 airlines*



### **Dart and Spey**

Sales of the well-established Dart turboprop engine continued during 1985 for both the Fokker F27 and BAe 748; over 7,000 Darts have now been produced.

The Dart Mk 552 engine received its airworthiness certificate during the year and deliveries of production engines and retrokits will proceed in 1986. This version provides considerable cost of ownership advantages over earlier Dart engines and its features can also be applied to engines already in service.

Approximately 80 Spey engines were delivered in 1985 for Gulfstream III and Fokker F28 aircraft, bringing the total number of Spey engines manufactured for civil and military applications to some 4,500. Of particular significance to the programme during the year was the Piedmont Airlines order for eight new Fokker F28 Mk 4000 aircraft which will add to their existing fleet of 20 Fokker F28 Mk 1000s.

The latest aircraft to be powered by the Spey – the Italian/Brazilian AMX close-support fighter – continued its flight development programme during the year. It is powered by the Spey Mk 807 engine and by the end of 1985, three development AMX aircraft were flying in Italy together with the

prototype Brazilian aircraft, which made its first flight in October. Production deliveries of the Spey Mk 807 begin in mid-1986.

### **New Projects**

The Company recognises the considerable business opportunities offered by the development of a new turboprop engine for the commuter aircraft market and step-change improvements in propulsion system fuel economy – ranging from open rotor concepts (widely known as propfans) to very high bypass ratio ducted rotors for underwing installation. Details of the current and planned engineering work on these projects are given in the Corporate Engineering section (pages 18 to 20).

*Cathay Pacific operate non-stop services between Hong Kong and London using Boeing 747s with the latest RB211-524 variant.*

The Group manages and supports a wide range of engines for military fixed-wing aircraft, supersonic aircraft and civil and military helicopters. Over 11,000 Rolls-Royce engines are currently in service with 124 armed services worldwide.

#### **RB199**

The Turbo-Union RB199 was jointly developed by Rolls-Royce, MTU in West Germany and Fiat Aviazione in Italy for the Tornado aircraft. During 1985, the joint programme constituted a major part of Military Engine Group activity; deliveries included the first production examples of the Mk 104 extended reheat version for the Tornado Air Defence Variant (ADV). There are now over 500 Tornado aircraft in service.

The announcement of the first export orders for the Tornado to Saudi Arabia and Oman increased the total engine build programme to over 2,300 engines, with production continuing until at least 1990. At the end of 1985 over 1,400 engines had been delivered by the consortium.

RB199 Mk 104 engines were also delivered to British Aerospace, Warton, for installation in the Experimental Aircraft Programme demonstrator, due to fly in May 1986.

#### **Adour**

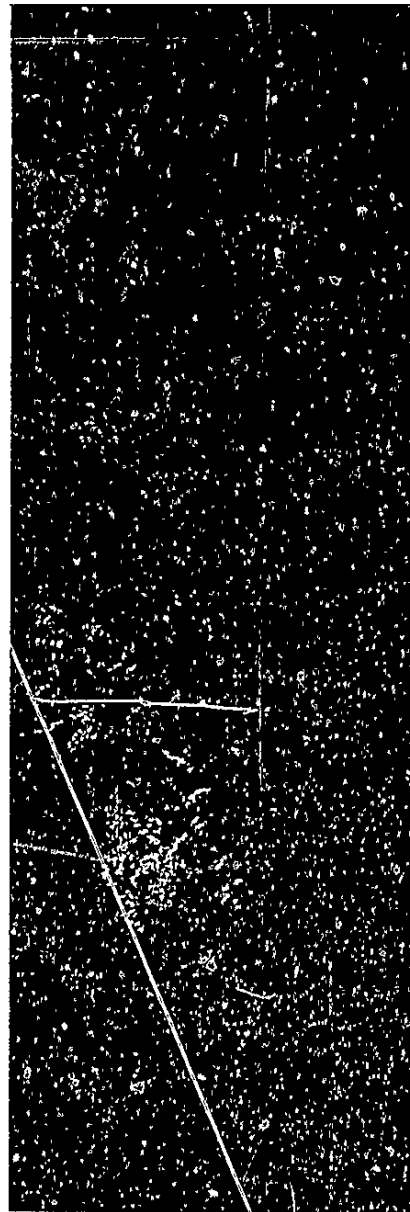
The Adour reheated turbofan was developed by Rolls-Royce and Turbomeca for the Anglo-French Jaguar aircraft. It was subsequently adopted for the Japanese F-2 and F-1 aircraft and, in unheated form, for the British Aerospace Hawk trainer. The Adour now has over 2.2 million hours of service experience, and its selection for the US Navy's F-45 Goshawk programme of over 300 trainer aircraft ensures its continued production well into the 1990s.

In June 1985 the uprated Mk 871 version ran for the first time. It offers substantial thrust increases at high ambient temperatures and high airspeeds, matched to the requirements of the single-seat Hawk 200 fighter/ground attack aircraft. The Hawk 200 is due to fly in the Spring of 1986 and to enter service in 1988.

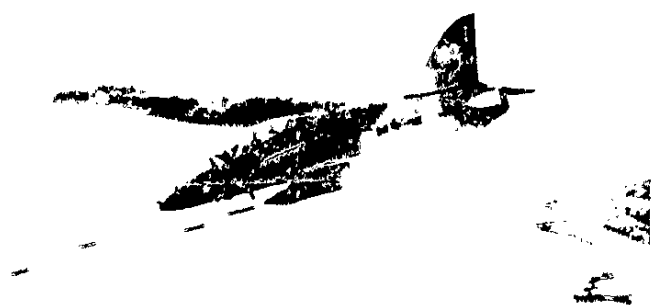
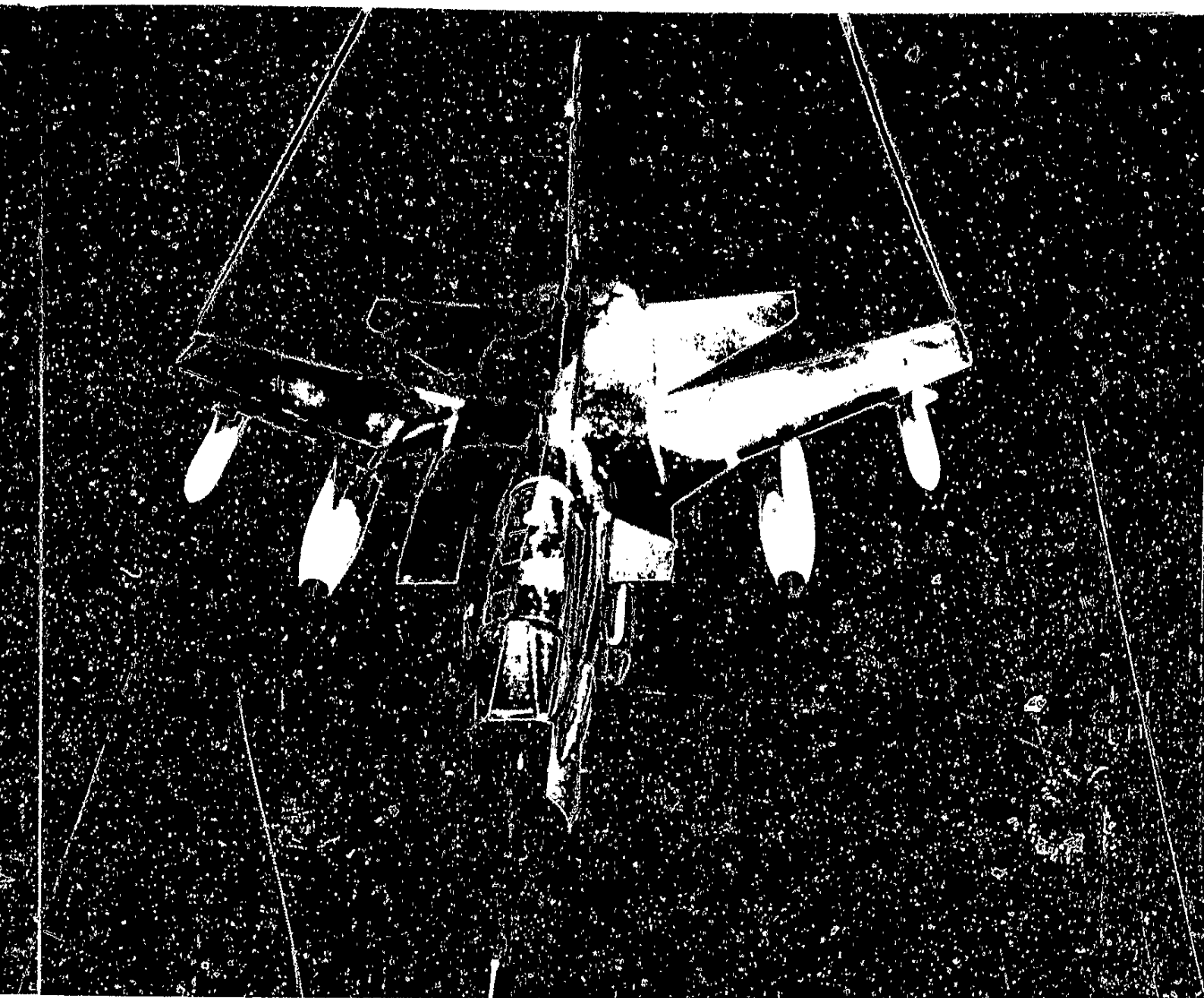
#### **Pegasus**

The rate of delivery of the Pegasus vectored-thrust turbofan increased during 1985 for Sea Harriers for the Indian Navy and the Royal Navy and AV8B Harrier IIs for the United States Marine Corps (USMC) and the Royal Air Force. The Harrier II enjoyed an exceptionally smooth entry into USMC service, passing its demanding operational evaluation with flying colours. The first operational squadron was formed at the Marine Corps Cherry Point Air Station. The RAF version of the aircraft, the Harrier GR5, will be in full squadron service by 1987.

New variants of the Harrier II are under consideration to extend production beyond the currently planned 390 aircraft. In parallel with this development, Rolls-Royce is demonstrating a Pegasus engine with 15 per cent greater thrust which could be available for service in 1990.



An RB199 engine for a Tornado at RAF Honington



## Viper

With more than eight million flight hours and over 5,000 engines delivered, the Viper turbojet is one of the world's most experienced military engines. Despite this longevity, continuous development has kept the Viper competitive and it powered four of the modern military aircraft presented at the 1985 Paris Air Show – Macchi's MB339 trainer and Veltro II fighter, Yugoslavia's Super Galeb trainer and the Orao strike/attack aircraft jointly developed by Yugoslavia and Romania.

## Olympus 593

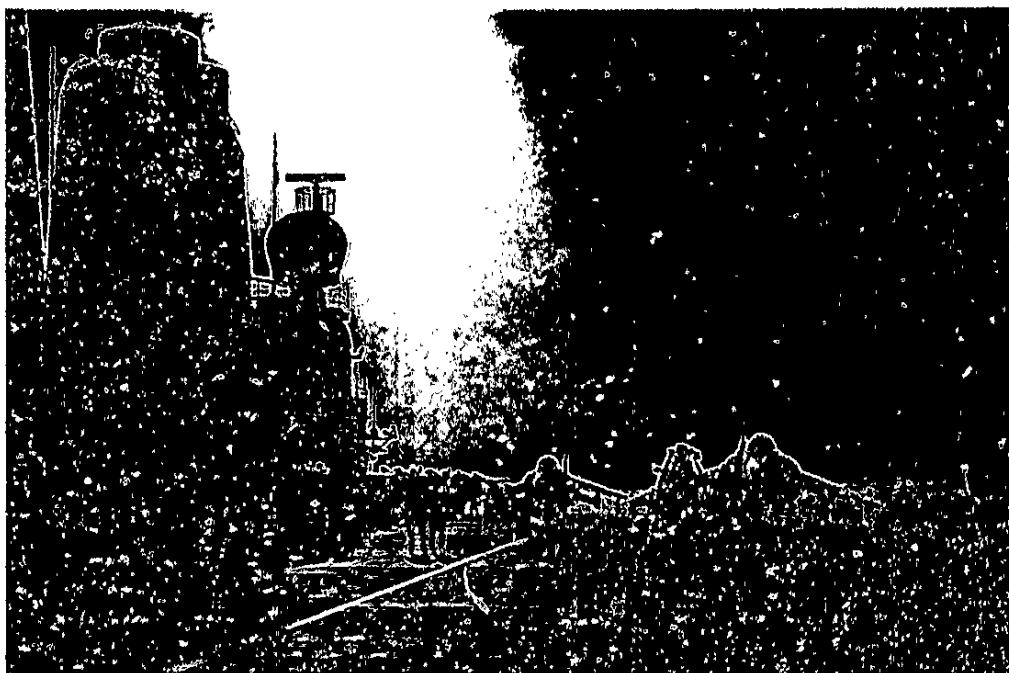
The Olympus 593 which powers Concorde has now completed ten years of successful commercial operation – during this time more than 1.4 million passengers have been carried. Today Concorde operates on scheduled services from London to New York, London to Washington and Miami and Paris to New York. During these operations more than 280,000 hours have been logged at supersonic aircraft speeds and almost 200,000 hours at Mach 2 and above.

This successful experience contributes significantly to the design of new supersonic military engines.

## Helicopter Engines

Continuing steady sales of Sea King helicopters have kept the Gnome turboshaft in full production and orders were also received for Gnome H100-I engines to uprate Boeing Vertol 107 helicopters in service with the Swedish Navy.

First production orders were received for Gnome Mk 100-I engines to power Agusta A129 Mangusta anti-tank helicopters scheduled to begin operations with the Italian army in 1987. The Mangusta is highly effective in its role and has good export potential.



The RTM322 turboshaft made excellent progress on test, both in Britain and at the Bordes facility of Rolls-Royce's partner, Turbomeca. Worldwide interest in the engine as a power unit for medium helicopters is increasing; this was confirmed by United Technologies Corporation's decision to take a licence enabling Pratt and Whitney to build and market the RTM322 for North American government sales.

Flight testing of the engine will begin in 1986 in a Sikorsky Black Hawk helicopter; the necessary engine flight clearance testing has already been completed. Production engines will be available from 1988.

## European Fighter Aircraft Engine

In August 1985 Britain, Germany, Italy and Spain agreed to proceed with the definition phase of the European Fighter Aircraft and its engine. The engine programme, which will be managed by a new joint company based in Munich, is expected to represent a significant proportion of Rolls Royce's military workload during the 1990s and into the next century.



*Top: Sea Harrier V STO aircraft are prepared for launching from a Royal Navy carrier.*

*Above: Lynx helicopters with Gnome engines are in service with the British Army, the Royal Navy and other armed services.*

The Group's most active project during 1985 was the marine Spey which went to sea in the Autumn in two new warships. These are the Japanese Maritime Self Defence Force's DDG destroyer Hatakaze, which has two Speys for cruising, and the Royal Navy's Type 22 frigate HMS Brave, which uses two Speys for high-speed operation.

The further development of this engine progressed during 1985 with work continuing on schedule on an uprated 18MW version and on an important contract from the US Navy for preliminary design of an advanced-cycle version. This latter unit, the inter-cooled regenerative (ICR) Spey, is being developed by a study team comprising Rolls-Royce and two US concerns, Allison (a division of General Motors) and Garrett. Work under this latest contract is due for completion by late 1986.

The Spey was also prominent in the industrial sector, with the sale of more Spey-powered SK 15HE generating sets to the People's Republic of China. This order, worth £15 million – for three SK 15HEs for the Nan Jiang oilfield in western China – brings the total value of Chinese Spey business so far to over £25 million. There is potential for future sales to China and negotiations have continued on further possible contracts.

Operational landmarks in 1985 included the completion of 20 million service hours accumulated by 200 operators of industrial and marine engines since 1958. The industrial Avon also recorded two milestones which are believed to be world records – an engine in Dubai achieved 30,000 hours running offshore without removal and a liquid-fuelled Avon in Alaska completed 30,000 hours between overhauls.

In the Soviet Union, gas and oil projects are being pursued and the successful Soviet experience of Rolls-Royce equipment, with 42 Avons in service on a major gas line since the late 1970s, offers considerable hope for future business there.

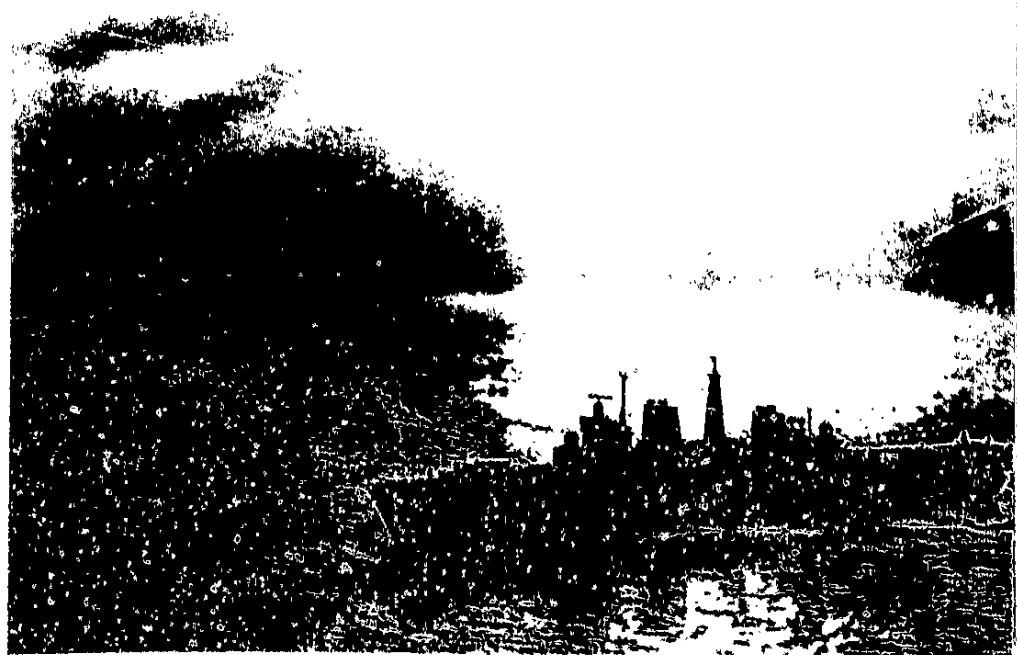
GEC Rolls-Royce (Power Generation) Limited, a joint-venture company with GEC, overcame a slow start and secured its first contracts in 1985. Its first order, worth £15 million, was placed by Shell for three generating sets powered by Rolls-Royce industrial RB211 and Avon gas generators for the Tern platform in the North Sea. GEC Rolls-Royce also secured orders from the Middle East, Denmark, Brazil and the United States for Avon and Olympus powered equipment. The total value of its 1985 orders, covering ten new units, was £40 million.

Cooper Rolls, another joint-venture company, formed in 1978 and operating in the mechanical drive sector, increased its total orders during 1985. Dresser Industries, another main contractor, also sold several units based on Rolls-Royce gas generators. These included breakthroughs into new offshore markets in Denmark, Australia and Egypt.



*Above: More Spey generating sets were sold in China during 1985.*

*Below: Rolls-Royce power combination - HMS Illustrious and the Sea Harrier.*





# ROLLS-ROYCE POWER

The Group's products provide the power for airliners, transport aircraft, combat aircraft, military trainers, helicopters, business jets, missiles, electrical power generation, gas and oil pumping (on land and off-shore), hovercraft, hydrofoils and surface warships. In all, over 1,200 customers operate more than 27,000 Rolls-Royce gas turbines. The Group also provides the propulsion systems for the Royal Navy's nuclear submarine fleet. Set out below are examples of the many applications for Rolls-Royce power.



BAe Lightning



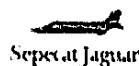
Mitsubishi T-2 F-1



Panavia Tornado



Aeritalia G91



Sepecat Jaguar



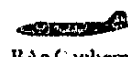
HAL Ajcet



Gulfstream IV



BAe Hunter



BAe Canberra



Fuji T1-A



Piaggio-Douglas PD 808



Boeing 747



BAe VC10



BAe Strikemaster



Soko Orao/LAR 93



Aeromacchi MB 339



Fokker F28



Boeing 707-420



Lockheed TnStar



Aeromacchi MB 326



BAe Britannia



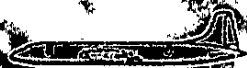
BAe Trident



HAL Kiran



Soko Super Galeb



Canadian Four



BAe Nimrod



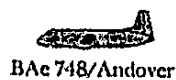
BAe Vanguard



Breguet Alizé



Dassault-Breguet Atlantic



BAe 748/Andover



HP Herald



BAe Argosy



BAe Buccaneer



Westland Wessex



Kawasaki/Boeing Vertol 107



Westland Scout/Wasp



Westland Sea King



Electrical generation



Process industry



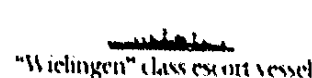
Warden/Winchester class hovercraft



"High Point" hydrofoil



"Spica" class fast patrol boat



"Wielingen" class escort vessel



"Invincible" class carrier



"Miyuki" class destroyer



Type 22 frigate



"Hatakaze" class destroyer



New DD destroyer



"Triton" class



"Swiftsure" class



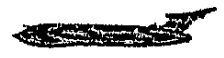
GAF Jindivik



BAe/Aerospatiale Concorde




F-4 Phantom



BAe Victor 2



BAe MDC GR Mk 5 Harrier II



Saab Lansen



MDC/BAe AV8B Harrier II



Saab Draken




Italian/Brazilian AMX




Gulfstream III




BAe HS 125




Douglas DC-8/40



Gulfstream II



MDC T-45 Goshawk




BAe Hawk




Boeing 757



Fokker 100



BAe/Rombac One-Eleven




GD Convair 600



Aerospatiale Caravelle



Gulfstream I



Short/Bellanca



Aeritalia G222




Transall C-160



Fokker F27/Fairchild FH227



NAMC YS 11




BAe Viscount




BAe Harrier



Vought A-7




Agusta-Bell 204B




Westland 30




Westland Lynx



Westland Commando



Agusta A129 Mangusta



Gas and oil pumpjack



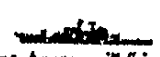
BAe Sea Dart




BAe/Ferranti Bloodhound



Offshore platform tower




"Dat-Assnwar" frigate



"Fatahilla" class corvette



"Niteroi" class frigate




Type 21 frigate




"M" class frigate



"Mako 300" class frigate



"Kortenaer" class frigate



Type 42 destroyer



"George Leygues" class destroyer



"Tromp" class destroyer



Type 23 frigate



"Vulcan" class



"Resolution" class

The Supply Group, employing some 10,000 people, is responsible for the domestic manufacture and external procurement of components for all Company requirements. Manufacturing facilities throughout the country are under the central direction of the Main Board Director responsible for Supply.

The substantial growth in demand for component parts from the Civil Engine Group, evident in 1984, continued throughout 1985. Although it resulted in the most significant step change in output requirement for many years, the programme was achieved in all areas. There was a smaller increase in the requirements from the Military Engine Group and this was also met, with a significant improvement in the timing of component delivery.

Further substantial progress was made during 1985 to improve productivity through use of the latest manufacturing technology and the rationalisation of products requiring manufacture inside Rolls-Royce.

In Derby the first computerised creep-feed grinding centre has now been fully commissioned and is being used for the manufacture of turbine blades for RB211 and Tay engines. Concurrently a similar but larger installation is at an advanced stage of commissioning for the manufacture of turbine blades for the increasing military engine programme. The advanced integrated manufacturing system (AIMS), for wheels and discs, was officially opened by the Prime Minister, the Rt Hon. Mrs Margaret Thatcher MP, on January 29, 1986. It utilises automatic guided vehicles and computer controlled storage facilities.

At Hillington revised and more cost effective methods for the forging of compressor blades have been



used for the production of blades for CF6-80C2 engines. Planning is now well advanced for a cell to automate the production of variable vanes for the CF6-80C2 and V2500 engines.

Manufacture of the advanced wide-chord fan blade has continued in the Barnoldswick factory. Improved facilities for the manufacture of RB211-535H4 blades were completed on plan and subsequently extended for the manufacture of early development sets of wide-chord blades for the V2500 engine. Through the use of this facility early development blades of exceptionally high quality were shipped to Japan ahead of schedule. A further extension of wide-chord fan blade manufacturing facilities is planned to increase capacity

inside the Company to meet production needs for RB211-535H4, V2500 and RB211-524 blades.

The fully automated 360 degree electro-chemical machining system for small compressor blades is now operational at Bristol. A further development during 1985 was the installation of an advanced creep-feed grinding cell for the manufacture of large turbine stators (nozzle guide vanes) for civil engines.

Investment in new machine tools is continuing within the framework of the Company's corporate manufacturing strategy. Major initiatives started during 1984 to improve quality and reduce non conformance have been successful and significant reductions in scrap and

*Left: Rolls-Royce's AIMS facility in Derby's No 1 shop, opened by Britain's Prime Minister, The Rt Hon Mrs Margaret Thatcher MP, on January 29, 1986 (see also picture far right).*

demonstrate what is being done within Rolls-Royce both to improve quality and reduce costs. The conference is being followed up by formal modular training within supplier companies.

In response to difficulties experienced in raw material procurement during 1985, a specification and size rationalisation programme has been launched and, where necessary, buffer stocks established. Improvements were also achieved during 1985 in the application of micro computers and terminal-based systems. These have contributed to improved inventory utilisation and delivery performance. Continued reduction in manufacturing lead times and associated improvements in stock turnover remain a key priority.

In 1984 the factories were still seeking to balance manpower reductions with work schedules, but in 1985 the emphasis has been on improving the effective use of people to cope with the much increased workload. A prime objective has been to increase the number of direct producers through redeployment from indirect overhead occupations.

The size of the increase in the manufacturing task also required external recruitment at most sites and Supply Group manpower increased by over 400 during 1985. The Derby factories absorbed most of this external recruitment and were still seeking additional skilled employees at the year end.

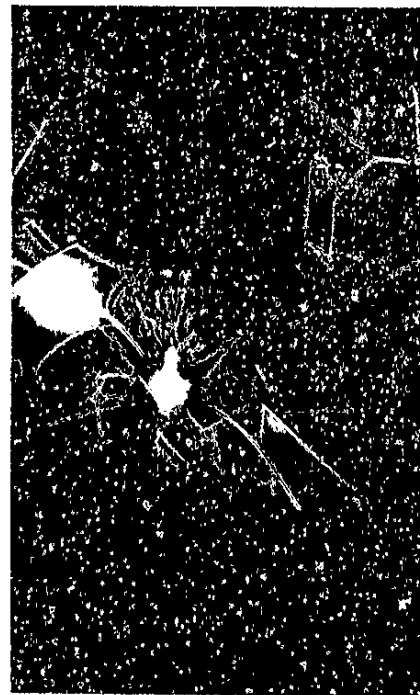
New investments and improvements in methods, performance and systems played an important part in the achievements of 1985. These would not, however, have been possible without the continued understanding and co-operation of employees throughout the Supply Group.

rework costs have been achieved. An important element has been the strong links which have been created between Supply and the major design groups during the past two to three years. Quality circles and other groups involving all levels of personnel have actively contributed to the achievement of improved quality. More than 3,000 such meetings were held throughout the Company during the year.

In 1985 significant progress was made in rationalising the network of suppliers to the Company, concentrating on groups of components manufactured externally. A further major quality initiative has been undertaken with suppliers and in October a conference was held to



*The Prime Minister is pictured with (left to right), F. T. Salt, Director Supply, R. H. Robins, Managing Director, Sir Francis Tombs, Chairman and A. Jackson, Facility Manager - Derby Machining.*



*Advanced laser techniques are used by Rolls-Royce to apply a hard coating strip to to admiting faces of fuel nozzles.*

The Group continued to extend the technology the Company needs in order to offer competitive and cost effective engines to its customers in the years ahead.

Excellent progress has been made with demonstrator programmes to reduce the cost of developing new engines. These prove the effectiveness of technology advances before they are applied to a new engine which is committed to full-scale development and production. This procedure cuts costs and programme delays caused by unexpected technical problems. This 'up-front' testing of technology advances for new engines has significantly reduced their overall engineering cost. Further savings are envisaged in the future.

The Group has also been engaged in project work aimed at the development of advanced new engines for transport aircraft. These include a new turboprop design, designated the RB550, for current and planned commuter aircraft with 50 to 70 seats. Its design is based on the core of the RTM322 helicopter engine, developed jointly with Turbomeca following the RTM321 demonstrator programme. Outstanding reliability will be provided by the RB550, which draws on the latest technology from the Company's demonstrators. This shows an economy of engineering effort resulting from the declared aim of using the research and demonstrator programmes in as many products as possible.

Looking further ahead, the Company is playing a major part in the search for large improvements in the fuel economy of propulsion systems. Possibilities range from open-rotor concepts, widely known as propfans, to ducted-rotor engines with very high bypass ratios, which will be required if underwing engine installations are to be retained. Investigation of both concepts is showing encouraging results. The Company is committing considerable technical resources to this work which is aimed at the possible start of full-scale production during the 1990s. It has included the construction of a new test facility for gearboxes transmitting up to 15,000 hp; such gearboxes may be required for future propfan engines.

On the military side the XG20 demonstrator programme has provided the technology which is being applied to enhance, by 20 per cent, the performance of RB199 engines for Tornado aircraft. Production engines with these performance advances could be in service in the late 1980s.

Another military demonstrator tested in 1985 was the XG15. It has demonstrated the technology which will improve the performance of the Pegasus engine for the Harrier II V/STOL aircraft. The XG15 incorporates an improved turbine and fan. As a result of this programme, a new version of the Pegasus is now being designed, which will provide an extra 3,000 lb of vertical thrust in hot-weather conditions.

For several years the corporate engineering group has also been developing the engine technology needed for Europe's new fighter aircraft for entry into service in the 1990s. High performance components have been designed and tested,



*A test is made on the advanced compressor for the XG40 demonstrator. This will prove engine technology for Europe's new agile fighter for the 1990s.*



...ed compressor  
... This will power  
...e's new engine

and the advanced XG40 demonstrator engine will make its first run in 1986. Testing of a new fan and the XG40 compressor began in 1985. The proposed high-performance engine for this new fighter will be produced by a group of European companies including MTU and Fiat Aviazione, partners with Rolls-Royce in the RB199 engine programme for Tornado aircraft. The new engine is expected to draw extensively on Rolls-Royce technology advances.

Other research programmes cover all aspects of engine construction and behaviour. It is essential to obtain accurate information about flow conditions and clearances inside engines in order to improve component efficiencies, which are already very high. This has put emphasis on aerodynamic and thermodynamic work to establish precisely what is happening inside an engine. Advanced techniques of flow visualisation and measurement have been developed for this purpose, including laser anemometry and X-ray examination of running engines.

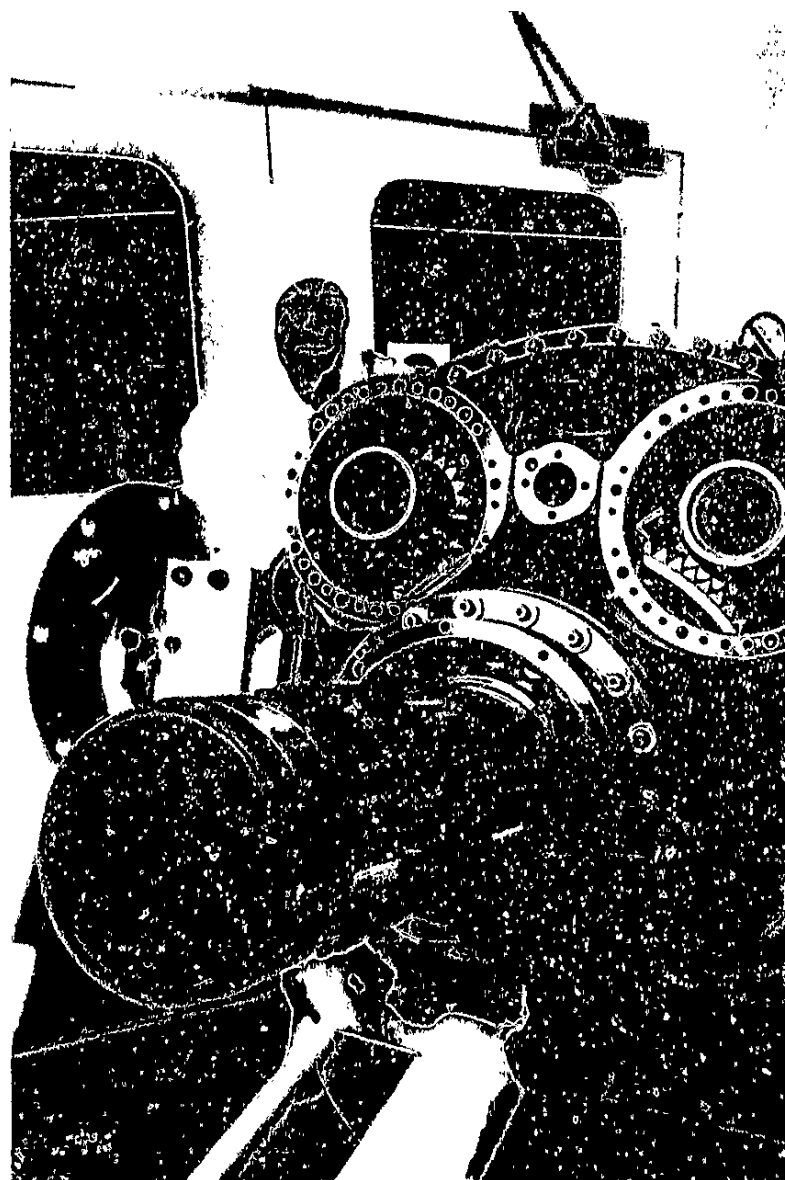
In 1985 the Rolls-Royce team which developed this X-ray technique received the prestigious MacRobert Award for their achievement. They are now also working to apply cold-neutron and isotope techniques to study the flow of fuel and oil in running engines.

During 1985 the Group increased its work on advanced materials. This is aimed at obtaining the greatest possible benefits which new and projected materials can bring to the performance of Rolls-Royce engines. Advances in the capabilities of metal alloys are applied to improve engine performance and reduce weight; other new materials increasingly used include carbon fibre composites and "Kevlar."

Other advances are being made through the wider application of computer techniques to engine research, design, development and manufacture. Increases in computing power have made it possible to link the stages in the evolution of an engine more closely than in the past, thus streamlining the processes and reducing costs.

The widespread application of computer-aided design and computer-aided manufacture has contributed significantly to cost-effective engine design, development and manufacture. Computing power within corporate engineering has

Rolls-Royce has built a new  
gearbox transmitting up to



been doubled and the application of vector processing has made it possible to complete complex calculations ten times faster than in the past. As a result it is now possible to design parts more rapidly and efficiently than could be done previously, as well as to eliminate a considerable amount of expensive test work.

Computer simulations are used to study the effect of bird impact on a new design of fan blade before it has been built. In the past it was necessary to manufacture and test a blade and subsequently modify it if it did not effectively withstand the impact.

Computer design techniques, allied to advances in fundamental knowledge, have also made it possible to design and develop engine components faster and more efficiently than in the past.

There is more advanced technology in air-cooled turbine blades than in any other part of an aero-engine. A typical blade with a working surface only four inches long extracts 500hp from the hot gas stream which drives it; this gas is hotter than the melting point of the blade material which also has to contend with a centrifugal load of several tons. Advanced techniques of internal and surface cooling, linked to the latest manufacturing methods, permit such blades to be operated for thousands of hours and to fly up to five million miles for the most widely used version of the RB211.

Powerful computer techniques and better knowledge about heat transfer have cut the time needed to design and develop these complex air-cooled turbine blades. Since the early 1970s the ratio of development to design costs has been reduced by over 70 per cent. The latest designs of blade need many fewer changes than their predecessors when tested, even though they are much more advanced; this saves both time and money.



*Top: Pulsed-laser techniques are used to measure gas temperature inside engines. This permits checks on computer predictions for high temperature engine parts*

*Above: Computer aided design and manufacture (CAD/CAM) enable engines to be designed and manufactured more efficiently than in the past*

*Left: Computer calculations allow bird strike damage to a fan blade to be assessed at the design stage. Here, a computer-generated image is compared with the actual damage seen in bird strike test*



With the commissioning of HMS Tireless on 5 October 1985, the nuclear submarine flotilla of the Royal Navy now totals 14 hunter-killer and 4 Polaris submarines. Rolls-Royce and Associates Limited continues to support this important element of Britain's defence capability through its staff at Rosyth, Devonport and Faslane, backed up by the extensive facilities at Derby, management of the Naval Reactor Test Establishment at Dounreay and a wide network of British sub-contractors.

A major event during the year was the movement of the Advanced Submarine Prototype (PWR2) from its construction berth at Barrow to a new test site at Dounreay. This 2,470 ton facility was moved by barge to Sandside Bay, Caithness, and then overland for 1.25 miles to the test site – a unique engineering feat, which was carried out on programme and within the planned cost. Work is now continuing to complete and commission this prototype of the new propulsion system which will power the next generation of the Royal Navy's nuclear submarines.

At the end of 1984, the first submarine prototype was shut down and de-fuelled after a most successful demonstration of its extended lifetime capability. Since then, work has begun on the conversion of the original prototype to an advanced test facility to demonstrate the safety of some features of reactor operation. This work, together with the commissioning and operation of the new advanced prototype, is expected to ensure the future of the Dounreay site for the next decade.

The repair and overhaul business in 1985 continued at approximately the same level as in previous years, contributing significantly to Company turnover.

Following a competitive tender, the facility at East Kilbride, Scotland, was awarded the contract by the United States Department of Defense to overhaul modules from TF34 engines installed in A10 ground-attack aircraft. This breakthrough heralds the prospect of significant further work from other equipment operated by the United States Air Force in Europe. The competitive tender issued by the UK Ministry of Defence for maintenance support of the Dart engine has also been won.

Among new commercial customers are British Midland Airways for Darts powering their Viscount and F27 fleet and Swissair and KLM for Tays for Fokker 100 airliners.

A powerful factor in the cost of engine maintenance is the ability to repair worn components safely and economically. In this field the Company is investing in new technology and equipment in order to provide a competitive parts-repair service for the gas turbine industry. Management of this important element of the repair business has been reorganised and strengthened.

Profitable growth of the Rolls-Royce repair and overhaul business is being sought and diversification into non Rolls-Royce engines is underway. Computerisation is being exploited in areas of configuration data management, work planning and scheduling, and inventory management and control. These strategies, together with the development of 'in-house' skills will ensure the Company's continued success in this highly competitive field.



Seven Rolls-Royce plants in Britain, Brazil and Canada provide repair and overhaul services on 27 engine types.



During 1985 the prototype plant for the Royal Navy's next generation of nuclear submarines was moved from Barrow to Dounreay. Here it is being moved overland in the last stage.



A substantial part of Rolls-Royce's business is generated outside the UK, and users of the Company's aviation, marine and land-based products have therefore to be supported on every continent.

In addition to the employment overseas of over 300 service representatives, Rolls-Royce has established a number of regional offices whose staff work with UK-based personnel in promoting the sale of the Company's products and maintaining essential relationships with customers. These offices are located in the USA, Canada, Brazil, France, the Middle East, India, Hong Kong, Singapore, China, Japan and Australia.

Rolls-Royce also retains a worldwide network of advisers and correspondents who provide up-to-date information on local economic and political issues and assist in identifying new business opportunities.

In the USA, Canada, and Brazil over 3,000 people are employed by operating subsidiary companies in a variety of activities principally but not entirely related to the aerospace industry.

#### **United States**

The USA is the biggest and most significant civil aviation market in the world, while the American defence budget dwarfs that of other western nations.

Rolls-Royce has for many years maintained a presence in the United States, and this is currently reflected in Rolls-Royce Holdings Inc. and its operating subsidiary companies, Rolls-Royce Inc. and Rolls-Royce Credit Corporation. These companies have their headquarters in Greenwich, Connecticut, but also maintain marketing groups and operational units in other key locations in the United States.

The Rolls-Royce Inc. product support group based in Atlanta is responsible for liaison with over 600 customers in North and Central America, Mexico and the Caribbean. These customers operate more than 1,250 Rolls-Royce powered airliners and business aircraft. Strong support is also provided to the US military authorities on such programmes as the Pegasus for the US Marine Corps AV8B Harrier, the TF 41 for the US Air Force and US Navy A-7 Corsair, the Adour for the US Navy T-45 Goshawk and the Spey for the US Air Force C20A.

Overall local management of the US military business is centred in Washington DC, so that close liaison can be maintained with the US Department of Defense and the headquarters of the user services.

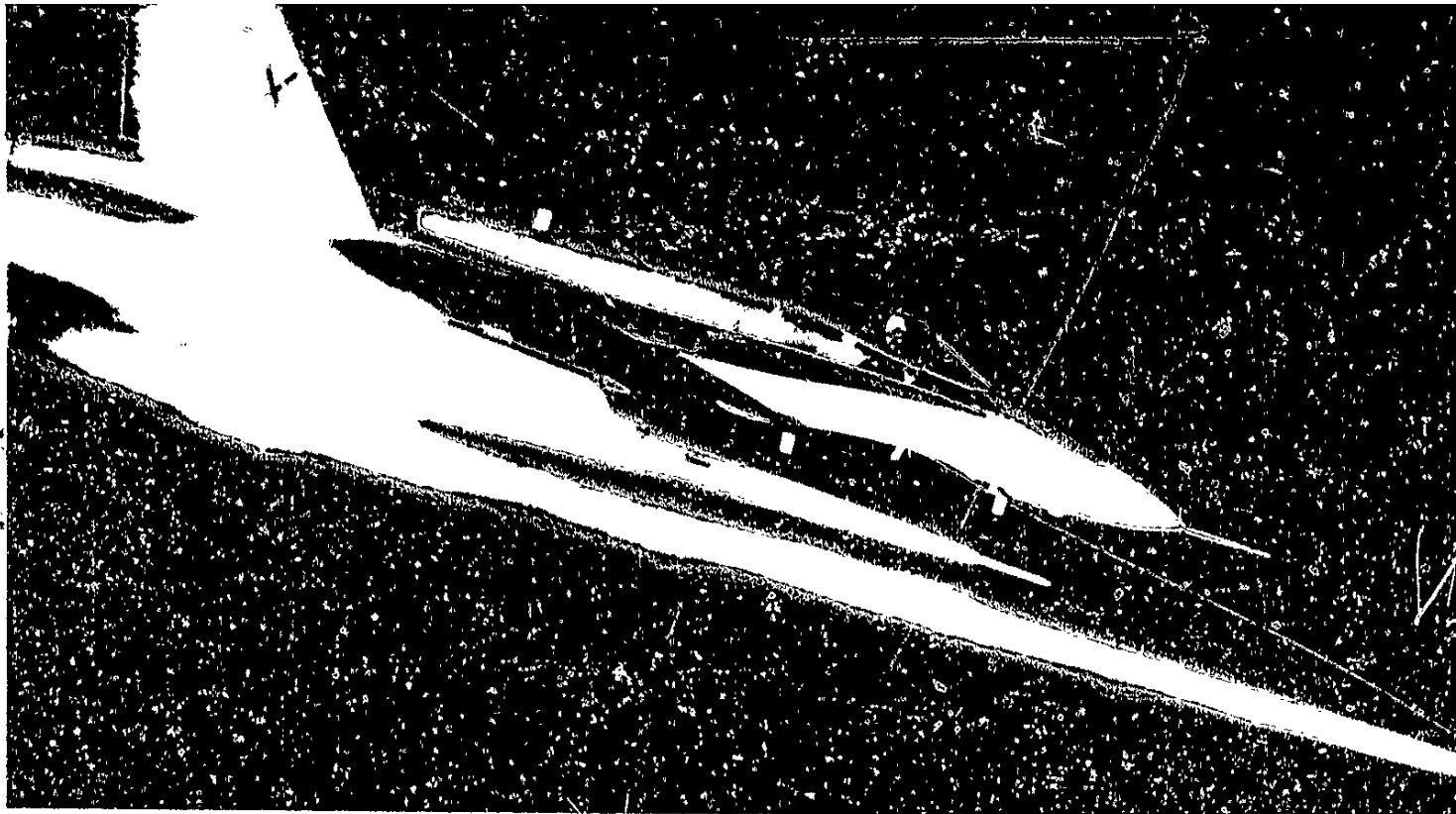
Atlanta is also the headquarters of the Rolls-Royce Inc. engineering group whose research activities continue to broaden. These include advanced high-speed propulsion studies, the development of three-dimensional computer simulation of turbine heat transfer and advanced balancing techniques.

The Miami machining facility increased both its production capability and its output during 1985, and is providing sub-contract support to the US aerospace industry.

The SK30 gas turbine generating set for the Dade County cogeneration project has been delivered and is installed in the Florida facility for completion and commissioning in late 1986.



*Rolls-Royce has more than 300 product-support staff based worldwide to assist engine operators.*



### Canada

On January 1, 1985 the Canadian companies established a new corporate name, Rolls-Royce Industries Canada Inc., in order to reflect more accurately the group's activities.

Bristol Aerospace Limited, based in Winnipeg and with over 1,400 employees, is the largest company in the group. Its activities include the development and manufacture of upper-atmosphere rocket research vehicles and air-to-ground missiles and the manufacture and overhaul of gas turbine, airframe and nuclear reactor components. It also undertakes the repair and overhaul of military aircraft and helicopters. The manufacture of remotely positioned weather stations is another activity which demonstrates the company's electronics expertise.

Rolls-Royce (Canada) Limited employs some 700 people at its base in Montreal. It provides North American airlines, military and corporate aircraft operators with competitive automotive facilities for engine repair and overhaul. The company also manufactures and overhauls industrial gas turbines.

To broaden these facilities, the company is constructing a new test

cell to be completed in 1986. It will be used for Tay engine overhaul activities resulting from the entry of the Gulfstream IV business jet and Fokker 100 airliner into service in North America.

Industrial RB211 and industrial Avon gas turbine sales by the Montreal-based Rolls-Royce Industrial & Marine Limited increased in 1985. New export orders were taken for the United States, Australia, Denmark and Dubai.

### Brazil

Motores Rolls-Royce Limitada, located in Sao Paulo, employs over 400 people on repair and overhaul of a range of Rolls-Royce and other manufacturers' engine types. For the future this company will seek new manufacturing work including participation in the Brazilian share of the Spey 807 power plant for the Italian-Brazilian AMX fighter. Also associated with this project, Rolls-Royce has a technical assistance agreement with CEFMA, the Brazilian aero-engine company. This provides for Rolls-Royce to supply consulting and technical support services in a range of manufacturing disciplines and personnel training

*Air-to-ground rockets - such as the CRV pictured above - are developed and produced by Bristol Aerospace at Winnipeg.*

*An engine on test at Motores Rolls-Royce, Sao Paulo - the company repairs and overhauls a wide range of engine types.*



Rolls-Royce has a long tradition of involving employees in the conduct of its affairs. Every effort is made to develop this further.

### **Communications**

Many different media are used to ensure that employees are informed about significant developments within the Company and in the aero-engine business worldwide. One such medium is *Rolls-Royce News*, a monthly newspaper available free to all employees. This in-house newspaper covers all aspects of the business including the activities of Rolls-Royce employees.

Another medium is the loud-speaker system and this is used particularly for the communication of new orders and 'stop press' developments. Communication of a less immediate kind is achieved in many areas and functions by local periodic newsletters and other briefing documents. Other areas continue to communicate orally through local briefing groups.

Right across the Company employees are directly briefed on an annual basis concerning the Company's sales, financial performance and business prospects. Typically these briefings take the form of a video message given by the appropriate Executive Director and this is followed by a presentation by local senior management. Employees are encouraged to ask questions and if these cannot be answered on the spot, the questioner is assured of receiving a reply very quickly following the presentation.

### **Consultation**

The Company has for many years been committed to joint committees for the promotion of consultation concerning the business. Across the sites management and union representatives hold some 150 consultative

meetings annually. These committees are designed to provide two-way communication of information, ideas and viewpoints between management and unions concerning the Company's achievements, problems and opportunities.

These meetings take place at site level which is where, by corporate policy, most issues of employee relations are resolved.

The Company has, however, developed over the years a central Forum which is attended by the Company's most senior management and by more than 100 representatives of works and staff unions from all sites.

Management presentations on corporate issues are followed by questions, comment and debate. So far seven such sessions, each spanning two days, have taken place. The format and content will continue to evolve but the Forum is now firmly established as a highly valuable and valued opportunity for consultation face to face.

### **Involvement**

Important as communication and consultation are, they do no more than provide a framework within which employee involvement can thrive. The Company seeks to encourage employees, not just through suggestion schemes, but as a normal function of their daily working lives, to contribute their thoughts and ideas to improve the efficiency and secure the success of the enterprise.

### **Pension Fund**

Membership of the pension fund is a condition of employment. The Board of Trustees comprises four trustees plus a Chairman appointed by the Company and four staff and four works trustees who are directly elected by employees.

### **Training**

The Company is committed to providing cost-effective training which is clearly identified with, and supportive of, current and future business requirements. To achieve this objective the Company provides training in four main areas:

- for new recruits and those promoted to new positions
- for those whose jobs will be affected by technological or organisation changes
- for employees to achieve optimum performance in their jobs
- for long term development through a range of formal training schemes and apprenticeships which will prepare all types of employees for their future careers.

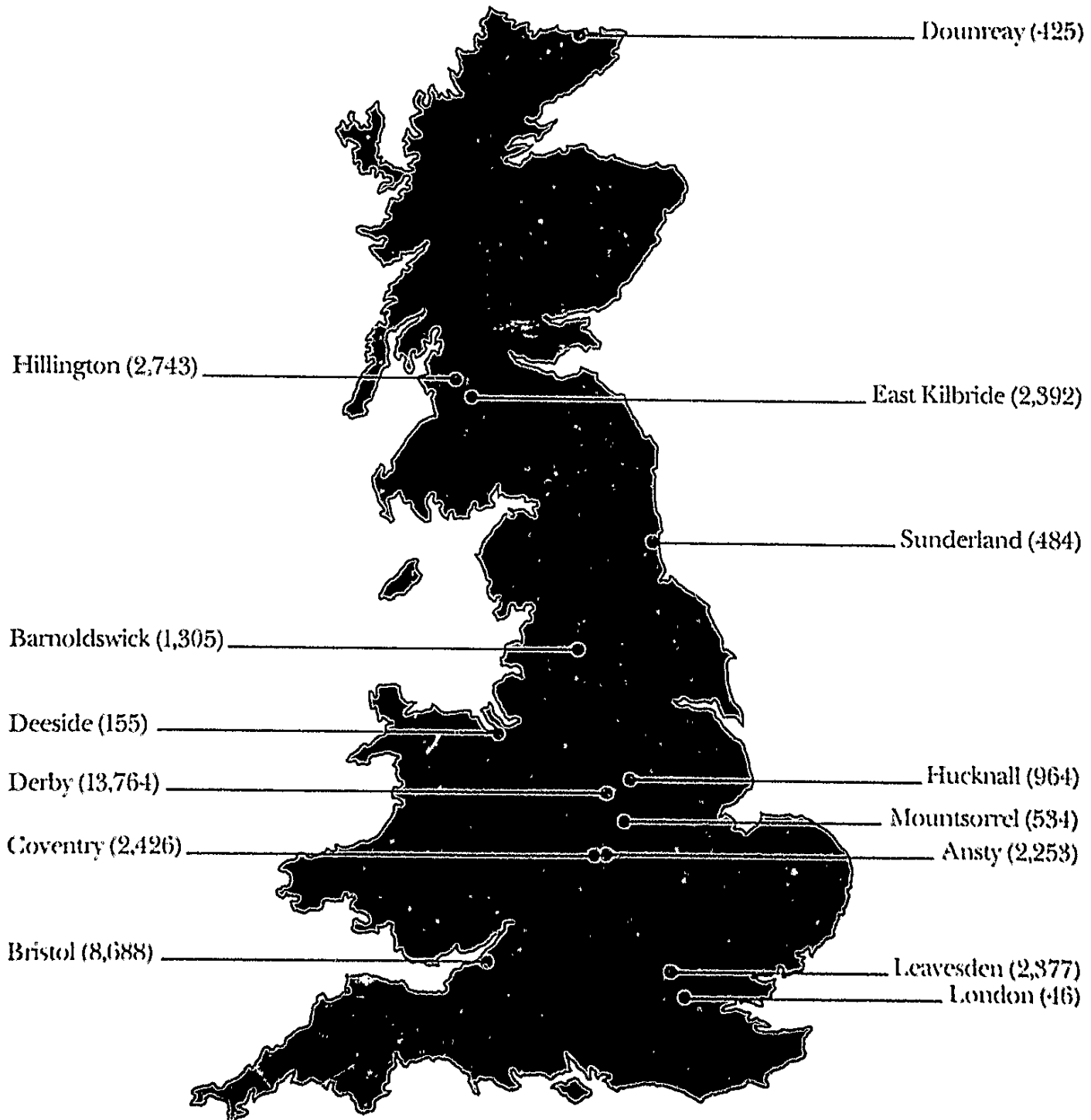
As at December 31, 1985 there were 1,100 full time trainees in the Company. In 1986 the Company expects to recruit over 500 school, college and university leavers to the training and apprenticeship schemes.

### **Health and Safety**

New initiatives in 1985 included a review of health and safety controls of maintenance work throughout the Company's factories in co-operation with the Factory Inspectorate; significant resource was also given over to investigating the health and safety factors of robotisation – which continues to develop within the Company.

The structure of safety committees continues to serve the Company well. These committees cover all operating units and ensure full consultation with employee representatives on health and safety issues. A major input to this work results from the activities of the trade unions' safety representatives who act for both manual and staff employees.

# UK LOCATIONS AND NUMBERS EMPLOYED at December 31, 1985



# REPORT OF THE DIRECTORS

## Principal activities

The Company's principal business is the design, development, manufacture and sale of gas turbine engines and ancillary equipment for aircraft and for industrial and marine applications.

Subsidiary companies include Rolls-Royce and Associates Limited which designs, develops, procures and supports nuclear steam-raising plant for naval purposes. Other subsidiary companies are mainly involved in the manufacture of aerospace and related products and in providing sales and service support of the Company's products overseas.

## Results for the year

Turnover for the year was £1,601m (1984 £1,409m), including direct exports of £712m (1984 £519m).

Profit before taxation was £81m (1984 £26m). The directors do not recommend the payment of a dividend and the net profit of £77m (1984 £20m) has been retained.

A review of the year's operations, research and development activities and future prospects is contained in the Chairman's Statement and in the Review of Activities.

## Fixed assets

Expenditure on fixed assets during the year amounted to £48m (1984 £26m), mainly in respect of gas turbine manufacturing and engineering facilities.

Professional valuations of Group properties were obtained during the year. Details are given in note 13 to the accounts.

## Subsidiary and related companies

In October 1985 the Company increased its interest in Deeside Titanium Limited from 20 per cent to 82½ per cent.

## Share capital

During the year the nominal value of the issued share capital was reduced from £508m to £127m. £372m of the reduction was used to eliminate the deficit on the Company's Profit and Loss Account at December 31, 1984 and the balance of £9m was credited to a non-distributable reserve.

At the same time, the authorised share capital was reduced from £600m to £150m.

## Re-registration as a public company and adoption of new Articles of Association

It is planned that the Company will shortly register as Rolls-Royce plc and adopt new Articles of Association.

## Employees

The number of Group employees at the end of the year was 41,700 (1984 40,900).

## Employee involvement

Company policy on employee involvement is outlined on page 24.

## Disabled persons

The Company's policy continues to be to provide, wherever possible, employment opportunities for disabled people, to look after employees who become disabled and to make the best possible use of their skills and potential.

## Donations

No political donations were made by the Company or its subsidiaries. Charitable donations amounted to £13,500 (1984 £45,000).

## Directors

The directors listed on page 27 were in office throughout 1985 apart from Mr H. G. Mourgue (appointed May 1, 1985), Mr S. C. Miller (appointed October 10, 1985), Sir Philip Shelbourne (appointed January 1, 1986) and Sir Robin Nicholson (appointed April 1, 1986).

Sir Peter Thornton resigned from the Board on June 20, 1985, Sir St John Elstob on October 11, 1985 and Mr P. J. Molony on December 31, 1985.

None of the directors of the Company at December 31, 1985 had, during the year, any interests in the shares or debentures of the Company or any of its subsidiaries.

## Auditors

A resolution to re-appoint the auditors, Coopers & Lybrand, will be proposed at the Annual General Meeting.

By order of the Board

*Anthony Warrington*  
Anthony Warrington  
Secretary  
April 10, 1986

## BOARD OF DIRECTORS

as at April 1988

### Chairman

Sir Francis Tombs

### Managing Director

R. H. Robins

### Executive Directors

S. L. Hugginbottom CBE  
Chairman, Rolls-Royce Inc.

J. O. Ken  
Director, Civil Engines

S. C. Miller  
Director, Corporate Engineering

J. A. Rigg  
Director, Finance

F. T. Salt CBE  
Director, Supply

J. D. Wragg  
Director, Military Engines

### Non-Executive Directors

Sir Arnold Hall

Air Chief Marshal Sir Douglas Lowe  
CBE DFC AFC

H. G. Mourgue

Sir Robin Nicholson

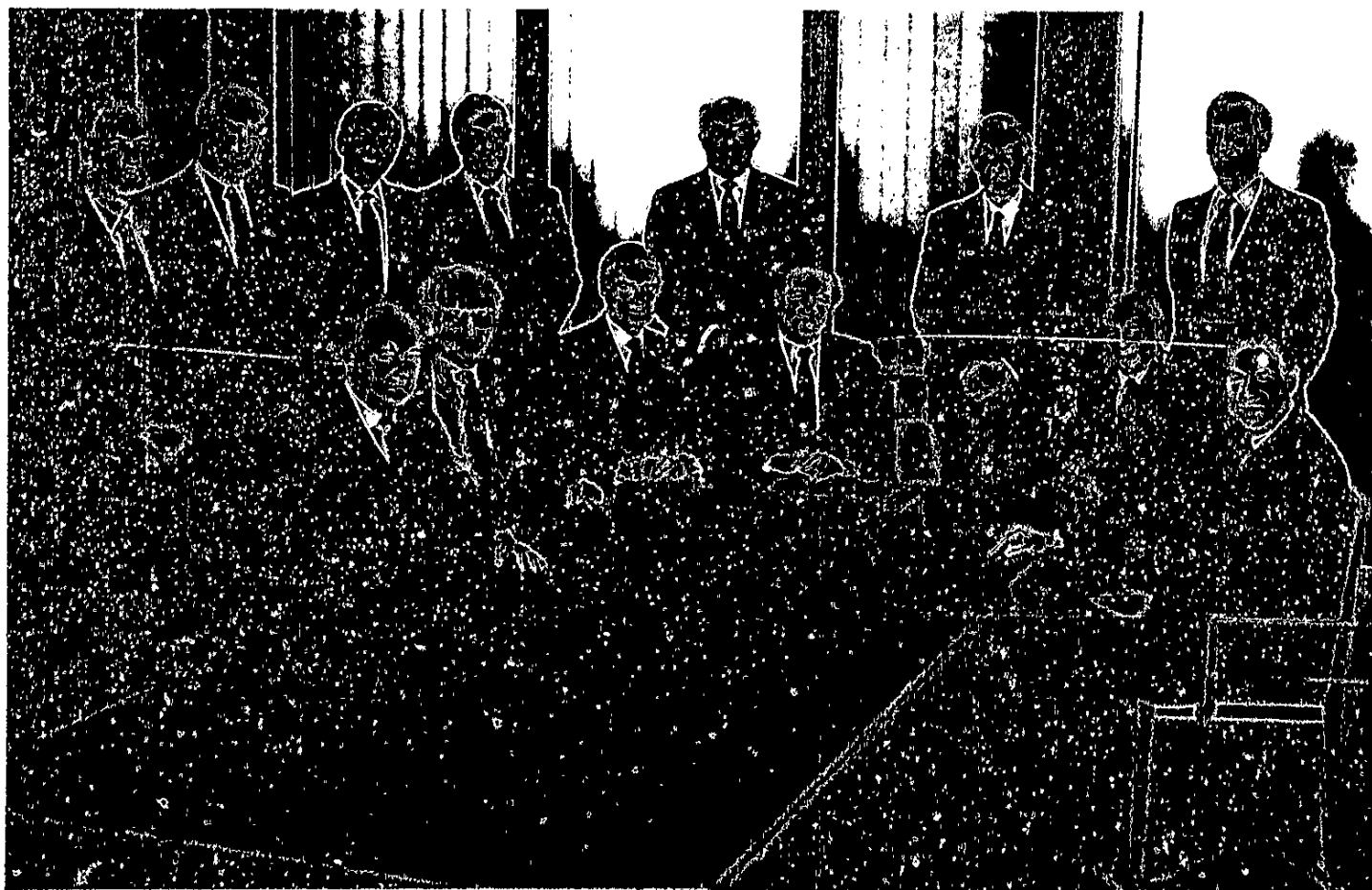
Sir Philip Shelbourne

### SECRETARY

Anthony Warrington

### REGISTERED OFFICE

65 Buckingham Gate,  
London SW1E 6AT



*The Board of Rolls Royce Limited photographed on March 13, 1986. Seated (left to right): Sir Philip Shelbourne, H. G. Mourgue, R. H. Robins, Sir Francis Tombs, Sir Arnold Hall, Air Chief Marshal Sir Douglas Lowe. Standing (left to right): A. Warrington (Secretary), S. C. Miller, J. O. Ken, J. D. Wragg, S. L. Hugginbottom, F. T. Salt, J. A. Rigg*

# CONSOLIDATED PROFIT AND LOSS ACCOUNT

for the year ended December 31, 1985

	Notes	1985 £m	1984 £m
Turnover	2	1,601	1,409
Cost of sales		(1,235)	(1,104)
Gross profit		366	305
Commercial, marketing and product support costs		(77)	(71)
General and administrative costs		(78)	(72)
Operating profit	2	211	162
Research and development (net)		(100)	(101)
Interest payable and similar charges	3	(29)	(35)
Share of losses in related companies		(1)	-
Profit on ordinary activities before taxation	4	81	26
Taxation	7	(3)	(5)
Profit on ordinary activities after taxation		78	21
Attributable to minority interests		(1)	(1)
Profit attributable to Rolls-Royce Limited	10	77	20

	1985 £m	1984 £m
Statement of retained profits (losses)		
Accumulated deficit at January 1 as previously reported	(316)	(341)
Prior year adjustment (see note 10 on page 37)	(4)	(4)
As restated	(320)	(345)
Elimination of the January 1 Company deficit as a result of the share capital reduction (see Report of the Directors on page 26)	372	-
Profit for the year	77	20
Foreign exchange translation adjustments	(17)	2
Transfer from revaluation reserve of depreciation charge attributable to revaluation surplus	4	3
At December 31	116	(320)

The Company profit and loss account is not shown – Section 228(7) Companies Act 1985

The notes on pages 31 to 47 form part of these accounts

The auditors' report is on page 47

# BALANCE SHEETS

at December 31, 1985

	Notes	Consolidated 1985 £m	1984 £m	Company 1985 £m	1984 £m
<b>Fixed assets</b>					
Tangible assets	11 & 12	383	381	306	291
Investments:					
Shares in group companies	14	—	—	22	38
Shares in related companies	15	—	1	—	1
		<u>383</u>	<u>382</u>	<u>328</u>	<u>330</u>
<b>Current assets</b>					
Stocks	16	578	511	523	450
Debtors	17	227	258	224	240
Cash at bank and in hand		33	31	1	10
		<u>838</u>	<u>800</u>	<u>748</u>	<u>700</u>
<b>Creditors – amounts falling due within one year</b>					
Bank loans, overdrafts and other borrowings	18	(180)	(101)	(142)	(54)
Other creditors	19	(379)	(359)	(354)	(346)
		<u>279</u>	<u>340</u>	<u>252</u>	<u>300</u>
<b>Net current assets</b>					
		<u>279</u>	<u>340</u>	<u>252</u>	<u>300</u>
<b>Total assets less current liabilities</b>		662	722	580	630
<b>Creditors – amounts falling due after more than one year</b>					
Bank loans and other borrowings	20	(62)	(186)	(52)	(184)
Other creditors	21	(118)	(95)	(116)	(76)
		<u>403</u>	<u>325</u>	<u>345</u>	<u>265</u>
<b>Provisions for liabilities and charges</b>	22	(79)	(116)	(67)	(105)
		<u>403</u>	<u>325</u>	<u>345</u>	<u>265</u>
<b>Capital and reserves</b>					
Called up share capital	23	127	508	127	508
Revaluation reserve	8	147	132	141	127
Other reserves	9	9	—	9	—
Profit and loss account	10	116	(320)	68	(370)
		<u>399</u>	<u>320</u>	<u>345</u>	<u>265</u>
Minority interests		4	5	—	—
		<u>403</u>	<u>325</u>	<u>345</u>	<u>265</u>

Francis Tombs }  
J A Rigg } Directors  
April 10, 1986

*Francis Tombs*

*J A Rigg*

The notes on pages 31 to 47 form part of these accounts  
The auditors' report is on page 47



**CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS**  
for the year ended December 31, 1985

	1985 £m	1984 £m
<b>Source of funds</b>		
Profit before taxation	81	26
Adjustments for items not involving the movement of funds:		
Depreciation	50	45
(Decrease) in provisions for liabilities and charges excluding deferred taxation	* (38)	(12)
	<u>93</u>	<u>59</u>
Increase (decrease) in creditors falling due after more than one year	23	(20)
Foreign currency translation adjustments	(7)	(6)
Disposals of tangible fixed assets	12	1
Miscellaneous items	<u>-</u>	<u>(2)</u>
	121	32
<b>Application of funds</b>		
Capital expenditure	* (56)	(26)
Tax paid	<u>(6)</u>	<u>(3)</u>
	59	3
<b>Changes in net current assets</b>		
Increase in current creditors excluding corporate taxation	* 21	119
(Increase) in stocks, net of progress payments	* (67)	(6)
Decrease (increase) in debtors excluding corporate taxation	* 34	(22)
	<u>47</u>	<u>94</u>
<b>Change in net liquid assets and loans</b>		
Represented by:		
Increase in cash balances	* 2	16
(Increase) decrease in bank loans, overdrafts and other borrowings:		
amounts falling due within one year	* (79)	90
amounts falling due after more than one year	* 124	(12)
	<u>47</u>	<u>94</u>
<b>*Summary of the effects of the acquisition of Deeside Titanium Limited:</b>		
Fixed assets - net book value	8	
Stocks	2	
Debtors	4	
Creditors falling due within one year	(1)	
Bank loans, overdrafts and other borrowings	(12)	
Provisions for liabilities and charges	(3)	
Cash	4	
Net purchase value (see note 14 on page 41)	<u>2</u>	

The auditors' report is on page 47

## **1 ACCOUNTING POLICIES**

### **Basis of accounting**

The accounts on pages 28 to 47 have been prepared on the historical cost basis, modified to include the revaluation of land and buildings at December 31, 1985.

The Group's share of profits or losses of related companies is included in the consolidated profit and loss account. Any provisions for diminution in value of related company investments are made in the Company's profit and loss account.

### **Turnover and trading profit**

Turnover excludes value added tax and comprises:

- (i) Amounts invoiced to customers, including any foreign exchange effect of products priced in currencies other than sterling.
- (ii) Estimated sales values, where prices have not been agreed with customers.
- (iii) Income from licences and management fees.

Trading profit is taken at the time of sale; in the case of long-term contracts, profit is arrived at by reference to the estimated overall contract profitability.

### **Foreign currencies**

#### **(i) Company accounts**

Assets and liabilities in foreign currencies are translated into sterling on the following bases:

- (a) Borrowings and loans to subsidiary companies at the exchange rates ruling at the year end.
- (b) With effect from January 1, 1984, the Company designated certain foreign currency borrowings as a hedge against investments in overseas subsidiaries and consequently, from that date, such borrowings and related overseas investments are treated as foreign currency items. Accordingly, at each balance sheet date, the borrowings are restated at the sterling equivalent. The movement since January 1, 1984 in the sterling cost of acquiring the relevant subsidiaries is similarly restated in the Company's balance sheet.
- (c) Assets and other liabilities at the estimated sterling equivalent, account being taken of forward exchange contracts.

Differences, other than those referred to in (b) above, are charged or credited in determining profit on ordinary activities before taxation.

#### **(ii) Consolidated accounts**

- (a) Assets and liabilities of overseas subsidiaries are translated into sterling at the exchange rates ruling at the year end.
- (b) Turnover and profits or losses of overseas subsidiaries are translated at the average exchange rates for the year.
- (c) On consolidation, differences on exchange arising from the retranslation of the opening net investment in subsidiary companies, and from the translation of the profits or losses of those companies at average rate, are taken to reserves.
- (d) To the extent that foreign currency borrowings by the Company act as a hedge against the net assets of overseas subsidiary companies, the differences on exchange arising from the retranslation of those foreign currency borrowings are taken to reserves.

#### **(iii) General**

All other exchange differences are charged or credited in determining profit on ordinary activities before taxation.

## NOTES TO THE ACCOUNTS

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### 1. ACCOUNTING POLICIES (CONTINUED)

#### **Taxation**

Provision is made at the rate for the year for United Kingdom corporation tax, for overseas taxation on profits of overseas subsidiaries and for deferred taxation where a liability is expected to arise in the foreseeable future.

#### **Research and development**

Capital expenditure on research laboratories and plant is written off over its expected working life. All other research and development expenditure borne by the Company, net of contributions from Her Majesty's Government, is charged in the year of expenditure.

#### **Stocks**

Stocks are valued at cost of materials, labour and relevant manufacturing overheads, less provisions for obsolete and surplus items and, where necessary, provisions to reduce cost to estimated realisable value. Progress payments received are deducted from stocks up to the limit of the relevant work in progress. Other advance payments and deposits are included in creditors.

#### **Accounting for leases**

In accordance with Statement of Standard Accounting Practice No. 21, assets owned by third parties and finance leased from them have been capitalised at amounts equal to the original cost of the assets to the lessors and depreciation provided on the basis of Group depreciation policy. The future obligations under finance leases are included as liabilities in the balance sheet and the current year's interest element is charged to the profit and loss account.

The results for the year ended December 31, 1984 have been restated to reflect this change in accounting policy (see note 10 on page 37).

#### **Depreciation**

##### **(i) Properties**

Depreciation is provided on the valuation of properties adopted at December 31, 1980 and on the original cost of purchases since 1980 and is calculated on the straight-line basis over estimated lives advised by the Group's professional valuers. Depreciation is not provided on freehold land.

The estimated lives are:

- (a) Freehold buildings – 10 to 45 years (average 28 years).
- (b) Leasehold land and buildings – lower of valuers' estimate or period of lease.

##### **(ii) Plant and Machinery, Fixtures and Fittings**

Depreciation is provided on the original cost of plant and machinery, fixtures and fittings and is calculated on the straight-line basis over estimated lives in the range 5 to 14 years.

#### **Provisions**

Provisions are made for:

- (i) Likely future expenditure on warranties relating to sales up to the year end.
- (ii) Anticipated losses on current contracts.

# NOTES TO THE ACCOUNTS

## 2. TURNOVER AND OPERATING PROFIT

	1985			1984		
	United Kingdom £m	Overseas £m	Total £m	United Kingdom £m	Overseas £m	Total £m
<b>Turnover</b>						
Civil Aero	79	498	577	48	398	446
Military Aero	217	518	735	252	488	735
Industrial and Marine	56	87	143	48	74	122
Other activities	105	41	146	76	30	106
	<u>457</u>	<u>1,144</u>	<u>1,601</u>	<u>424</u>	<u>985</u>	<u>1,409</u>
<b>Geographical analysis:</b>						
North America		435			332	
Europe		391			400	
Asia		235			168	
Australasia		38			37	
Africa		22			25	
Other countries		23			23	
		<u>1,144</u>			<u>985</u>	
<b>Exports from the United Kingdom – Direct</b>		712			519	
– Indirect		313			370	
		<u>1,025</u>			<u>889</u>	
<b>Sales by overseas subsidiaries</b>		170			138	
<b>Parent Company sales to overseas subsidiaries</b>		(51)			(42)	
		<u>1,144</u>			<u>985</u>	
		1985			1984	
		£m			£m	
<b>Operating profit</b>						
Civil Aero		73			39	
Military Aero		110			111	
Industrial and Marine		20			6	
Other activities		8			6	
		<u>211</u>			<u>162</u>	

# NOTES TO THE ACCOUNTS

## 3. INTEREST PAYABLE AND SIMILAR CHARGES

	1985 £m	1984 £m
Interest payable on:		
Borrowings repayable within five years otherwise than by instalments	14	16
Other loans	14	16
Finance leases	6	6
	<u>34</u>	<u>38</u>
Less interest received	5	4
	<u>29</u>	<u>34</u>
Exchange differences on dollar borrowings	—	1
	<u>29</u>	<u>35</u>

## 4. PROFIT ON ORDINARY ACTIVITIES BEFORE TAXATION

	1985 £m	1984 £m
After charging		
Depreciation of owned tangible fixed assets	35	33
Depreciation of tangible fixed assets held under finance leases	15	12
Operating leases – Hire of plant and equipment	10	9
– Hire of other assets	7	6
Auditors' remuneration (1985 £0.6m 1984 £0.6m)		
After crediting		
Rentals receivable in respect of operating leases	5	4
Profit on sale of tangible fixed assets	5	1

# 5. EMOLUMENTS OF DIRECTORS AND SENIOR EMPLOYEES

The emoluments of directors, charged before arriving at operating profit, were:

	1985	1984
	£	£
Fees	37,300	41,000
Other emoluments, including pension contributions	549,300	501,400
Compensation for loss of executive office	110,000	-

The emoluments of directors and senior employees working wholly or mainly in the United Kingdom, excluding pension contributions, were:

## Chairman:

Sir Francis Tombs	55,900	-
Sir William Duncan	-	125,900
Sir Arnold Hall	2,700	4,000

Highest paid director	86,900	125,900
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Directors (other than the Chairman and the highest paid director):

Emoluments £	Number	Number
Nil to 5,000	3	-
5,001 to 10,000	3	6
10,001 to 15,000	1	-
20,001 to 25,000	-	1
40,001 to 45,000	-	1
45,001 to 50,000	-	1
50,001 to 55,000	1	2
55,001 to 60,000	2	1
60,001 to 65,000	1	-
65,001 to 70,000	1	-

## Senior employees:

Emoluments £		
30,001 to 35,000	36	24
35,001 to 40,000	19	21
40,001 to 45,000	13	5
45,001 to 50,000	7	1
50,001 to 55,000	2	-

## 6. EMPLOYEE INFORMATION

	Consolidated	
	1985	1984
	£m	£m
Staff costs		
Wages and salaries	452	418
Social security costs	34	33
Other pension costs	36	34
	<u>522</u>	<u>485</u>
Number of employees in the Group		
The average weekly number of employees during the year was:	Number	Number
United Kingdom	38,400	38,900
Overseas	<u>3,000</u>	<u>2,900</u>
	<u>41,400</u>	<u>41,800</u>

## 7. TAXATION CHARGE

	Consolidated	
	1985	1984
	£m	£m
United Kingdom deferred taxation	1	1
Group share of related company taxation	(1)	-
Overseas taxation	<u>3</u>	<u>4</u>
	<u>3</u>	<u>5</u>

A potential deferred taxation liability of £28m has not been provided in respect of the surplus arising on the revaluation of land and buildings as there is no present intention to dispose of any land and buildings.

No other potential deferred taxation liability existed at December 31, 1985.

## 8. REVALUATION RESERVE (NON-DISTRIBUTABLE)

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
At January 1	132	135	127	130
Depreciation charge attributable to revaluation surplus	(4)	(3)	(4)	(3)
Surplus arising on revaluation of land and buildings at December 31, 1985 (see note 13 on page 40)	<u>19</u>	<u>-</u>	<u>18</u>	<u>-</u>
At December 31	<u>147</u>	<u>132</u>	<u>141</u>	<u>127</u>

# 9. OTHER RESERVES (NON-DISTRIBUTABLE)

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Special reserve	<u>9</u>	<u>-</u>	<u>9</u>	<u>-</u>

In connection with the reduction in the nominal value of the Company's issued share capital, the Company undertook to the Court to set up a Special Reserve which is to remain in existence so long as there remains outstanding any debt or claim against the Company to which a creditor was entitled at the date of the capital reduction. Sums to be transferred to the Special Reserve include initially the credit balance of £9m arising from the reduction in capital (see Report of the Directors on page 26) and subsequently certain profits (or losses) after taxation arising from any future disposal of the Company's tangible fixed assets and investments in subsidiary and related companies held at December 31, 1984.

# 10. PROFIT AND LOSS ACCOUNT

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Accumulated deficit at January 1 as previously reported	(316)	(341)	(372)	(394)
Prior year adjustment (see below)	<u>(4)</u>	<u>(4)</u>	<u>2</u>	<u>2</u>
As restated	(320)	(345)	(370)	(392)
Elimination of the January 1 Company deficit as a result of the share capital reduction (see Report of the Directors on page 26)	372	-	372	-
Profit for the year	77	20	62	19
Foreign exchange translation adjustments	(17)	2	-	-
Transfer from revaluation reserve of depreciation charge attributable to revaluation surplus	<u>4</u>	<u>3</u>	<u>4</u>	<u>3</u>
At December 31	<u>116</u>	<u>(320)</u>	<u>68</u>	<u>(370)</u>

The Company's accounting policy for tangible fixed assets finance leased from third parties has been revised in 1985 and the corresponding figures for 1984 have been restated. The prior year adjustment included in 1985 is derived from the restatement of the following elements of the December 31, 1984 Balance Sheet:

	Consolidated		Company	
	Previously Reported	Revised	Previously Reported	Revised
	£m	£m	£m	£m
Tangible fixed assets	302	381	240	291
Stocks	521	511	450	450
Debtors	263	258	242	240
Creditors - amounts falling due within one year:				
Obligations under finance leases	-	(14)	-	(12)
Others	(345)	(345)	(334)	(334)
Creditors - amounts falling due after more than one year:				
Obligations under finance leases	-	(54)	-	(35)
Others	(41)	(41)	(41)	(41)
	<u>700</u>	<u>696</u>	<u>557</u>	<u>559</u>
Prior year adjustment (see above)		<u>(4)</u>		<u>2</u>



# 11. TANGIBLE FIXED ASSETS - CONSOLIDATED

	Land & buildings (see note 13 on page 40)	Plant & machinery	Fixtures & fittings	In course of construction	Total
	£m	£m	£m	£m	£m
Cost or valuation:					
At January 1, 1985	209	453	10	10	682
Exchange adjustments	(5)	(12)	(1)	-	(18)
Additions at cost	2	31	1	14	48
Acquisition of subsidiary	4	22	-	-	26
Completed assets brought into use	3	4	-	(7)	-
Disposals	(5)	(18)	(2)	-	(25)
Revaluation adjustment at December 31, 1985	(19)	-	-	-	(19)
At December 31, 1985	<u>189</u>	<u>480</u>	<u>8</u>	<u>17</u>	<u>694</u>
Accumulated depreciation:					
At January 1, 1985	29	266	6	-	301
Exchange adjustments	(1)	(6)	(1)	-	(8)
Acquisition of subsidiary	2	16	-	-	18
Provided during year	7	42	1	-	50
Disposals	-	(11)	(2)	-	(13)
Adjustment on revaluation	(37)	-	-	-	(37)
At December 31, 1985	<u>-</u>	<u>307</u>	<u>4</u>	<u>-</u>	<u>311</u>
Net book value at December 31, 1985	<u>189</u>	<u>173</u>	<u>4</u>	<u>17</u>	<u>383</u>
The net book value at December 31, 1985 includes the following amounts in respect of assets held under finance leases	<u>-</u>	<u>66</u>	<u>-</u>	<u>-</u>	<u>66</u>
Net book value at December 31, 1984	<u>180</u>	<u>187</u>	<u>4</u>	<u>10</u>	<u>381</u>
The net book value at December 31, 1984 includes the following amounts in respect of assets held under finance leases	<u>-</u>	<u>69</u>	<u>-</u>	<u>-</u>	<u>69</u>

The original cost of assets fully written off, but still in use and included in the consolidated figures above, amounts to £134m (1984 £126m).

## Assets held for use in operating leases at December 31:

	1985 £m	1984 £m
Cost or valuation	58	65
Accumulated depreciation	(26)	(22)
Net book value	<u>32</u>	<u>43</u>

## 12. TANGIBLE FIXED ASSETS - COMPANY

	Land & buildings (see note 13 on page 40)	Plant & machinery	Fixtures & fittings	In course of construction	Total
	£m	£m	£m	£m	£m
Cost or valuation:					
At January 1, 1985	185	339	6	9	539
Additions at cost	1	22	-	13	36
Completed assets brought into use	3	4	-	(7)	-
Disposals	(1)	(9)	(1)	-	(11)
Revaluation adjustment at December 31, 1985	(14)	-	-	-	(14)
At December 31, 1985	<u>174</u>	<u>356</u>	<u>5</u>	<u>15</u>	<u>550</u>
Accumulated depreciation:					
At January 1, 1985	25	219	4	-	248
Provided during year	7	31	-	-	38
Disposals	-	(9)	(1)	-	(10)
Adjustment on revaluation	(32)	-	-	-	(32)
At December 31, 1985	<u>-</u>	<u>241</u>	<u>3</u>	<u>-</u>	<u>244</u>
Net book value at December 31, 1985	<u>174</u>	<u>115</u>	<u>2</u>	<u>15</u>	<u>306</u>
The net book value at December 31, 1985 includes the following amounts in respect of assets held under finance leases	<u>-</u>	<u>56</u>	<u>-</u>	<u>13</u>	<u>69</u>
Net book value at December 31, 1984	<u>160</u>	<u>120</u>	<u>2</u>	<u>9</u>	<u>291</u>
The net book value at December 31, 1984 includes the following amounts in respect of assets held under finance leases	<u>-</u>	<u>45</u>	<u>-</u>	<u>6</u>	<u>51</u>

### 13. LAND AND BUILDINGS

Group properties were revalued at December 31, 1985. Specialised properties, including certain of the Group's major manufacturing sites, have been revalued on a depreciated replacement cost basis and the remainder by reference to their open market value for existing use. In the United Kingdom the valuation was carried out by Gerald Eve & Co., Chartered Surveyors and Fuller Peiser, Chartered Surveyors. Overseas properties were valued by independent local valuers.

#### Consolidated

The total surplus arising on revaluation amounted to £18m (£37m less £19m – see note 11 on page 38), of which a revaluation deficit of £1m is attributable to minorities. The £19m revaluation surplus has been transferred to the consolidated revaluation reserve.

Land and buildings comprise:

	Freehold	Leasehold		Total
	£m	Long £m	Short £m	£m
Valuation at December 31, 1985	<u>177</u>	<u>10</u>	<u>2</u>	<u>189</u>
Net book value at December 31, 1984	<u>166</u>	<u>11</u>	<u>3</u>	<u>180</u>

#### Company

The total surplus arising on revaluation amounted to £18m (£32m less £14m – see note 12 on page 39) which has been transferred to the Company revaluation reserve.

Land and buildings comprise:

	Freehold	Leasehold		Total
	£m	Long £m	Short £m	£m
Valuation at December 31, 1985	<u>164</u>	<u>8</u>	<u>2</u>	<u>174</u>
Net book value at December 31, 1984	<u>150</u>	<u>7</u>	<u>3</u>	<u>160</u>

Note: Land and buildings included at valuation would have been, on an historical cost basis, as follows:

	Consolidated £m	Company £m
Cost	112	95
Aggregate depreciation	(71)	(62)
Net book value at December 31, 1985	<u>41</u>	<u>33</u>
Net book value at December 31, 1984	<u>44</u>	<u>34</u>

# NOTES TO THE ACCOUNTS

## 14. INVESTMENTS IN GROUP COMPANIES

	Company	
	1985 £m	1984 £m
Shares at cost:		
At January 1	22	21
Additions during year	2	1
Transfer from related company	2	—
At December 31	26	22
Foreign currency translation adjustments (see note 1 on page 31)	—	17
	26	39
Provision for post-acquisition losses:		
At January 1	(1)	(1)
Transfer from related company	(2)	—
Charge for year	(1)	—
At December 31	(4)	(1)
Net book value	22	38

The principal subsidiary companies are listed on page 49.

Rolls-Royce Finance Limited, a wholly-owned subsidiary, has not been consolidated. The Company, through this subsidiary, has entered into arrangements for the financing of purchases by certain customers. The circumstances relating to these arrangements are such that the subsidiary operates under restrictions imposed by lenders. The control of the subsidiary by Rolls-Royce Limited is significantly impaired and, in the opinion of the directors, it would be misleading to consolidate it.

The following information is provided with regard to Rolls-Royce Finance Limited:

	1985 £m	1984 £m
Net assets at December 31	4	4
Net aggregate profits attributable to Rolls-Royce Limited, dealt with in the accounts of the Parent Company:		
(i) net profit for the year	—	—
(ii) accumulated profits	—	—
Amounts owing to Parent Company	2	1
Amounts due from fellow subsidiary	5	5

## NOTES TO THE ACCOUNTS

### 15. INVESTMENTS IN RELATED COMPANIES

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Shares at cost:				
At January 1	3	2	3	2
Additions during year	-	1	-	1
Transfer to subsidiary company	(2)	-	(2)	-
At December 31	<u>1</u>	<u>3</u>	<u>1</u>	<u>3</u>
Provision for share of post-acquisition losses:				
At January 1	(2)	(2)	(2)	(2)
Transfer to subsidiary company	2	-	2	-
Charge for year	(1)	-	(1)	-
At December 31	<u>(1)</u>	<u>(2)</u>	<u>(1)</u>	<u>(2)</u>
Net book value	<u>-</u>	<u>1</u>	<u>-</u>	<u>1</u>

The principal related companies are listed on page 49.

### 16. STOCKS

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Raw materials	71	68	62	60
Work in progress, jigs and tools	416	381	385	337
Finished parts and engines	378	348	360	329
Payments on account	8	14	11	14
	<u>873</u>	<u>811</u>	<u>818</u>	<u>740</u>
Progress payments against stocks	<u>(295)</u>	<u>(300)</u>	<u>(295)</u>	<u>(290)</u>
	<u>578</u>	<u>511</u>	<u>523</u>	<u>450</u>
Current replacement cost exceeds historical cost of stocks by	<u>35</u>	<u>33</u>	<u>20</u>	<u>21</u>

# NOTES TO THE ACCOUNTS

## 17. DEBTORS

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Amounts falling due within one year				
Trade debtors	166	206	118	142
Amounts owed by:				
Group companies	-	-	23	11
Related companies	29	30	29	29
Other debtors	19	8	14	5
Prepayments and accrued income	6	6	4	5
	<u>220</u>	<u>250</u>	<u>188</u>	<u>192</u>
Amounts falling due after more than one year				
Trade debtors	5	5	5	5
Amounts owed by group companies	-	-	29	40
Prepayments and accrued income	2	3	2	3
	<u>7</u>	<u>8</u>	<u>36</u>	<u>48</u>
Total debtors	<u>227</u>	<u>258</u>	<u>224</u>	<u>240</u>

## 18. BANK LOANS, OVERDRAFTS AND OTHER BORROWINGS - AMOUNTS FALLING DUE WITHIN ONE YEAR

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Bank loans and overdrafts	151	54	142	54
Other borrowings	29	47	-	-
	<u>180</u>	<u>101</u>	<u>142</u>	<u>54</u>

## NOTES TO THE ACCOUNTS

### 19. OTHER CREDITORS - AMOUNTS FALLING DUE WITHIN ONE YEAR

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Trade creditors	151	121	132	105
Amounts owed to:				
Group companies	-	-	30	60
Related companies	-	2	-	2
Payments received on account	118	123	110	110
Corporate taxation	1	2	-	-
Other taxation and social security	13	12	10	11
Other creditors	73	62	50	37
Accruals and deferred income	6	23	6	9
Obligations under finance leases	17	14	16	12
	<u>379</u>	<u>359</u>	<u>354</u>	<u>346</u>

### 20. BANK LOANS AND OTHER BORROWINGS - AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
<b>Unsecured</b>				
Bank loans repayable 1987 to 1991 (interest rates 11.7% to 12.6%)	51	183	51	183
Other loan repayable 1987 to 1990 (interest rate 12.2%)	10	-	-	-
<b>Secured</b>				
Loans repayable 1987 to 1994, secured by charges on related buildings (interest rates 8.8% to 10.5%)	<u>1</u>	<u>3</u>	<u>1</u>	<u>1</u>
	<u>62</u>	<u>186</u>	<u>52</u>	<u>184</u>
<b>Repayable by instalments:</b>				
Between one and two years	11	-	8	-
Between two and five years	39	97	32	95
In more than five years	-	64	-	64
	<u>50</u>	<u>161</u>	<u>40</u>	<u>159</u>
<b>Repayable otherwise than by instalments:</b>				
Between two and five years	12	-	12	-
In more than five years	-	25	-	25
	<u>62</u>	<u>186</u>	<u>52</u>	<u>184</u>

# NOTES TO THE ACCOUNTS

## 21. OTHER CREDITORS - AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Payments received on account	33	13	33	13
Accruals and deferred income	38	28	36	28
Obligations under finance leases:				
Payable in the second to fifth years inclusive	44	45	38	33
Payable after five years	3	9	9	2
	<u>118</u>	<u>95</u>	<u>116</u>	<u>76</u>

## 22. PROVISIONS FOR LIABILITIES AND CHARGES

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Deferred taxation	7	6	-	-
Other provisions, including principally warranty and estimated future losses on contracts	<u>72</u>	<u>110</u>	<u>67</u>	<u>105</u>
	<u>79</u>	<u>116</u>	<u>67</u>	<u>105</u>
Movements on other provisions were:				
At January 1	110	122	105	116
Charge to profit and loss account	26	36	24	35
Utilised	(62)	(45)	(60)	(44)
Released	(2)	(3)	(2)	(2)
At December 31	<u>72</u>	<u>110</u>	<u>67</u>	<u>105</u>

## 23. SHARE CAPITAL

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Authorised				
At December 31	<u>150</u>	<u>600</u>	<u>150</u>	<u>600</u>
Issued ordinary shares of 25p (1984 £1) each fully paid				
At December 31	<u>127</u>	<u>508</u>	<u>127</u>	<u>508</u>

### On December 5, 1985:

The authorised share capital was reduced from £600m, divided into 600 million shares of £1 each, to £150m, divided into 600 million shares of 25p each;

The issued share capital was reduced from £508m, divided into 508 million shares of £1 each fully paid, to £127m, divided into 508 million shares of 25p each fully paid.



## NOTES TO THE ACCOUNTS

### 24. PENSION FUNDING

The pension schemes for employees of Rolls-Royce Limited and its United Kingdom subsidiaries are administered by Trustees, and the assets of the funds are invested by them independently of the finances of the Group. The schemes are funded by annual contributions over the period of employment from both the Company and members at rates recommended by the actuaries to the schemes; these provide for future entitlements in respect of past service, based upon actuarial valuations carried out not less than once every three years. The actuaries have confirmed, following revaluations as at March 31, 1985, that the present contribution rates are adequate to meet the benefits provided under the rules of the schemes.

Pension arrangements for employees of overseas subsidiary companies are managed and funded in accordance with local requirements and professional advice.

### 25. FUTURE CAPITAL EXPENDITURE

	Consolidated		Company	
	1985	1984	1985	1984
	£m	£m	£m	£m
Future capital expenditure for which no provision has been made in the accounts:				
Contracted	19	16	18	2
Authorised but not contracted	21	11	13	2

### 26. OTHER FINANCIAL COMMITMENTS

At December 31, 1985 there were annual commitments under operating leases expiring as follows:

	Consolidated		Company	
	Land and buildings	Other	Land and buildings	Other
	£m	£m	£m	£m
Within one year	1	2	—	1
In the second to fifth years inclusive	2	2	1	1
After five years	2	3	2	1

## NOTES TO THE ACCOUNTS

### 27. CONTINGENT LIABILITIES

	Consolidated		Company	
	1985 £m	1984 £m	1985 £m	1984 £m
Guarantees, custom bonds, recourse on supplier credit arrangements subject to ECGD insurance cover and minor miscellaneous items	6	8	5	7
Guarantees under sales financing arrangements with customers, after taking into account the estimated realisable value of any underlying security	1	—	1	—
Together with other companies involved in a collaborative agreement, the Company has provided a joint and several guarantee to a customer. The Company's share, after taking into account the estimated realisable value of the underlying security and recourse amongst the collaborating companies in accordance with the terms of relevant agreements	5	—	5	—
Guarantees in respect of financial obligations of subsidiary companies	—	—	97	104

In the opinion of the directors, no significant losses are likely to arise in respect of the above.

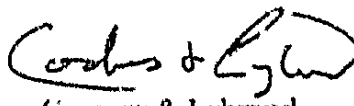
Contingent liabilities exist in respect of performance and reliability guarantees entered into in the ordinary course of business. In the opinion of the directors, any claims under such guarantees, after allowing for provisions already made, will not be significant in relation to the Group's future activities.

### REPORT OF THE AUDITORS TO THE MEMBERS OF ROLLS-ROYCE LIMITED

We have audited the accounts on pages 28 to 47 in accordance with approved Auditing Standards.

In our opinion the accounts give a true and fair view of the state of affairs of the Company and the Group at December 31, 1985 and of the profit and source and application of funds of the Group for the year then ended and comply with the Companies Act 1985.

London  
April 10, 1986

  
Coopers & Lybrand  
Chartered Accountants

## FIVE-YEAR REVIEW

### Consolidated profit and loss account

	1985	1984	1983	1982	1981
	£m	£m	£m	£m	£m
Turnover	1,601	1,409	1,331	1,493	1,440
Operating profit	211	162	74	122	15
Research and development (net)	(100)	(101)	(131)	(131)	(6)
Interest payable and similar charges	(29)	(35)	(56)	(84)	(7)
Share of losses in related companies	(1)	-	(2)	-	-
Profit (loss) before taxation	81	26	(115)	(93)	1
Taxation	(3)	(5)	(4)	(4)	(1)
Profit (loss) after taxation	78	21	(119)	(97)	1
Attributable to minority interests	(1)	(1)	(1)	(1)	(1)
Extraordinary item - Net restructuring costs	-	-	(74)	(38)	(1)
Profit (loss) attributable to Rolls-Royce Limited	77	20	(194)	(136)	1

### Consolidated balance sheet

Fixed assets	383	382	393	390	38
Current assets	838	800	756	920	1,00
	1,221	1,182	1,149	1,310	1,4
Liabilities and provisions	(818)	(857)	(846)	(813)	(8)
	403	325	303	497	5
Share capital	127	508	508	508	4
Reserves	272	(188)	(210)	(16)	1
	399	320	298	492	5
Minority interests	4	5	5	5	-
	403	325	303	497	5

Note: The 1981 to 1984 consolidated profit and loss accounts and balance sheets have been restated to reflect the change in policy for accounting for leases (see note 1 on page 32).

# PRINCIPAL SUBSIDIARY AND RELATED COMPANIES

## Subsidiary Companies

### REGISTERED IN ENGLAND:

Doonik Thimble Limited	82%
Rolls-Royce and Associates Limited (25% A shares 100% B shares)	45
Rolls-Royce (China) Limited	100
Rolls-Royce (Far East) Limited	100
Rolls-Royce Finance Limited	100
Rolls-Royce (France) Limited	100
Rolls-Royce India Limited	100
Rolls-Royce Leasing Limited	100
Rolls-Royce Plant Leasing Limited	100
Sawley Packaging Company Limited	100

### INCORPORATED OVERSEAS:

Australia	- Rolls-Royce of Australia Pty. Limited	100
Brazil	- Motores Rolls-Royce Limitada	100
Canada	- Rolls-Royce Industries Canada Inc.	100
	- Bristol Aerospace Limited	100*
	- Rolls-Royce (Canada) Limited	100*
	- Rolls-Royce Industrial & Marine Limited	100*
USA	- Rolls-Royce Holdings Inc.	100
	- Rolls-Royce Inc.	100**
	- Rolls-Royce Credit Corporation	100**
	- Rolls-Royce Capital Inc.	100
Saudi Arabia	- Rolls-Royce Industrial Turbines (Saudi Arabia) Limited	51

The interests in companies marked \* are held by Rolls-Royce Industries Canada Inc.

The interests in companies marked \*\* are held by Rolls-Royce Holdings Inc.

The interest in Rolls-Royce Capital Inc. was transferred from Rolls-Royce Limited to Rolls-Royce Holdings Inc. on February 12, 1966.

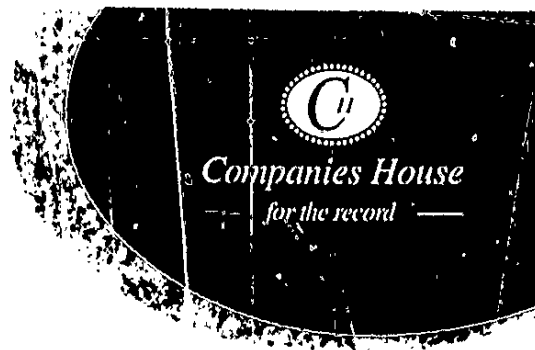
## Related Companies

### REGISTERED IN ENGLAND:

GEC Rolls-Royce (Power Generation) Limited	50
Rolls-Royce and Japanese Aero Engines Limited (100% A shares)	50
Rolls-Royce Turbomeca Limited (100% B shares)	50
Turbo-Union Limited (40% ordinary shares 57 1/2% A shares)	40

### INCORPORATED OVERSEAS:

USA	- Cooper Rolls Inc.	50
Switzerland	- IAE International Aero Engines AG	50



# NOTICE OF ILLEGIBLE DOCUMENT ON THE MICROFICHE RECORD

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The poor quality has been noted, but unfortunately steps taken to improve them were unsuccessful.

**Companies House would like to apologise for any inconvenience this may cause**

