

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

Defence

Assurance critical power transmission
systems for the defence industry

Bespoke gear systems for critical defence applications

David Brown Santasalo 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 David Brown Santasalo 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

David Brown Santasalo 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 David Brown Santasalo 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.

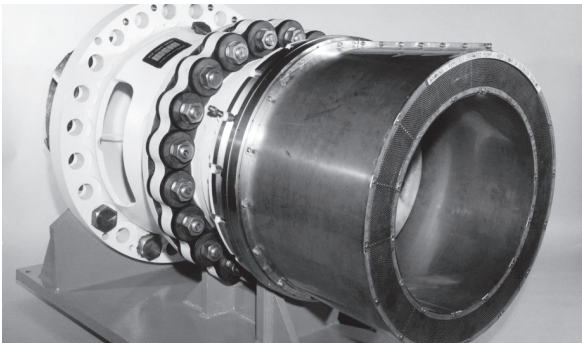
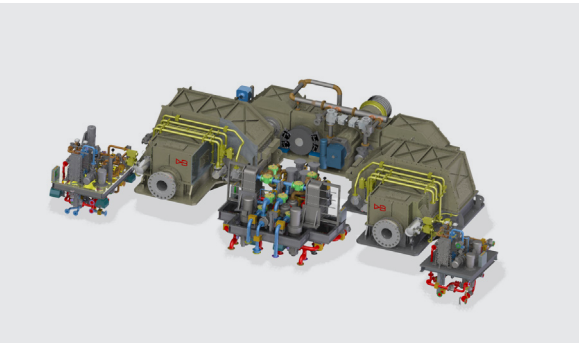


David Brown Santasalo technology and innovation has been incorporated into several generations of defence applications on land and at sea spanning over 100 years.

Marine defence capabilities

David Brown Santasalo 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

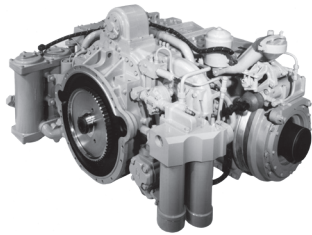
David Brown Santasalo is internationally recognised as an innovative supplier of bespoke transmission systems for armoured fighting vehicles, with an extensive installed base of proven product and track record of reliability, product upgrade and life extension.

- 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

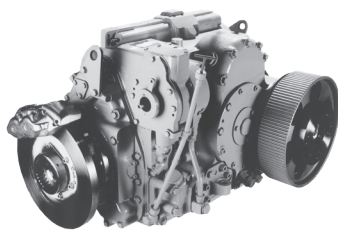
| | | |
|-------------------------------|---------------------------------------|---------------------------------|
| Centurion Main Battle Tank | Titan and Trojan Engineering Vehicles | CVR(T) |
| Chieftain Main Battle Tank | Stormer | MLRS Weapons System |
| Challenger 1 Main Battle Tank | Combat Engineer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

Tracked vehicle transmissions



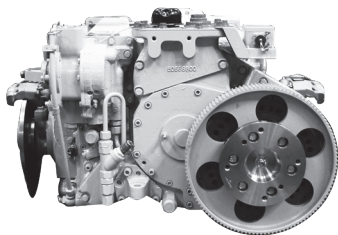
TN54

- 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



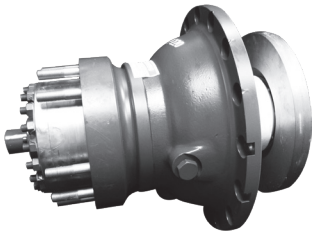
TN15

- 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



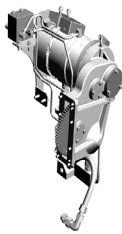
T300

- 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

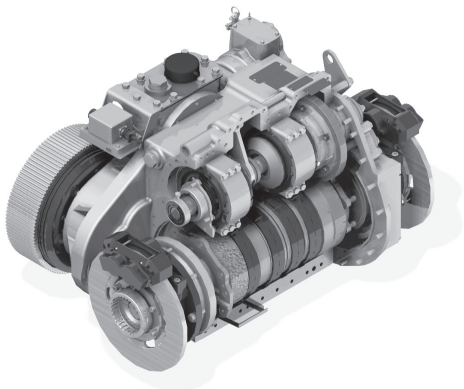
David Brown Santasalo continues to invest in programmes that provide significant improvements to performance and reliability of in service applications. This includes obsolescence management and re-engineering gear systems to enable drop in replacements and upgrades that deliver next generation performance 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.

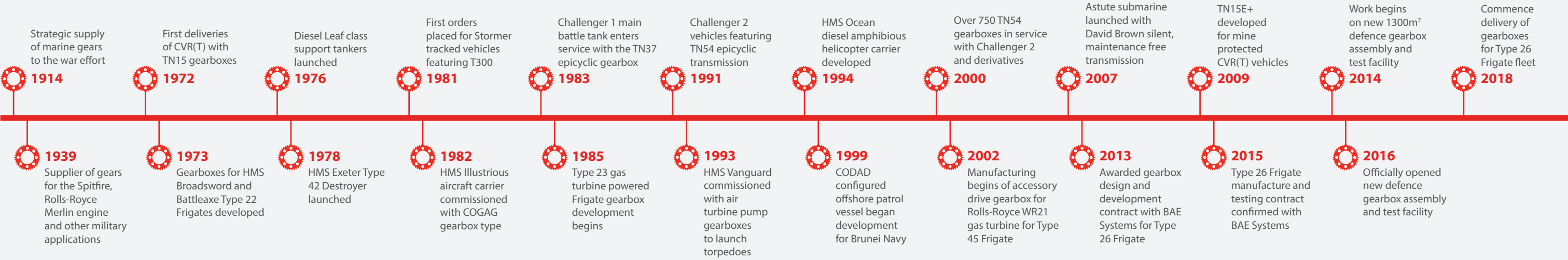
Test solutions

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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Europe

Finland
Jyväskylä, Hyvinkää & Tornio
T: +358 293 401000
E: finland@dbsantasalo.com

France
Bordeaux
T: +33 547 745 402
E: france@dbsantasalo.com

Germany
Wuppertal
T: +49 202 24 14 0
E: germany@dbsantasalo.com

Russia
Saint-Petersburg
T: +7 812 612 25 30
E: russia@dbsantasalo.com

Sweden
Gothenburg & Gällivare
T: +46 31 710 20 50
E: sweden@dbsantasalo.com

Turkey
Istanbul
T: +90 216 514 80 08
E: turkey@dbsantasalo.com

UK
Huddersfield
T: +44 1484 465500
E: uk@dbsantasalo.com

Americas

Canada
Cambridge, Ontario
T: +1 519 621 6390
E: canada@dbsantasalo.com

Canada
Montreal
T: +1 514 457 7700
E: canada@dbsantasalo.com

Chile
Santiago
T: +56 2 2234 5000
E: chile@dbsantasalo.com

Chile
Antofagasta
T: +56 5 5249 2800
E: chile@dbsantasalo.com

Peru
Arequipa
T: +51 9 7763 7240
E: peru@dbsantasalo.com

USA
Greer, SC
T: +1 864 627 1700
E: usa@dbsantasalo.com

Asia Pacific

Australia
Bulli & Melbourne
T: +61 2 4283 0300
E: australia@dbsantasalo.com

Australia
Mackay
T: +61 7 4842 3222
E: australia@dbsantasalo.com

Australia
Perth
T: +61 8 9365 5555
E: australia@dbsantasalo.com

China
Suzhou
T: +86 512 6299 8852
E: suzhou@dbsantasalo.com

China
Tianjin
T: +86 135 1245 2820
E: tianjin@dbsantasalo.com

India
Hosur, Tamil Nadu
T: +91 4344 277 740
E: india@dbsantasalo.com

Indonesia
Surabaya
T: +62 31 8910977
E: indonesia@dbsantasalo.com

Malaysia
Kuala Lumpur
T: +60 (3) 9207 9700
E: malaysia@dbsantasalo.com

Philippines
Subic Bay
T: +63 047 250 2407
E: philippines@dbsantasalo.com

Africa

South Africa
Benoni
T: +27 11 748 0000
E: salessa@dbsantasalo.com