

## DEFENCE

Assurance critical, engineered power transmission systems for the land and marine defence industry

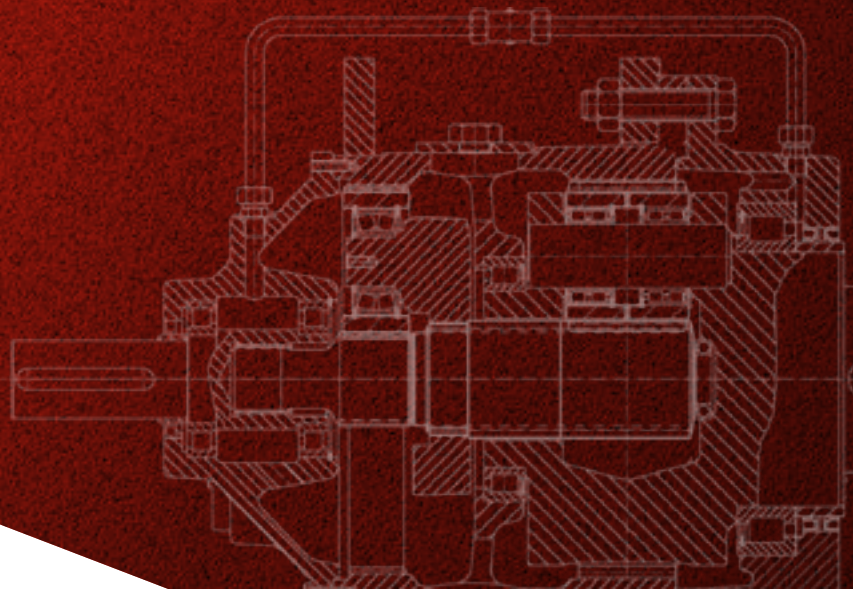


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Cement  
Chemicals  
**Defence**  
Fibre, paper & tissue  
Food & beverage  
Marine & port operations  
Metals  
Mining & minerals  
Oil & gas  
Panelboard  
Power generation  
Rail  
Rubber  
Sugar  
Water & wastewater





## Bespoke gear systems for critical defence applications

DB Defence has been integral to the development of land and marine defence gearing applications for more than 100 years. Our specialist engineers have been at the forefront of application innovation, designing bespoke transmission systems in partnership with our customers worldwide.

Over 10,000 high integrity gearboxes have been designed and manufactured at our UK centre of excellence, which continues to see investment and expansion with best in class facilities.

### Our customers

UK Ministry of Defence	Rolls-Royce	US Government
BAE Systems	Bell Helicopter	FNSS
Babcock DSG	Thales	NSPA
Lockheed Martin	Babcock	Singapore Technologies
CAT	General Dynamics	Royal Army of Oman

## Global capability

Our leading gear technology development in land, sea, space and air combined with specialist gear engineering expertise in critical applications creates a wealth of experience and inherent understanding of the industry. Our complete understanding of our customers' operating environments supports every DB Defence gear system.

Through life global service and support is delivered through customer proximity, responsive in-field and offshore service teams, long term relationships and in-depth experience of the markets we serve.

### Design and development

DB Defence is responsible for many advances in armoured warfare and continues to deliver next generation technology including low noise and high accuracy gearing to meet customer demands for reliability, stealth, availability, value and durability.

### Manufacturing capability

We have significant metallurgical expertise, testing, metrology equipment and high integrity manufacturing capabilities including a newly expanded secure assembly and test facility and unrivalled heat treatment facility. All DB Defence gearboxes are manufactured to international standards such as Lloyds, DEF-STAN and MIL-STD.

### Commissioning

Equipped, capable and experienced in offsite commissioning worldwide. Partner in acceptance trials offshore, in harbour and at sea in locations globally.



DB Defence technology and innovation has been incorporated into several generations of defence applications on land and at sea spanning over 100 years.



## Marine defence capabilities

DB Defence has extensive experience engineering high integrity, bespoke transmission systems for surface and sub-surface platforms from initial design and development to repair and overhaul.

- Depth of experience across types, roles, duties and configurations
- Bespoke, client centred design approach to achieve specific requirements with optimum assurance
- Array of concepts provides build options to enable development of optimum package
- Reassurance of specialist design, manufacturing and testing teams driving reliability, innovation and performance into the most demanding of applications
- Highly specialised application of power transmission to the weapons discharge system
- Best in class technology including low noise submarine transmissions and compact gear arrangements



### Main propulsion

- Highly reliable, silent transmission systems to meet strict acoustic specifications
- Configurations to suit gas turbine, diesel and electric prime movers including CODOG, CODAG, CODLAG and COGAG
- Option of single and double helical gearing with or without thrust cones
- High accuracy gears with optimised tooth topology
- Option of thrust cones to limit noise emissions

### Accessory drives

- Custom engineered for any ancillary operation including air turbine pumps, lifting, jacking and winching
- Full gear type range includes single and double helical, spur, epicyclic and bevel
- Manufactured to high accuracy gears with optimised tooth topography
- Utilising ferrous and non-ferrous materials for low magnetic signatures
- Creating high reliability, low noise bespoke technology
- Proven with UK Navy and 25 other Navies worldwide

### Key references for marine defence

- |                   |                                   |
|-------------------|-----------------------------------|
| Maestrale Frigate | Patrol Boats                      |
| Type 22 Frigate   | Coast Guard Vessels               |
| Type 23 Frigate   | Invincible Class Aircraft Carrier |
| Type 26 Frigate   | Offshore Patrol Vessels           |
| Type 42 Destroyer | Astute Class Submarines           |
| Type 45 Destroyer |                                   |



## Land defence capabilities

DB Defence is internationally recognised as an innovative supplier of bespoke transmission systems for armoured fighting vehicles, with an extensive installed base of proven product and track record of reliability, product upgrade and life extension.

- Advanced gear system design for the most demanding requirements including main transmissions, transfer cases and drives for accessories, turrets, pumps and final drives
- Capabilities in tracked armoured vehicles to support main cross drive transmissions and final drives
- Expertise in unique wheeled armoured vehicles driveline requirements including differential, combination, speed change, bevel, hub, and transfer gearboxes
- Re-engineering and upgrade of any brand of transmission products to meet enhanced performance requirements

### Key references for land defence

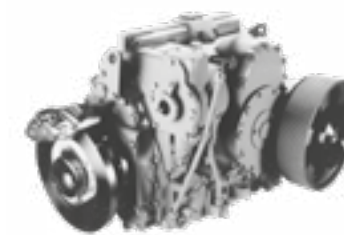
Centurion Main Battle Tank	Titan and Trojan Engineering Vehicles	CVR(T)
Chieftain Main Battle Tank	Stormer	MLRS Weapons System
Challenger 1 Main Battle Tank	Combat Engineer Tank (CET)	M1117 Armoured Security Vehicle
Challenger 2 Main Battle Tank	CRARRV Engineering Vehicles	

## Tracked vehicle transmissions



### TN54

- 1200 to 1500 bhp
- 6 forward, 2 reverse gears
- Epicyclic change speed section
- Multi-plate, hydraulically actuated clutches
- Integral hydrostatic steer system
- Integral service and parking brakes



### TN15

- 195 to 235 bhp at 2500 rpm
- Manual or automatic gear selection
- 7 forward, 7 reverse gears with ratio speed of 19.40
- Epicyclic change speed section
- Merritt-Brown regenerative steer system
- Centrifugal input clutch



### T300

- 360 bhp (automatic) 300 bhp (manual)
- 7 forward, 7 reverse gears with ratio speed of 20.45
- Manual or automatic gear selection
- Merritt-Brown regenerative steer system



### Final Drives

- Bespoke designs based on well proven in service drives
- Proven, high grade materials for durability and reliability
- Available as co-axial or offset with single or double reduction gearing
- Twin speed options



### Power take offs

- Custom engineered to suit specific vehicle and operational requirements
- Pump drives, alternator drives or other drives for auxiliary services
- Durable, reliable, minimal maintenance solutions
- Manufactured from high quality, durable materials for complete assurance





## Delivering lowest cost of ownership

We deliver innovative service support through a global network of service centres. Our responsive onsite teams will optimise reliability and help lower your total cost of ownership.

Fully qualified field service engineers are equipped to work alongside client personnel anywhere in the world to inspect, install and make recommendations to meet exacting operational requirements, resolve service issues and ensure continued product integrity and reliability

- On site services
- Service and repair
- Retrofit and upgrade programmes
- Repairs overhauls and upgrades
- Strategic spares management

## Fleet management

DB Defence continues to invest in programmes that provide significant improvements to performance and reliability of in service applications. This includes obsolescence management and re-engineering gear systems to enable drop in replacements and upgrades that deliver next generation performance within existing or new operating environments.

### CVR(T) gearbox upgrades deliver 300% MTBF improvement

The TN15E is the latest development of the TN15D gearbox which incorporates the proven reliability upgrades which were introduced in TN15E+ for higher weight and power (13 tonnes, 235 bhp) vehicles.

The TN15E offers a 300% improvement in MTBF for use in standard weight and power vehicles (9 tonnes, 195 bhp).

The TN15E is a crossdrive transmission with an integral steering system which is currently fitted to CVR(T) vehicles and is a drop in replacement for existing TN15P and TN15D transmissions. It is also suitable for other armoured personnel carrier and armoured fighting vehicle applications.



## Test facilities and test rigs

Experience and expertise in the design, installation and commissioning of advanced technology automated test rigs encompasses automotive transmissions, marine main propulsion gearboxes and pumping sets for international customers.

### Special purpose test rigs

Bespoke rigs developed for specific programmes including Challenger 2, CVR(T), Stormer and Shielder. In house multi-purpose test facilities adaptable for specific transmissions. Modular facilities available for testing and developing final drives, differential units and auxiliary units under various tilt / gradient positions.

### Data capture and rig control

System development for test rig facilities and vehicle test programmes. Provision of test instrumentation, after test analysis and reporting. Bespoke solutions are all to customer specification.

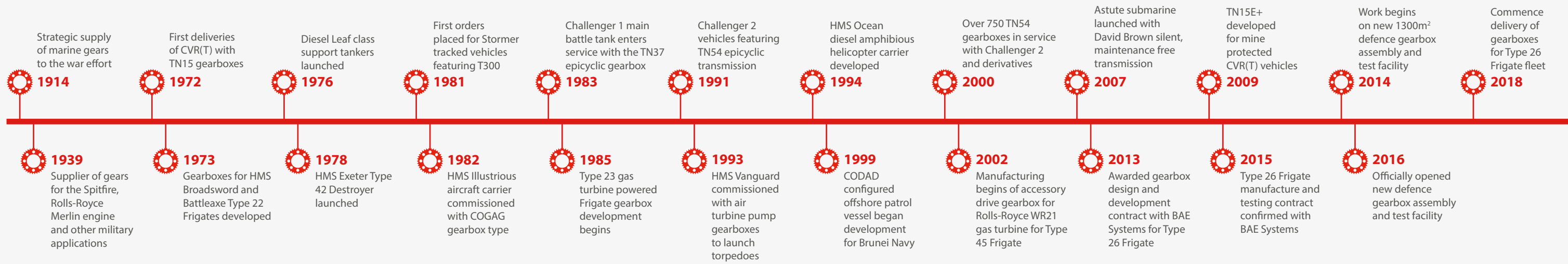
### Test solutions

Flexible testing parameters use combination of motors, cardan shafts, couplings, transfer drives and dynamometers. Available up to 4,000 Hp (drive motors and dynamometers) and 15,000 rpm dependent on load conditions.



## Generations of innovation

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