# ARCHIVED REPORT

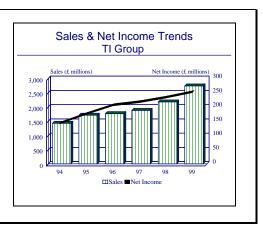
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# TI Group (Dowty) - Archived 10/2001

# **Outlook**

- TI Group strengthened its position through a series of acquisitions aimed at diversifying the company and fostering growth
- Dowty Aerospace businesses enjoyed another healthy year, thanks in part to the recent acquisition of Tri-Industries
- The addition of this complementary business to Dowty's product line has enhanced the company's overall portfolio of jet engine components



# **Headquarters**

TI Group plc Lambourn Court Abingdon, Oxon OX14 1UH, United Kingdom Telephone: (44 1235) 705555 Web site: http://www.tigroup.com

The TI Group is a world leader in the production of mechanical seals through its John Crane subsidiary and fluid-carrying systems through its Bundy subsidiary. With the acquisition of Dowty in the summer of 1992, the TI Group is now represented in the international market for specialized aerospace products. In particular, Dowty is a world-renowned producer of propellers and hydraulic systems.

Dowty was formed in Cheltenham, England, in 1931, and soon thereafter the firm established itself as one of

Britain's most important manufacturing firms, particularly due to the growth of the British aircraft industry during and after the Second World War. Following a hostile takeover by TI in early summer 1992, Dowty has been assimilated and reorganized as a third group in TI hierarchy. Under TI, Dowty designs and produces engineered systems and component systems using the latest electronic and hydromechanical technologies for aerospace, maritime, commercial electronics, industrial and automotive applications.

Total employment for the TI Group stands at approximately 38,300 persons. The merger of Dowty and TI operations has made the TI Group the UK's second-largest engineering concern (behind BAE Systems plc).

# Structure and Personnel

Sir Christopher Lewinton Chairman William J. Laule Chief Executive Martin D. Angle Group Finance Director David P. Lillycrop General Counsel John Langston
CEO, Specialty Polymer Products
T. Allan Welsh
CEO, Automotive Systems
Geoff F. Smith
CEO, Dowty Group



# **Product Areas**

TI is believed to manage its four major operations in the following manner.

#### **TI GROUP**

- 1. John Crane
- 1.1 John Crane International
- 2. Specialty Polymer Products
- 3. Automotive Systems
- 3.1 Bundy International
- 4. Dowty Group
- 4.1 Dowty Aerospace
- 4.1.1 Dowty Aerospace Propellers
- 4.1.2 Hydraulics and Actuation
- 4.1.3 Dowty Turbine Engine Components
- 4.1.4 Dowty Space Projects
- 4.1.5 Dowty Tubular Systems
- 4.2 Hamble Group
- 4.3 Dowty Defence & Engineering Systems
- 4.4 Dowty Special Projects

**John Crane.** This operation is the leading manufacturer of engineered seal and sealing systems, and a supplier to most key industries.

**Specialty Polymer Products.** The product range covers three main areas: Engineered Seals, Pipe Seals and Specialty Products. The unit specializes in devising customized polymer sealing solutions. Its main customer base is in the industrial, automotive and aerospace markets.

**Automotive Systems.** This business specializes in fluid storage and delivery systems, serving the global automotive market in the fields of fuel, brake and powertrain.

**Dowty Group.** Dowty Aerospace is a supplier of many products for a variety of applications. Dowty is involved in the design, development and manufacture of actuators, propeller systems, fuel controls generators, armor systems, data communications, electronic warfare systems, flight controls, materials, modems, naval combat systems, sonar, sonobuoys, and gearboxes. Through Hamble the unit is a leading supplier of aircraft structures. Defence Systems and Special Products focuses on niche market businesses offering specialist aerospace, defense and other engineered products and services.

# **Facilities**

TI Group World Operating Headquarters, Lambourn Court, Abingdon, Oxon OX14 1UH.

Dowty Group, Lambourn Court, Abingdon, Oxon OX14 1UH. Telephone: (44 1235) 705544. Web site: http://www.dowty.com

Dowty Aerospace Wolverhampton, Wobaston Road, Wolverhampton, WV9 5EW. Telephone: (44 902) 39 77 00.

Dowty Aerospace Hydraulics, Arle Court, Cheltenham, Gloucestershire, GL51 OTP UK. Telephone: (44 1242) 22 11 55.

Dowty Aerospace Propellers, Anson Business Park, Cheltenham Road East, Gloucester GL2 9QN. Telephone: (44 1452) 71 60 00.

Dowty Space Projects, Wobaston Road, Wolverhampton, WV9 5EW. Telephone: (44 1902) 397 700

Dowty Defence and Engineering Systems, Locksbrook Road, Bath, North East Somerset, BA1 3EX Telephone: (44 1225) 481054

Dowty Aerospace Yakima, 2720 W. Washington Ave, PO Box 9907, Yakima, WA. Telephone: (509) 248 5000.

Dowty Aerospace Turbine Engine Components, Head Office, PO Box 68, Crestwood Industrial Park, Mountaintop, Pennsylvania 18707-0068 Telephone: (570) 474 6371

# **Corporate Overview**

Since becoming a part of the TI Group, Dowty has been reorganized as promised. So far, Dowty has shed its polymer, information technology, fuel systems, and electronic systems interests. According to parent TI, the

divestitures were initiated in an effort to concentrate Dowty on its core businesses. So far, both TI and Dowty have been generally strengthened since the takeover.

#### **New Products And Services**

<u>Eurofighter Fuel Tanks</u>. In July 2000, Dowty was selected to supply supersonic fuel tanks for the Eurofighter. The new contract, which has a potential value of £30 million in full series production, has been won by its Hamble aerostructures business and will bring the overall value of Eurofighter to Dowty to well over £150 million, on current firm aircraft orders.

Thrust Reverser Contract. In February 2000, Dowty Aerospace Wolverhampton, won new contracts worth up to \$200 million after being chosen by Hurel-Dubois as its preferred supplier of thrust reverser actuation systems. The alliance with Hurel-Dubois significantly strengthens Dowty's position on key programs in the expanding regional jet aircraft market and marks a breakthrough for Dowty as a supplier of thrust reversers on Airbus aircraft. Hurel-Dubois, a leading supplier of aircraft nacelle systems, has been selected on four important new aircraft programs - the Airbus A318, powered by Pratt & Whitney engines, the Fairchild Dornier 728JET and the Embraer ERJ170, both powered by General Electric engines - as well as the new Bombardier Continental Business Jet, equipped with Honeywell (AlliedSignal) engines. Dowty has won contracts to supply the thrust reverser actuation systems on all four aircraft, representing new business with a value of up to \$200 million on currently projected aircraft sales.

### Plant Expansion/Organization Update

Automotive Unit Created. In June 1999, following the successful acquisition of Walbro Corporation, TI Group announced the formation of TI Group Automotive Systems. The new grouping will bring together the recently acquired Walbro fuel systems business with Bundy. TI Group also announced that Allan Welsh, a main Board director, is appointed Chief Executive of TI Group Automotive Systems.

TI Group Automotive Systems will combine Walbro's automotive fuel storage and delivery technology with Bundy's fuel lines and quick connectors to create a unique supplier of complete fuel storage and delivery systems on a global basis. The new fuel business will operate alongside Bundy's brake line and powertrain fluid-carrying businesses.

According to the TI Group, consolidation in the automotive industry is driving a requirement for fewer, specialized suppliers who are able to provide a greater systems content on a global basis. The formation of TI Group Automotive Systems will capitalize on these industry trends, integrating Bundy's and Walbro's approach to global automotive customers and accelerating the growth of the businesses.

### **Mergers/Acquisitions/Divestitures**

Busak+Shamban Acquired. In August 1999, the TI Group acquired Busak+Shamban for DM800 million (£275 million) in cash. The acquisition, which is highly complementary to the TI Group's specialty polymer products business, will accelerate the growth of the combined businesses. Busak+Shamban designs, manufactures and distributes specialty polymer seals and bearings.

TI Sells Additional EIS Units. In June 1999, the TI Group sold part of the Aircraft Support and Electronics Distribution division acquired with EIS to UMECO plc, a UK listed company, for £11.75 million in cash. According to the company, TI's strategic focus is to develop the global market leading positions of its four core business groups of Bundy, John Crane, Dowty and Forsheda. EIS was acquired primarily for its couplings and fluid technology businesses which are complementary to John Crane, and the strong synergies between the majority of its aerospace interests and Dowty.

<u>Walbro Acquired.</u> In June 1999, the TI Group completed its acquisition of Walbro, a manufacturer of automotive fuel storage and delivery systems, for \$570 million. Following completion of the acquisition, TI Group combined its existing fuel businesses with Walbro, creating a major player in the market for automotive fuel storage and delivery systems. This business will sit alongside Bundy's global brake and powertrain businesses and together form the newly created TI Group Automotive Systems. The combined revenues for this new group in 1998 would have been \$2 billion.

TI Acquires Tri-Manufacturing. In March 1999, the TI Group acquired Tri-Manufacturing from GE Aircraft Engines for \$58 million in cash. The acquisition will be incorporated into Dowty's Turbine Engine Components (D-TEC) business. Headquartered in Terre Haute, Indiana, Tri-Manufacturing is a fabricator of jet engine hot section components for a wide range of major engine manufacturers including GE and Pratt & Whitney. In 1998, Tri-Manufacturing had sales of \$64 million.

EIS Aircraft Structures Unit Sold. In September 1998, the TI Group completed the sale of the C F Taylor aircraft galley structures business to B/E Aerospace, Inc of Florida for £15.4 million in cash. The C F Taylor aircraft galley structures business is part of the EIS Group which was acquired by TI Group in July; it manufactures aircraft galleys and crew rests and employs 500 people at plants in Wokingham, Berkshire and Dafen, South Wales. Its net operating assets

amount to approximately £8 million and for the year to 31 December 1997, its sales were £25 million. The business was sold on a debt-free and cash-free basis. The TI Group will retain the C F Taylor airframe components business which has been integrated into TI's Dowty Aerospace business.

EIS Group Acquired. In July 1998, the TI Group acquired EIS Group plc for £267 million (\$435.2 million). EIS specializes in fluid coupling and precision engineering. The group will be added to the Dowty Aerospace division. The purchase will almost double Dowty's turnover base and open up new, complementary markets in aerostructures and specialized defense products.

Sealol Acquired. In April 1998, the TI Group's John Crane unit acquired the Sealol Industrial Division of US-based EG&G for \$100 million. At the same time, John Crane has agreed to sell its Belfab business for \$45 million to EG&G. The net consideration of \$55 million will be paid in cash. Sealol is a world leading manufacturer of mechanical seals with a primary focus on the high temperature segment of the refining and petroleum industry which is complementary to the John Crane product offering. Sealol's primary market is the United States. At December 31, 1996, Sealol had sales of \$88.8 million, operating profits of \$10.3 million and net assets of \$22.8 million.

Prior to this acquisition, in December 1997, TI purchased the Sealol marine seal product line from US-based EG&G Inc for \$4.2 million. The product line comprises hull, pump and torpedo seals which are used predominantly by the US Navy's submarine fleet; John Crane Marine is already the major marine seals supplier to the US Navy's surface fleet.

TI Seeks Remaining Shares in JMT. In April 1998, the TI Group which currently owns 50.14% of the shares in Japan Marine Technologies (JMT), announced a public offer for the remaining shares representing 49.86% of the shareholding in JMT, which are publicly held.

In May 1998, the TI Group reported that valid acceptances had been received in respect of 3,858,000 shares, representing 39.37 percent of the issued share capital of JMT. TI Group's interest, including the acceptances received under the Public Offer, has therefore increased to 8,772,000 shares, representing 89.51 percent of the issued share capital of JMT. TI Group offered Y580 (£2.62) per share, making the total consideration payable Y2.24 billion (£10.1 million).

The increased shareholding will enable the TI Group to accelerate the growth of its marine division by providing a stronger foothold in the Far East. JMT is a leading manufacturer and supplier of specialized seals

and bearings to the world's shipbuilding industry and other industrial applications.

<u>S&H Acquired</u>. In March 1998, TI Group announced the £212 million (\$350 million) purchase of S&H Fabricating & Engineering Inc, a US-based marketleading manufacturer of powertrain fluid handling systems. S&H is complementary to Bundy's existing brake and fuel system businesses. It conforms with Bundy's strategy, bringing a significant position in the important and fast growing automotive powertrain fluid handling markets which comprise mainly airconditioning, oil cooling and power steering applications.

Messier-Dowty Stake Sold to Snecma. In December 1997, the TI Group agreed to sell its landing gear interests to Snecma for £207.5 million, before adjustment for the net debt in Messier-Dowty. TI Group's landing gear business consists of its 50 percent stake in Messier-Dowty and its 100 percent owned repair and overhaul businesses which primarily service Messier-Dowty's product range. The deal was completed in June 1998.

TI sold the operation after failing to secure sole ownership from co-owner France's state-controlled Snecma. According to reports, TI was not happy with the unit's results and it was decided that either TI or Snecma should have single ownership.

With its focus on aerospace and its contacts with all the major aircraft manufacturers, Snecma is well suited to be sole owner of Messier-Dowty. Snecma will continue to develop Messier-Dowty's world leading position in the landing gear market and combine TI Group's repair and overhaul business with its own.

This disposal will further add to the financial strength of TI Group. The company will reinvest the proceeds in more niche acquisitions from which it can generate additional value, a strategy that has proved successful over the past 11 years.

### **Teaming/Competition/Joint Ventures**

**Messier-Dowty.** In early 1994, the undercarriage business of Messier-Bugatti (a subsidiary of Snecma) and Dowty was agreed upon and finalized. The new company – Messier Dowty – was a 50:50 joint venture. On the basis of current programs, the joint venture was a world leader in landing-gear design and manufacture and customer support. In addition, the combined strength of both parents, a wider customer base, and full onshore capabilities on both sides of the Atlantic placed the company in a commanding position to meet customers and win new programs. The company became fully operational on January 1, 1995. Dowty

sold its stake in this joint venture to Snecma in mid-1998 (see Mergers/Acquisitions/Divestitures).

**Avro.** In late 1993, Dowty Aerospace Wolverhampton and Avro announced that Dowty would provide flight control actuation systems for the Avro family of regional jets. Starting in 1994, Dowty would become the prime supplier of all flying control actuation equipment for the RJ Avroliner range of aircraft. Dowty and Avro also intended to develop the advanced flying control actuation system for future regional airliners, including the Avro RJX twinjet.

**Dowty & Smiths Industries Controls Ltd.** Dowty & Smiths Industries Controls Ltd, which is 49 percent controlled by Smiths Industries of the UK and 51-percent controlled by the Dowty Group, is a joint venture company which is involved in the design, development, manufacture, and marketing of aircraft engine control They are heading a team that includes Magneghi Milano and has been awarded a contract for development and production of air-intake cowl actuators for the EFA's EJ200 turbofans. Dowty has been awarded a subcontract by team leader Dunlop Aviation Division to collaborate in the design and development of the landing gear computer for the EFA (potential contract value is £11.5 million). Dowty is leading a consortium comprised of CESA, Nardi, and Liebherr, that is developing and will produce EFA undercarriage units. Total contract value may reach £150 million.

**Allison.** Dowty Aerospace is collaborating with Allison to produce an advanced turboprop propulsion system. Dowty is providing the electronic control system.

**British Aerospace.** Dowty has been working with British Aerospace in the area of research on ways to reduce passenger cabin noise on prop-driven aircraft, including propeller design and new aircraft sidewalls. BAe was leading a UK Department of Trade & Industry

R&D project aimed at reducing aircraft cabin noise, with the total project value estimated at £8.57 million for a 2.5-year effort. Dowty's share of the £2.562 million government grant was £584,000. Dowty's share of the total program cost was £1.169. Specific goals were to narrow the lead held by US companies in the area, and to offer a competitive aircraft model should fuel prices again begin to climb. The effort officially began in May 1990 but had actually started off on a low level about four years prior.

**General Dynamics.** After an accelerated design and development program provided actuators for use in a demonstration and validation program for the USAF's Advanced Tactical Fighter (ATF), in 1990 Dowty Aerospace Yakima was awarded a contract by GD to supply five actuators for the F-22 (GD's entrant in the ATF competition and eventual winner). Contract work involves a side-bay trapeze actuator, a main landing gear door and uplock actuator, a main weapons bay spoiler actuator, a side weapons bay trapeze uplock actuator, and a transverse nozzle seal actuator.

**General Electric.** In September 1987, Dowty and GE Aircraft Engines signed an agreement covering the design, development, and manufacture of composite fan blades for the GE36 Unducted Fan Engine. GE's advanced fan blade concept made use of Dowty's extensive in-service experience with composite propeller blades.

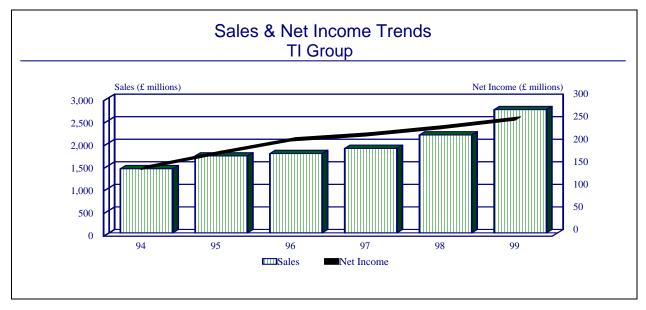
Martin Marietta. Dowty Aerospace is teamed with Martin Marietta in the competition for the US Navy's ALFS (Advanced Low Frequency Sonar). ALFS is to equip SH-60B and SH-60F ASW helicopters to detect quiet submarines. ALFS is designed to penetrate anechoic tiles and coatings used on submarines to deter acoustic detection methods.

**Singapore Airlines.** Around mid-1992, Dowty signed an agreement with Singapore Airlines for landing gear and other components to be repaired and overhauled in the Dowty Aerospace Aviation Services' Singapore facilities. The fleet of Singapore Airlines includes Boeing 747s and Airbus 310s.

# **Financial Results/Corporate Statistics**

TI Group's 1999 sales rose 26 percent to £2.72 billion compared to £2.17 billion in 1998. Profit before tax rose to £257 million from £238 million in 1998. US dollar figure, in millions, is translated as a 1999 average at the rate of £1 = \$1.6182. Latest-year available statistics are provided below.

Y/E December 31	1995	1996	1997	1998	1999	1999
(£ millions)						US\$
Turnover	1703	1756	1870	2168	2729	4416
Profit (pretax)	181	211	222	238	257	416

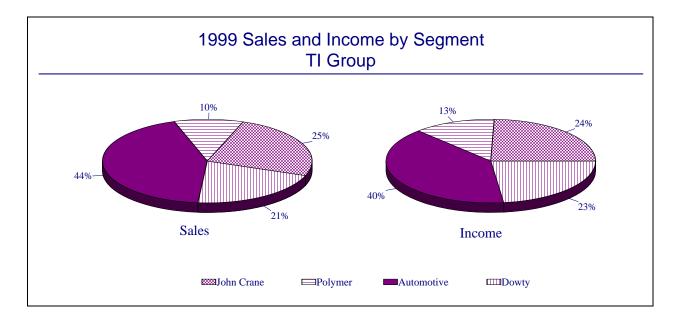


# **Industry Segments**

A breakdown of TI's sales and income by major market segment for the past five years is given below. Totals may not add due to rounding. Discontinued operations for 1997-1998 include Messier-Dowty/Repair & Overhaul. Please note that in 1999 TI restated its figure to conform to its new presentation. The tables below now follow the company's current format and hence operating income data for 1995-1997 was not reported.

SALES	1995	1996	1997	1998	1999
(£ millions)					
John Crane	410	424	411	586	685
Specialty Polymer Products	136	169	244	248	285
Automotive Systems	718	718	740	794	1191
Dowty	189	218	275	451	568
Discontinued	250	228	200	89	0
TOTAL	1703	1757	1870	2168	2729

OPERATING INCOME	1995	1996	1997	1998	1999
(£ millions)					
John Crane	-	-	-	76.0	76.4
Specialty Polymer Products	-	_	-	33.8	39.3
Automotive Systems	-	-	-	90.9	124.1
Dowty	-	-	_	59.3	72.1
Discontinued	-	-	-	9.2	0
TOTAL		-	-	265.3	160.6



# **Strategic Outlook**

Over the past two years the TI Group has strengthened its economic position through a series of acquisitions aimed at diversifying the company and fostering growth. Despite a softening in some of its core markets, the worldwide spread and diversity of the company's activities continued to demonstrate its value, and enabled the company to report record results for yet another year.

The Dowty Aerospace businesses enjoyed another healthy year, thanks in part to the recent acquisition of Tri-Industries. The addition of this complementary business to Dowty's product line greatly enhances the company's overall portfolio of jet engine components.

As major suppliers to Airbus and Boeing, both of which have announced record sales and substantial new orders, the group continues to benefit from the strong civil aerospace market.

Overall, the upswing in commercial aerospace is good news for Dowty. Thanks to this, Dowty expects a steady flow of orders from Boeing and Airbus to continue for the near term, despite problems in Asia. With a business mix that is 80 percent commercial, the growth in air travel will provide substantial revenue for the unit over the years ahead.

# **Prime Award Summary**

Unavailable

# **Program Activity**

**Business Interests.** Some important aerospace and government programs currently under way at Dowty are listed below. The briefs are intended to provide a listing of programs that are of major importance to the company. For detailed information or analysis of specific aerospace and defense programs or equipment, please refer to the appropriate FORECAST INTERNATIONAL binder (for example AIRCRAFT, MILITARY VEHICLES, WARSHIPS, MISSILES, ELECTRONICS, and GAS TURBINES). The

following is an outline of the company's business interests:

- Actuators
- Landing gear
- Propeller systems
- Generators
- Armor systems
- Flight controls
- Materials
- Gearboxes



### **Aircraft Programs**

The following is a listing of the various components Dowty produces for the aerospace industry, followed by its involvement in specific programs.

#### **Actuators**

Dowty handles a wide variety of actuators including the following: for the F-22 ATF it is supplying a side-bay trapeze actuator, a main weapons-bay spoiler actuator, a side weapons-bay trapeze uplock actuator, and a traverse nozzle seal actuator; a thrust reverser actuation system for the Boeing 777 passenger jet; for the EFA, primary flight control actuators, air-intake cowl actuators; for the MD T-45 Goshawk trainer, slat lock actuators and the leading edge slat actuation system; an impact resistant actuator; and variable stator-vane actuators for Rolls-Royce RB.211-524H and Trent engines.

#### Armor

Armor products include a detachable ceramic armor for helicopters and polymer-based ballistic and fragmentation systems.

### **Engine Controls**

Dowty is involved in the following engine control projects: thrust reverser actuators for the Boeing 777 (all three different engines involved); an electronic logic control unit and an electronic belled valve control unit for Rolls-Royce; engine speed limiters for the Rolls-Royce RB-211 engine; an after-burner fuel contact unit for the Taiwanese Ching-Kuo fighter aircraft (Garrett engines); the fault monitor/recorder for the P&WC JT15D engine; fuels controls for the F402 engine; digital engine controls for the P&WC PW305 engine; and development of the electronic control system for an Allison advanced turboprop propulsion system.

#### **Materials**

Dowty operations are involved with various types of materials including fluoro-carbons, fluoro-silicons, silicone polymers and fluoro-elastomers. Dowty also has a wide-ranging capability to perform custom moldings with these materials.

#### **Propellers**

Dowty produces propellers for various applications including the US Marine Corps' LCAC (Landing Craft Air Cushion), the propeller associated with the Allison GMA2100 turboprop engine, the Metro III twinengined commuter aircraft, the Gulfstream JetProp Commander, the Fairchild Merlin IV, the CASA C-212, and the BAe Jetstream 31. It is also doing research in advanced propeller design, including noise reduction.

### Airbus Industrie A320/A321

Dowty provides hydraulics, ram-air turbine, booster stage bleed valve actuator, dedicated generator, ignition relay box, scavenge valve and variable stator vane actuator (with V2500 engines), electrical components, flexible circuits, main landing gear door actuator, insulation foam, noise-reduction materials on doors, and repair and overhaul services.

### **Airbus Industrie A330**

Dowty supplies for the A330 program the following systems: flap actuation and transmission system, thrust reverser actuation system, trailing edge seals, insulation foam, noise reduction materials on doors, overspeed governor and variable stator vane actuation system (Trent engine).

#### **Airbus Industrie A340**

Dowty supplies for the A340 program the following systems: flap actuation and transmission system, thrust reverser actuation system, tailing edge seals, insulation foam, and noise reduction materials on doors.

#### **BAe Sea Harrier**

Dowty supplies for the Sea Harrier program the following systems: fuel flow proportioner, hydraulics, ram air turbine, pitch q-feel unit, engine fuel control system, inlet guide vane control, burner gallery, electrical components, harnesses, throttle grip switch, sonar locator beacon, standby transmitter receiver, and ground support test equipment.

#### **BAe/Boeing AV-8B Harrier II**

Dowty supplies for the AV-8B program the following systems: fuel flow proportioner, hydraulics, pitch q-feel control unit, burner gallery, digital engine fuel control unit, inlet guide vane control, drum switches, electrical components, fan speed sensors, potentiometers, wing landing gear actuator, test equipment, lift improvement device system actuator, and overhaul and repair services.

### **BAe/Avro International 146/RJ**

Dowty supplies for the BAe 146 program the following systems: flap system, hydraulics, aileron and elevator gust damper, spoiler and lift dumper controls, electrical components, harnesses, flight deck lighting controllers, flight deck master warning system, wing flaps electronic control, engine control system components, and overhaul for flap transmission/ball screws and flying controls.

#### **BAe 748**

Dowty supplies for the BAe 748 program the following systems: drive shafts, feathering pumps, gearboxes, governor units, hydraulics, propellers, synchronized units, electrical components, harnesses, communications and control, and repair and overhaul services.

#### **Beechcraft 400 Beechjet**

Dowty supplies for the Beechjet program the following systems: hydraulic package, valve package, master brake cylinder, down lock release cylinder, flap cylinder and uplock release cylinder.

# **Bell/Boeing V-22 Osprey**

Dowty supplies for the V-22 program the following systems: rudder flight control actuators, ground test rigs for elevators, flap and rudder flight control actuators, main gear and ramp latch actuators, and hydraulics.

# **Boeing E-3A Sentry**

Dowty supplies for the E-3A program the following systems: aileron snubber, brake deboost valve assembly, cargo door actuators, centering cylinder assembly, door snubbers, elevator snubbers, escape spoiler actuators, pressure door actuator, rudder tab damper, shuttle valve assembly, spoiler actuator and spoiler modular package.

# **Boeing 727**

Dowty supplies for the 727 the following systems: flap gearbox, flap control valve assemblies, rudder trim actuator, door snubbers, leading edge slat and flap actuators, cargo door locking actuators, pressure door actuator, speed brake actuator, swivel assembly, transfer cylinder assembly, ventral stairs actuators and snubber, aileron and auxiliary rudder power control packages, door sequence valve, tail skid actuator, noise reduction kit, overhaul for flap transmissions/ball screws, and hydraulic units.

#### **Boeing 737**

Dowty supplies for the 737 program the following systems: flap gear box, hydraulics, rudder trim actuator, auto brake shuttle valve, door snubbers, alternate brake selector valve (-300), elevator centering unit (-200), elevator tab lock actuator, rudder centering unit (-200), transfer cylinder, thrust reverser actuation system, hydraulic flow rate fuse, auxiliary flow rate fuse, auxiliary rudder power control unit, flight and ground spoiler actuators, and flight spoilers, ground service and systems A&B modular packages, isolation system valve, noise reduction kit, and repair and overhaul services.

#### Boeing 747

Dowty supplies for the 747 program the following systems: flap gearbox, elevator centering unit, rudder trim actuator, fuel enrichment solenoid valve, engine

electronic limiter and dedicated alternator (RB.211) auto brake actuator, disconnect clamp, fuel control assembly, mixing box assembly, shield (P&W engines), elevator feel actuator, hydraulic low-rate fuse, nose gear lock actuator, stabilizer trim actuator, noise reduction kit, insulation foam, services.

### Boeing 757

Dowty supplies for the 757 program the following systems: power pack, engine bleed valve electronic control unit, anti-skid shuttle valve, auto brake shuttle valve, cowl actuator hand pump, disconnect (anti-skid), door snubber, alternate brake selector valve, cargo door actuators, pressure door actuators (freighter version), volumetric fuse, hydraulics, thrust reverser actuation system (P&W engines), hydraulic flow rate fuse, rudder ratio changer bypass valve, noise reduction kit and overhaul for hydraulic units.

# **Boeing 767**

Dowty supplies for the 767 program the following systems: MLG sequence valve and cowl door actuation/ reservoir, power pack, anti-skid shuttle valve, auto brake shuttle valve, disconnect (anti-skid), door snubber, main landing gear door, arming lockout, hydraulics, hydraulic flow-rate fuse, repair, overhaul and services.

#### **EFA**

Dowty supplies for the EFA program the following systems: air intake cowl actuators, primary flight control actuators, digital engine control unit, electrical engine control, pilots, stick top controller, throttle top grip, master armament safety switch and remote indicator, and insulation foam.

#### **Lockheed Martin/Boeing F-22**

Dowty supplies for the F-22 program the following systems: side bay trapeze actuator, main landing gear door, and uplock actuator, main weapons bay spoiler actuator, side weapons bay trapeze uplock actuator, transverse nozzle seal actuator, power piston and module assemblies.

#### Panavia Tornado ADV

Dowty supplies for the Tornado ADV program the following systems: hydraulics, ram air turbine, airframe presswork, engine intake ramp actuator, radar rotary actuator, afterburner fuel control incorporating vapor core pump, wing sweep angle transmitter, electrical components, recce pod actuator, communication control system, nav/attack panel, ground support test equipment, nosewheel steering amplifier, sonar locator beacon, and wing slot seal.

#### **Panavia Tornado IDS**

Dowty supplies for the Tornado IDS program the following systems: hydraulics, ram air turbine, airframe presswork, engine intake ramp actuator, radar rotary actuator, afterburner fuel control incorporating vapor core pump, wing sweep angle transmitter, electrical components, control handle, recce pod actuator, communication control system, nav/attack panel, ground support test equipment, nosewheel steering amplifier, sonar locator beacon, and wing slot seal.

# Saab JAS 39 Gripen

Dowty supplies for the JAS 39 Gripen program the following systems: gearbox, hydraulics, auxiliary

power unit actuator, electrical components, electronic control unit actuator, and hydraulic monitoring computer.

### **Westland Sea King**

Dowty supplies for the Westland Sea King program the following systems: hydraulics, dual input valve for main and tail rotor flight controls, electrical components, standby UHF equipment, sonar locator beacon, electro-hydraulic components, winch, and communication control system.

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