



# MILITARY LASERS

## INTRODUCTION



IN 1968 OUR ORGANISATION DEVELOPED THE WORLD'S FIRST FULLY STABILISED AIRBORNE LASER SYSTEM. TODAY, THIS TRADITION OF EXCELLENCE IS CONTINUED AS THE NEXT GENERATION OF LASER TECHNOLOGY IS PIONEERED WITHIN THE F-35 JOINT STRIKE FIGHTER (JSF) ELECTRO-OPTICAL (EO) TARGETING SYSTEM.



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We have designed, developed and manufactured military laser designator, rangefinder and receiver systems for over 40 years and continue to invest in developing the technologies, designs, facilities, processes and skills necessary to remain at the forefront of military laser supply.

### KEY FACTS

- Laser design established in Edinburgh in 1963
- Laser manufacture initiated in Edinburgh in 1969
- Over 4,500 lasers transmitters and receivers produced and supported through full life cycle
- Dedicated production and development specialists
- Integrated on over 40 platforms across air, land and sea for more than 25 countries around the world
- Over £6 million recent investment in new purpose built facilities and equipment
- Significant Intellectual Property Rights (IPR)
- Ongoing technology research and product development.



**WE STAND PROUD OF OUR PRODUCTS, HERITAGE AND REPUTATION FOR PROVIDING CUSTOMERS WITH THE BEST IN HIGH PERFORMANCE AND COST-EFFECTIVE TECHNOLOGY FOR LASER REQUIREMENTS. BY CHOOSING OUR PRODUCTS, CUSTOMERS ARE RECEIVING UNPARALLELED LEVELS OF QUALITY AND SUPPORT.**

### PEOPLE

**We have been at the forefront of laser technology since the invention of the laser in the 1960's, and retain a number of employees who have worked continually on lasers for over 40 years.**

The majority of the UK's leading military laser engineers are employed in-house. They represent cumulative experience in excess of 1,000 years.

We work closely with leading universities on research and training activities, ensuring the cross-fertilisation of people and ideas to continually pioneer new laser technology.

### TECHNOLOGY

We pioneered the use of gas and solid state lasers into the military laser market. Patenting many of the core design elements used for ruggedised military lasers, we have added to the considerable intellectual property we hold.

We have worked with diode pumped solid state lasers for more than 12 years, and use this technology to deliver enhanced performance over older flashlamp based systems – resulting in lower cost of ownership. Diode pumping creates a laser product with a greater than 108 shot lifetime, 100 times that of flashlamp based systems. Every shot is fired with consistently high beam quality, reliability and substantially reduced power consumption, resulting in lower heat load and cooling requirements.

As suppliers of full military systems, our experience in detailed design of complex systems enables us to work closely with prime contractors to integrate the laser and associated sensing systems in the optimal configuration.

## LASER PORTFOLIO



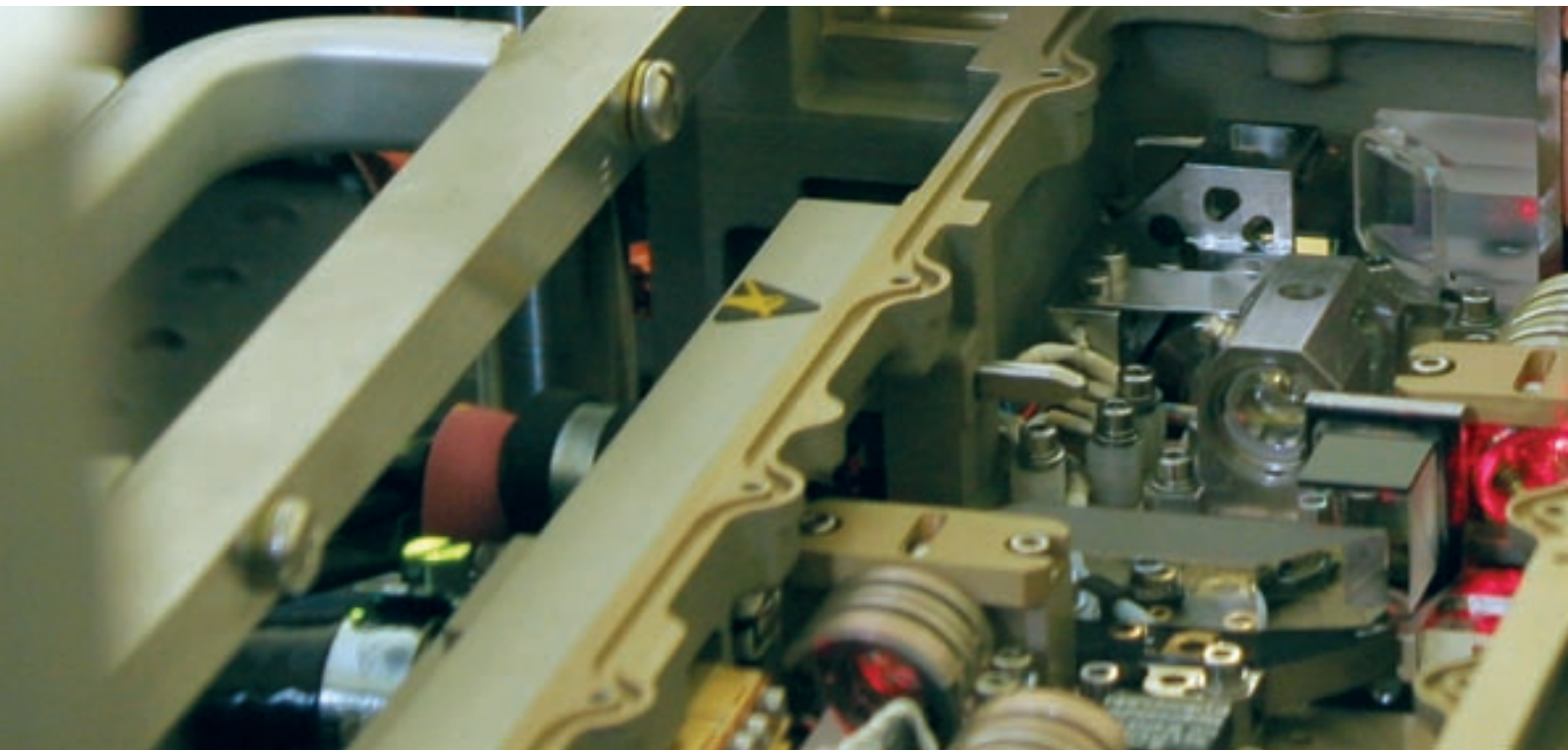
**WE HOLD A PORTFOLIO OF ADVANCED LASER PRODUCTS DESIGNED TO MEET THE REQUIREMENTS OF HIGH PERFORMANCE TARGETING SYSTEMS, HELICOPTER AND UNMANNED AERIAL VEHICLE (UAV) PAYLOADS AND INFRARED (IR) COUNTERMEASURES.**

**Our Company has a strong heritage in the development and production of laser systems for air, land and sea applications. This pedigree provides the foundation for the numerous innovative laser systems we have available today.**

Our experience and innovation was one of the key factors that led to our selection in 2003 to design and manufacture the Laser Designator and Range Receiver (LDRR) for the F-35 Joint Strike Fighter Electro-Optical Targeting System (EOTS).

### **KEY BENEFITS**

- Compact and lightweight laser transmitter/ receiver modules
- Diode-pumped laser technology - low power requirement and minimal cooling for a given output energy
- Single-band or dual-band (switchable) for tactical/ eye-safe operations
- Very high beam quality - low divergence and highly uniform beam quality
- High Mean Time Before Failure (MTBF) resulting in low maintenance costs
- Modular design for simple re-configuration, packaging and acquisition costs
- 50% fewer parts against comparable products.



**High Energy Laser Rangefinder / Designator**

300mJ @ 1.06  $\mu\text{m}$  / 90mJ @ 1.57  $\mu\text{m}$

Providing airborne designation and ranging capability for high performance targeting systems.

**Burst Illumination Advanced Targeting Laser Designator**

220mJ @ 1.06  $\mu\text{m}$  / 80mJ @ 1.57  $\mu\text{m}$

Advanced laser source for designation, range finding and active imaging. Highly compact packaging ensures suitability for a variety of airborne and land based platforms.

**Modular Laser Rangefinder / Designator**

160mJ @ 1.06  $\mu\text{m}$  / 40mJ @ 1.57  $\mu\text{m}$

Introducing an advanced, modular designator and range finder for system application on UAV, rotary, fixed wing, naval and ground based platforms.

**IR Countermeasure Laser**

High power low volume mid-IR laser source with diverse wavelength capability.

**Laser Spot Tracker**

1.06 $\mu\text{m}$  spectral response with quadrant PIN photodiode.

Compact laser receiver for target detection and tracking within a wide range of high performance targeting applications.



## LASER CENTRE OF EXCELLENCE



**OPENED IN MAY 2004, THE LASER CENTRE OF EXCELLENCE HAS BEEN DESIGNED BASED ON EXTENSIVE RESEARCH INTO MANUFACTURING BEST PRACTICE WITHIN THE DEFENCE AND COMMERCIAL SECTORS.**

The Centre is certified to ISO Class 8, and covers an area in excess of 2000 square metres. Using specialised laminar flow optical workstations, this standard can be raised to the ultra-clean ISO Class 5. Modular construction techniques have been utilised to provide flexible manufacturing space and to allow for future growth.



## MANUFACTURING FACILITY



The facility comprises 10,500m<sup>2</sup> of open plan flexible workspace containing:

- High specification constant monitor clean rooms (Class 100k /10k /1k /100)
- Co-located production facility
- Environmental screening chambers
- EMC test facility
- Laser firing rooms
- RFI screened rooms
- Process areas
- IPT offices adjacent to manufacturing halls
- Open-plan flexible workspaces supporting rapid reconfiguration
- Compact test range.

A Highly skilled workforce operates within an Integrated Product Team (IPT) environment supporting communication and shared knowledge framed by life-cycle management with a proven ability to deal with product and process complexity. A high performance culture enabled through Lean Manufacturing and DFM methodologies delivers leading edge solutions.

Within this workforce a capability team of Engineers and Technicians with the expertise to transition products from design to a product reality has been established. Deploying a range of tools and methodologies including DFM/ Simulation/ Cost modelling/ DTUPC/ Process development and Rapid Prototyping, this team ensures that new products have a smooth transition into manufacture and works both up and down the supply chain.

A Centre of Excellence strategy has been implemented developing and growing key technology capabilities within specialist areas of laser and microelectronics manufacture.

This is all supported and enabled by state-of-the-art systems and logistics capabilities delivering an integrated business system offering comprehensive reporting and business flexibility, cost reduction and improved service levels.



