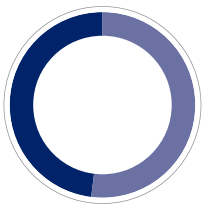
Business review

Summary
The Civil Aerospace business is a major manufacturer of aero engines for the large commercial aircraft and corporate jet markets. We power 35 types of commercial aircraft and have more than 13,000 engines in service around the world.

Key highlights

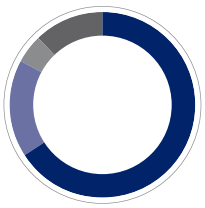
- Underlying revenue unchanged; gross margins lower:
  - Original equipment (OE): increased deliveries of newer Trent engines but lower link-accounted Trent 700 and business aviation sales reduced achieved margins.
  - Services: growth from in-production large engine fleet, but declining regional and older large engine fleet aftermarket revenues; increase in technical costs for large engines, including the Trent 700 and Trent 900, largely mitigated by foreign exchange benefits.
- £4.4bn order book growth; includes £2.1bn benefit from long-term US dollar planning rate change.
- New programmes: Trent 1000 TEN received EASA certification in July; first test run of new UltraFan® gearbox; first flight of the Airbus A350-1000 powered by the Trent XWB-97.
- Supply chain modernisation reducing costs and increasing capacity for Trent XWB ramp up.
- 2017 outlook: modest growth in revenue and profit; cost improvements offsetting OE and aftermarket mix effects.

UNDERLYING REVENUE MIX



OE revenue	**48%**
Services revenue	**52%**

UNDERLYING REVENUE BY SECTOR



Large engine	**66%**
Business aviation	**17%**
Regional	**5%**
V2500	**12%**

In 2016, the Trent 1000 was selected to power the first test flight of the Boeing 787-10 Dreamliner. It has already powered the first flights of the 787-8 and 787-9.

CIVIL AEROSPACE

Operational review

Financial overview

Overall, underlying revenue for Civil Aerospace was unchanged (up 2% at actual exchange rates). OE revenue was unchanged, with increases from higher volumes of large engines being offset by the decline in business jet engines and V2500 modules. Aftermarket revenue was down 1% despite strong growth from our in-production engines.

OE revenue from *Large engine: linked and other** was up 2% reflecting increased volumes of Trent 900s and a higher number of spare Trent XWB engines, partly offset by Trent 700 volume and price reductions, ahead of the introduction of the Trent 7000 for the Airbus A330neo. Sales of spare engines to joint ventures, included in *Large engine: linked and other**, generated revenue of £288m (2015: £189m).

OE revenue from *Large engine: unlinked installed** increased 47%, led by higher volumes of Trent XWBs.

* See table on page 20.

Large engine service revenue reflected double digit growth from our in-production engines which more than offset the reduction from older engines, including the expected lower year-on-year utilisation of Trent 500 and Trent 800 engines. Time and material revenue reduced, as a result of fewer overhauls of engines across the out-of-production fleet. Contract accounting effects within service revenue in 2016 were significantly lower than prior year. As a result, while there was a small foreign exchange improvement in 2016, underlying service revenue from large engines was down 4%. Adjusting for contract accounting effects, service revenue from large engines would have been up 2%.

Revenue from *business aviation** OE engine sales was, as expected, lower, particularly for the BR710 engines, reflecting general market weakness and a transition to newer non Rolls-Royce powered platforms. Volumes of our newer BR725 engine, which powers the Gulfstream G650 and G650ER, were stable. Overall, *business aviation** OE revenues declined 25% while aftermarket revenue was slightly down. Service revenue from our *regional** jet engines declined 14%, reflecting retirements and reduced utilisation of relevant fleets by North American operators in particular.

On the *V2500** programme, which powers aircraft including the Airbus A320, revenue from OE modules declined 10% reflecting the production slow-down as Airbus transitions to the A320neo, powered by another engine provider. However, *V2500** service revenues were 21% higher, reflecting price escalation on flying hour payments together with increased overhaul activity. Overall gross margins for Civil Aerospace were 16.8% (2015: 22.0%), declining £397m from 2015 on a constant currency basis. The main headwinds were as forecast at the start of the year: OE reductions to the Trent 700 programme; business aviation engines and V2500 modules; reduced utilisation and fewer overhauls of our out-of-production Trent 500 and Trent 800 and RB211 engines; and the declining regional aftermarket. In addition, we also incurred programme charges of around £30m for engines still in development. These were partially offset by the release, after accounting and legal review, of accruals related to the termination in prior years of intermediary services, totalling £53m (2015: £nil). Gross margin from spare engine sales to joint ventures contributed £97m (2015: £67m).

The in-year net benefit from long-term contract accounting adjustments totalled £90m (2015: total benefit of £222m, which included a £189m one-off benefit associated with the refinement of our methodology for risk assessment of future revenue). The £90m included a £217m benefit from lifecycle cost improvements (2015: benefit of £140m). We also recognised in this period a £35m benefit from a five cent change (2015: £nil) to our estimated long-term US dollar to sterling exchange rate to bring our own planning rate within updated external benchmark long-term forecast data. These benefits were offset by technical costs of £98m (2015: £24m) for large engines, including the Trent 900, relating to the need for increased shop visits in the short term, and the Trent 700, where we are upgrading the engine management system, together with a charge of £64m (2015: £83m), reflecting other operational changes.

ORDER BOOK

£71.4bn

The year-on-year change was also impacted by a one-off £65m write-back in 2015 of a previously recognised impairment of contractual aftermarket rights (CARs) for sales to a launch customer and the release of a related provision; in 2016 these sales were capitalised as CARs.

Costs below gross margin were £89m higher than the previous year at £818m on an underlying basis. Within this, R&D charges of £568m were £34m higher, reflecting higher spend on key programmes, particularly in respect of the Trent 7000 which are being expensed ahead of capitalisation and lower development cost contributions from risk and revenue sharing partners, partly offset by increased R&D capitalisation on the Trent 1000 TEN.

Underlying commercial and administrative costs were £43m higher than 2015 reflecting increased employee incentive charges. Underlying restructuring costs of £11m were £4m higher than 2015 and profits from joint ventures and associates were down £8m.

As a result, profit before financing and tax was 55% down, reflecting a combination of lower overall gross margins, higher commercial and administrative, R&D and restructuring costs and reduced joint venture and associate profits. Taking account of foreign exchange effects, underlying profit before financing and tax was £367m (2015: £812m).

CIVIL AEROSPACE | KEY FINANCIAL DATA

£m	2015	Underlying change*	Foreign exchange **	2016
Order book	**67,029**	**4,395**	**2**	**71,426**
Engine deliveries	**712**	**(63)**		**649**
Underlying revenue	**6,933**	**(27)**	**161**	**7,067**
Change		*–*	*+2%*	*+2%*
Underlying OE revenue	3,258	14	85	3,357
Change		*–*	*+3%*	*+3%*
Underlying services revenue	3,675	(41)	76	3,710
Change		*-1%*	*+2%*	*+1%*
Underlying gross margin	**1,526**	**(397)**	**56**	**1,185**
Gross margin %	*22.0%*	*-570bps*		*16.8%*
Commercial and administrative costs	(296)	(43)	(3)	(342)
Restructuring costs	(7)	(4)	–	(11)
Research and development costs	(515)	(34)	(19)	(568)
Joint ventures and associates	104	(8)	7	103
Underlying profit before financing	**812**	**(486)**	**41**	**367**
Change		*-60%*	*+5%*	*-55%*
Underlying operating margin	**11.7%**	**-700bps**		**5.2%**

* Order book underlying change includes £2.1bn increase from a change to our long-term US dollar planning rate.
** Translational foreign exchange impact.

Trading cash flow

Trading cash flow before working capital movements of £22m declined year-on-year by £462m, driven by a reduction in underlying profit before financing of £445m and increased property, plant and equipment additions. There were also increased certification costs driven by the Trent XWB-97 and higher R&D capitalisation of the Trent 1000 TEN development costs, offset in part by other timing differences including provision movements.

The overall trading cash flow improvement of £43m resulted largely from a significant year-on-year improvement in working capital, due mainly to differences in the timing of payments to suppliers and increased deposits, offset in part by an increase in inventory. In addition, reflecting the lower profits recorded on our linked engines such as the Trent 700, net long-term contract debtor additions were also lower.

TotalCare net assets and contractual aftermarket rights

TotalCare net assets increased in 2016 by £230m (2015: £406m) to £2.44bn reflecting accounting for new linked engines of £432m (2015: £521m), contract accounting adjustments taken in the year of £90m (2015: £222m) offset by the cash inflows and net other items of £(292)m (2015: £(337)m). It should be noted that the £230m net asset increase is different from the £246m used in the trading cash flow above because of foreign exchange effects on evaluating TotalCare net debtor balance movements.

The CARs balance increased by £169m (2015: increase of £156m) to £574m reflecting higher sales of unlinked Trent XWB engines partly offset by engine cost improvements.

Investment and business development

Order intake of £14.1bn in 2016 for Civil Aerospace was £1.3bn higher than the previous year. The order book closed at £71.4bn, up £4.4bn or 7% from 2015, which included a £2.1bn benefit from the change in the long-term planning foreign exchange rate discussed previously. Excluding this, the order book was up 3%.

Significant orders in 2016 included a US$2.7bn order from Norwegian for Trent 1000 engines, an order from Garuda Indonesia worth $1.2bn for Trent 7000 engines and a $900m order from Virgin Atlantic for Trent XWB. All of these include the provision of long-term TotalCare engine services.

Foundations for future growth are built from our investment in engineering excellence

During the year, we committed resources in order to ensure we made significant

CIVIL AEROSPACE | REVENUE SEGMENTATION

	2015					2016	
	£m	% of total	Underlying change	Underlying change %	Foreign exchange £m	% of total	£m
Original equipment	**3,258**	***48%***	**14**	**–**	**85**	***48%***	**3,357**
Large engine: linked and other	1,570	*23%*	32	*+2%*	2	*23%*	1,604
Large engine: unlinked installed	504	*7%*	237	*+47%*	1	*10%*	742
Business aviation	903	*14%*	(228)	*-25%*	82	*11%*	757
V2500	281	*4%*	(27)	*-10%*	–	*4%*	254
Service	**3,675**	***52%***	**(41)**	**-1%**	**76**	***52%***	**3,710**
Large engine	2,371	*34%*	(84)	*-4%*	2	*32%*	2,289
Business aviation	425	*6%*	(13)	*-3%*	40	*6%*	452
Regional	360	*5%*	(52)	*-14%*	34	*5%*	342
V2500	519	*7%*	108	*+21%*	–	*9%*	627

CIVIL AEROSPACE | TRADING CASH FLOW

£m	2016	2015	Change
Underlying profit before financing	**367**	**812**	**(445)**
Depreciation and amortisation	491	410	81
Sub-total	**858**	**1,222**	**(364)**
CARs additions	(208)	(161)	(47)
Property, plant, equipment and other intangibles	(739)	(502)	(237)
Other timing differences*	111	(75)	186
Trading cash flow pre-working capital movements	**22**	**484**	**(462)**
Net long-term contract debtor movements	(246)	(406)	160
Other working capital movements	267	(78)	345
Trading cash flow**	**43**	**–**	**43**

* Includes timing differences between underlying profit before financing and cash associated with: joint venture profits less dividends received; provision charges higher /(lower) than cash payments; non-underlying cash and profit timing differences (including restructuring); and financial assets and liabilities movements including the effect of foreign exchange movements on non-cash balances.

** Trading cash flow is cash flow before: deficit contributions to the pension fund; taxes; payments to shareholders; foreign exchange on cash balances; and acquisitions and disposals.

progress across all key engineering programmes in 2016. The Trent 1000 TEN engine undertook its first test flight in March and received its European Aviation Safety Agency (EASA) certification on 11 July. The Trent 1000 TEN will power all variants of the Boeing 787 Dreamliner family and will power the first flight of the 787-10 in 2017.

In November, the latest version of the Trent XWB, the higher thrust -97 engine, successfully powered the first flight of the Airbus A350-1000 in Toulouse. The Trent 7000 engine, which will exclusively power the Airbus A330neo, undertook ground testing for the first time and we started assembly of the first flight test engines.

In respect of future technologies, the Advance3 large engine demonstrator is proceeding well. The engine will test the new core architecture for future engine families and other key technologies such as lean burn combustion, ceramic matrix composites (CMC), CastBond (specialist turbine manufacturing) plus additive layer manufacturing (or 3D printing). It is currently in development at our Bristol, UK, facility with all core modules advancing well.

In September, we successfully ran the world's most powerful aerospace gearbox for the first time under the joint venture Aerospace Transmission Technologies (ATT). The gearbox is designed to reach up to 100,000 horsepower and is a significant step in the development of the new UltraFan engine technology.

Supporting our commitment to research and development, we also announced a US$30m expansion into a new facility in Cypress, California, that will be dedicated to research and development of ceramic matrix composite materials and processes for use in next generation aircraft engine components.

Investing in new aerospace supply chain capabilities to help drive operational excellence

In January 2016, we announced plans to invest more than £30m at our site in Washington, Tyne & Wear, UK, creating a new facility to manufacture a range of aerospace discs for in-service engines. The new facility is expected to be fully operational in 2018 and will have the capacity to manufacture well over 1,500 fan and turbine discs a year for use in a wide range of existing engines.

The construction of a £50m extension to our wide-chord fan blade facility in Barnoldswick, UK, started in December. The expanded facility will be able to manufacture 6,000 large Trent fan blades a year, almost twice its current capacity. We also announced the creation of a centre of excellence in structures & transmissions at the same site. The new centre, supported by £20m of investment, will manufacture many of the complex structures that feature in all Rolls-Royce aero engines.

Good progress strengthening our aerospace aftermarket service offering

We have continued to invest in our service capabilities to support our customers with state-of-the-art facilities and relevant products and services, particularly within our portfolio of TotalCare offerings.

During the year, we completed changes to three Approved Maintenance Centre (AMC) joint ventures. This included investing £154m to increase our stake in both Hong Kong Aero Engine Services Limited (HAESL) and Singapore Aero Engine Services Pte Limited (SAESL) to 50%. These AMCs support our strategy to offer a competitive, capable and flexible Trent service network to meet the changing needs of customers across the lifecycle of engines and to support the growing Trent engine fleet.

Additionally, we announced further details of a new AMC in Abu Dhabi with Mubadala Development Company, the emirate-based investment and development organisation. This purpose-built facility will carry out work on the Trent XWB.

We also announced that we are further expanding our global network of Authorised Service Centres (ASC) for business aviation aircraft under our CorporateCare® service provision for customers. Rolls-Royce now has 62 ASCs in place with key maintenance providers worldwide.

Following the launch of SelectCare in 2016, we secured our first agreement for Trent 800 engines as part of a wide-ranging deal with Delta Airlines.

Civil Aerospace outlook

On a constant currency basis, our Civil Aerospace business should deliver modest growth in revenue and profit in 2017, supported by large engine aftermarket growth, further lifecycle cost reductions and a higher level of R&D capitalisation. Business jet demand is expected to weaken further, as will the demand for aftermarket services to support Rolls-Royce powered regional aircraft. After a better year for trading cash flow in 2016, we now expect this to be broadly unchanged year-on-year reflecting higher volumes of cash-loss-making engines offsetting the positive effects of higher aftermarket cash revenues.

We expect the TotalCare net asset to peak in the next 12 months at between £2.5bn and £2.7bn, reflecting further targeted lifecycle cost improvements and other timing differences between cost and cash.

Positive market developments continue to drive long-term growth in Civil Aerospace

The long-term positive market trends for our leading power and propulsion systems remain unchanged despite some near-term uncertainties in Civil Aerospace that continue to impact business jet engine production volumes and service activity on older large engines. The long-term trends driving demand for growth in large passenger aircraft, business jets, power systems and maritime activity remain strong; in particular a growing aspirational and mobile middle-class, particularly in Asia, and globalisation in business, trade and tourism.

While recent political and economic developments have added some uncertainty to near-term utilisation, we continue to expect that strong widebody airframe demand – driven by the need for newer, more fuel-efficient aircraft – should provide resilience to manufacturing schedules over the next few years as the industry undergoes a strong replacement cycle.

New airframe growth and transitions are in line with expectations

Preparations for the transition of the Airbus A330ceo to A330neo models are also progressing well and once the transition is completed we will benefit from an exclusive position with the new Trent 7000 on the A330neo.

The roll-out of new engines, including the Trent XWB for the highly successful Airbus A350 family, will significantly grow our market share and the installed base of new engines that will deliver strong aftermarket revenues for decades to come.

Market review

Rolls-Royce is one of the world's leading civil aero-engine manufacturers with particular strengths in engines for civil widebody aircraft and large business jets, underpinned by our strength and continued investment in technology.

We have a strong market position on widebody aircraft produced by the world's two major aircraft manufacturers: Airbus and Boeing, who are broadly consistent in forecasting air traffic growth (revenue passenger kilometres) of approximately 5% compound annual growth rate over the next 20 years. In the engine market for narrowbody aircraft, we continue to supply some parts and services for the IAE V2500 engine family.

We are market leaders in the large business jet fleet market powering aircraft from most of the main aircraft manufacturers.

Key Rolls-Royce differentiators

⊕ Barriers to entry are extremely high. We invest heavily to maintain market-leading technologies and system level integration capabilities to deliver the best engine performance for our customers. We offer a wide range of aftermarket services which provide flexible and cost-effective options to our customers and build long-term relationships.

Market dynamics

- Overall there has been a slowdown in all major geographical markets for new aircraft orders after a period of higher than normal order placement for new airframe products in recent years (principally Airbus A350 XWB and A330neo, and Boeing 787 and 777X).
- Long-term growth in the number of widebody aircraft in the global fleet has historically been strongly correlated to global GDP growth and disposable income.
- Historically, growth has recovered quickly following major economic shocks. The geographic spread of our installed base and wide customer base spreads our risk and reduces our exposure to any one shock.
- Our current share in the widebody engine market is at 32% of the installed passenger fleet and is expected to exceed 50% early in the next decade.
- Older widebody aircraft are experiencing reduced utilisation by certain airlines.
- Trent-powered aircraft are starting to transition from their original operators to other operators as the fleet matures. This year, 46 Trent-powered aircraft transitioned, 13 of which were Trent 800-powered Boeing 777 aircraft.
- Over 90% of the Rolls-Royce widebody engine fleet is covered by our TotalCare service agreements.
- Over 65% of Rolls-Royce business jet engines are covered by our CorporateCare service agreements.
- Long-term demand for large business jets is related to global economic growth and increases in the number of high net worth individuals; the sector has historically been fairly resilient to financial shocks.
- The business jet market is slowly recovering in the US (our largest market), but is currently going through a slowdown elsewhere due to political tensions and customer anticipation of new models about to enter into service.
- Aftermarket demand for engines on 50-70 seat aircraft is reducing in line with expectations.

Competition

- GE is the main competitor supplying engines in the widebody sector. In 2016, deliveries of engines for widebody passenger aircraft were split Rolls-Royce 38%, GE 54%, Engine Alliance 6% and Pratt & Whitney 2%.
- Rolls-Royce is well positioned on all Airbus widebody airliner programmes and competes with GE on the Boeing 787 family.
- Rolls-Royce is the sole engine provider on the Airbus A350 XWB family where 810 aircraft have been ordered so far.
- GE is the sole engine provider on the Boeing 777X aircraft, scheduled to enter into service in 2020 where 306 have been ordered so far.
- In large business jets, the main competition is GE, Pratt & Whitney and Safran.
- Rolls-Royce has 3,100 powered business jets flying, representing 55% market share of the large/very large business jet fleet.

Business risks

- If we experience a major product failure in service, then this could result in significant adverse financial and reputational consequences and potential litigation.
- If an external event or severe economic downturn significantly reduces air travel and thereby reduces engine flying hours and demand for aircraft, then our financial performance may be impacted.
- If our aircraft manufacturer customers significantly delay their production rates, then our financial performance may be impacted.
- If we fail to achieve cost reductions at the necessary pace, then our ability to invest in future programmes and technology may be reduced.
- If we experience significant pricing pressure from increased competitor challenge in our key markets, then our financial performance may be impacted.
- If we suffer a major disruption in our supply chain, then our delivery schedules may be delayed, damaging our financial performance and reputation.
- If there are significant changes to the regulatory environment for the airline industry, then our market position may be impacted.

Trent XWB

The latest version of the Rolls-Royce Trent XWB, the most efficient large aero engine flying in the world today, has powered the Airbus A350-1000 aircraft to the skies for the first time. The Trent XWB-97 is the sole powerplant for the longer range A350-1000, which will enter service in 2017.

The first test flight, which took place in November at Toulouse, France, marked another milestone for the Trent XWB, our largest Civil Aerospace programme.

The Trent XWB-84 has already delivered outstanding performance and reliability since it first went into service in January 2015, powering the A350-800 and A350-900. The Trent XWB, specifically designed for the A350 XWB, is the fastest-selling widebody engine ever, with more than 1,600 already sold or on order.

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Opportunities

- Our position and long-term prospects in the widebody sector are strong across our Trent family.
- We continue to invest in our technology demonstrator programmes which underpin our Advance and UltraFan engine programmes. We are well positioned for future aircraft requirements, while also delivering technologies to enhance our existing product portfolio.
- The Trent XWB has now been in service for two years, with 64 Airbus A350s delivered to ten airlines and one lessor. In November, the A350-1000 successfully completed its first flight.
- Rolls-Royce is the sole supplier of engines for the new Airbus A330neo. The Trent 7000 engine is in development, and the first flight is expected in 2017.
- The new Trent 1000 TEN for the Boeing 787 is scheduled to enter service in 2017, which will deliver significant fuel efficiency improvement and an opportunity for greater market capture.
- China's COMAC is also planning a joint programme with Russia's UAC to develop a widebody aircraft, targeting entry into service around 2025. We remain in close dialogue with COMAC and UAC to understand their plans and whether their widebody programme presents an opportunity for Rolls-Royce.
- Our business jet market share is likely to fall in the medium term with the success of new entrants into the large/very large sector, but the market remains attractive and we will continue to invest to improve our position and retain leadership.

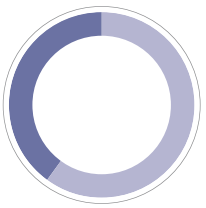
Summary
We are a leading engine maker for the military transport and patrol market and the second largest provider of defence aero-engine products and services globally. Rolls-Royce has 16,000 defence engines in service with 160 customers in over 100 countries.

Key highlights

- Underlying revenue up slightly; modest growth in OE.
- Underlying profit before financing down 8%; reflecting adverse product mix and costs related to the TP400 programme, partially offset by through-life cost-savings on a major EJ200 contract.
- Investing to enhance manufacturing, aftermarket service and closer proximity to core customers.
- 2017 outlook: revenue steady; margin and profit expected to soften from recent levels.

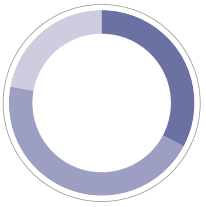
The F-35 Lightning II employing the Rolls-Royce LiftSystem®, demonstrated its vertical landing capabilities in the UK for the first time in 2016.

UNDERLYING REVENUE MIX



OE revenue	**40%**
Services revenue	**60%**

UNDERLYING REVENUE BY SECTOR



Combat	**33%**
Transport and patrol	**45%**
Other	**22%**

DEFENCE AEROSPACE

Operational review

Financial overview

Underlying revenue of £2,209m was up slightly on the prior year. Higher volumes for TP400 production, together with increased Adour engine deliveries, helped original equipment (OE) revenues increase 3%. Service revenues were stable, with lower demand for spare parts offset by increased revenues from long-term Eurofighter Typhoon and C-130J service contracts.

Gross margin declined by £49m, reflecting lower sales of spare parts, an adverse change in OE product mix, additional expenditure of £31m on the TP400 programme and higher payroll costs. Retrospective contract margin improvements totalled £82m, £5m lower than prior year, but ahead of early expectations. Of this, around half relates to delivering significant cost saving benefits on the largest Eurofighter Typhoon contract, which triggered a cost-saving incentive award.

While overall R&D costs were slightly lower than the prior year, the business continued to invest in future programme development and the Indianapolis transformation.

Restructuring costs were lower due to reduced level of severance costs and reversal of a provision for the closure of the defence facility at Ansty, UK, through better cost recovery than expected. Underlying commercial and administrative costs and other costs were similar to prior year.

Profit before financing of £384m was 8% lower than the prior period, driven by the lower gross margin.

Investment and business development

Order intake for 2016 was £1.5bn (2015: £1.7bn), reflecting significant follow-on export orders being delayed to 2017.

Significant activities in 2016 included: winning orders for the F-35B LiftSystem™; increased MRTT engines for A330 aircraft; and contract renewals for services. Deliveries of engines were slightly higher in 2016, driven by increased units for TP400 and Adour export. Services revenues were steady, reflecting higher flying hours from newer EJ200, F405 Adour and AE 2100 powered aircraft in the UK, North America and the Middle East.

The first T56 Series 3.5 technology insertion kits delivered to the US Air Force (USAF) for its legacy Hercules C-130 fleet have validated the expected fuel saving and performance benefits, prompting growing interest in the upgrade.

The UK and French Governments also committed to the €2bn UK-France Unmanned Combat Air System (FCAS) unmanned combat air system programme in December, enabling progress through to the demonstrator phase of the programme in 2017. Our LibertyWorks development unit was selected to provide the vertical lift propulsion for the new DARPA VTOL X-Plane. The unit also launched an infrared footprint suppression module, reflecting our diverse and cutting-edge technology capability.

Within the Services portfolio, the support contract for the US C-130J transport fleet was renewed and we signed a memorandum of understanding with Pratt & Whitney to extend support for the UK's new F-35B Lightning fleet beyond the Rolls-Royce LiftSystem.

This strategy of strengthening our service offerings closer to our major customers saw the opening of new on-base Service Delivery Centres in the UK (at RAF Brize Norton) and in the US (at Kingsville, Texas), as well as a new joint engine support facility for the USAF Global Hawk fleet.

ORDER BOOK

£3.9bn

As part of the TP400 consortium, the focus was on delivering solutions to improve the on-wing reliability of the GE-Avio gearbox. This included an on-wing exchange procedure which has greatly helped to reduce the service time and backlog.

Transformation milestones were achieved as planned, including completion of the first production cell as part of the investment activity in Indianapolis. Further manufacturing changes are due to come on stream in the first half of 2017.

Defence Aerospace outlook

While revenues should remain steady, margins are expected to come under pressure from the essential investments in efficiency and long-term growth. These reflect important product development and manufacturing transformation initiatives as the business looks to capitalise on its strong positions, particularly in combat and transport & patrol, and the absence of significant incentive arrangements under remaining long-term service agreements. As a result, margins and profits are expected to soften from the recent levels.

DEFENCE AEROSPACE | KEY FINANCIAL DATA

£m	2015	Underlying change	Foreign exchange*	2016
Order book	**4,316**	**(391)**	**1**	**3,926**
Engine deliveries	**649**	**12**	**–**	**661**
Underlying revenue	**2,035**	**17**	**157**	**2,209**
Change		*+1%*	*+8%*	*+9%*
Underlying OE revenue	801	22	67	890
Change		*+3%*	*+8%*	*+11%*
Underlying services revenue	1,234	(5)	90	1,319
Change		*–*	*+7%*	*+7%*
Underlying gross margin	**579**	**(49)**	**34**	**564**
Gross margin %	*28.5%*	*-260bps*		*25.5%*
Commercial and administrative costs	(124)	(3)	(7)	(134)
Restructuring	(8)	18	–	10
Research and development costs	(73)	5	(3)	(71)
Joint ventures and associates	19	(4)	–	15
Underlying profit before financing	**393**	**(33)**	**24**	**384**
Change		*-8%*	*+6%*	*-2%*
Underlying operating margin	**19.3%**	**-180bps**		**17.4%**

* Translational foreign exchange impact.

Market review

Rolls-Royce is a market leader in defence aero engines for military transport and patrol aircraft and has strong positions in other sectors, including combat aircraft, trainer aircraft and helicopters. We are pursuing new opportunities emerging in Asia and the Middle East to mitigate flat defence budgets in the established North American and European markets.

Key Rolls-Royce differentiators

We are investing heavily in technology, integration capabilities and facility modernisation to deliver capable, affordable engines for our customers. Additionally, we leverage our large installed base and strong services capabilities to provide superior and affordable service solutions.

Market dynamics

- Defence budgets are expected to show modest growth, flat in real terms in the US and UK, partially offset by growth in other emerging markets.
- Western customers are seeking to reduce and minimise costs by delaying or deferring purchase, improving asset availability and extending lifecycles of aircraft/engines.
- Increasing levels of economic affluence and political tension in the Asia Pacific and Middle East regions are leading to increases in both OE and services spend.
- Revenue has historically been broadly balanced between OE sales and aftermarket services, biased towards the latter.

Business risks

- If we experience a major product failure in service, then this could result in loss of life and have a major, negative impact on our reputation.
- If global defence spending experiences a further downturn, then our financial performance may be impacted.
- If we do not continue to invest to improve the performance and cost of our products, then we may lose market share.
- If we suffer a major disruption in our supply chain, then our delivery schedules may be delayed, damaging our financial performance and reputation.
- If we do not secure new applications, then our capabilities may be eroded in the long term.

Competition

- GE, Pratt & Whitney, Honeywell, and Safran are our main competitors in our sectors.
- In Europe, large defence programmes tend to be addressed by consortia of two or more companies due to the political environment. Examples include our collaboration with ITP, MTU and Safran on the TP400 engine for the Airbus A400M and with GE Avio, ITP and MTU on the EJ200 engine for the Eurofighter Typhoon.
- We work with our EJ200 engine partners on campaigns for Eurofighter Typhoon export sales opportunities as well as new indigenous combat programmes.
- Barriers to entry are high and we do not envisage the competitive landscape changing significantly in the near future.

Opportunities

- The UK's commitment to the next phase of the FCAS programme presents a next-generation combat development opportunity for Rolls-Royce.
- Our LiftFan system for the F-35B is just entering service and we expect to deliver over 400 systems in the next 20 years.
- Developing markets, such as India and Turkey, are inviting bids on new combat aircraft. We estimate a potential of over 300 aircraft for these programmes.
- In transport, we believe the Airbus A400M transport aircraft and V-22 Osprey have overseas sales opportunities.
- We see strong growth potential for increased service provision to the military and we are well positioned with programmes such as MissionCare®.

Improving fuel efficiency

Technical advances for our T56 engines on legacy Lockhead Martin C-130 and P-3 aircraft have led to significant improvements in fuel economy. The US National Oceanic and Atmospheric Administration (NOAA) was the launch customer and installed T56 engine upgrade kits, known as the Series 3.5, on its two 'Hurricane Hunter' P-3 aircraft. The result: fuel economy improvement of 12% on average after more than 3,000 engine flight hours through and around hurricanes. The USAF completed a Series 3.5 installation on the first of its fleet of C-130H aircraft and early flights showed similar results. The USAF will roll out the upgrades into C-130s operated by USAF Reserve and Air National Guard units, leading the way for installation of the Series 3.5 kits into the global fleet of hundreds of transport aircraft flown by other customers around the world.

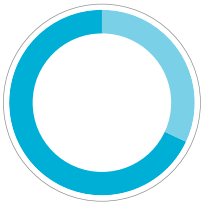
READ MORE AT WWW.ROLLS-ROYCE.COM

Summary
Power Systems is a leading provider of high-speed and medium-speed reciprocating engines, complete propulsion systems and distributed energy solutions as well as key engine components including fuel injection systems and turbochargers. The business serves the marine, defence, power generation and industrial markets through its core brands MTU, MTU Onsite Energy and L'Orange.

Key highlights

- Underlying revenue 1% lower; growth in power generation and industrial markets offset by reduction in commodity and oil price driven sales.
- Underlying profit before financing 14% lower; volume reduction and adverse product mix.
- Good start to transformation with new leadership in place to drive further performance improvement.
- 2017 outlook: steady, healthy order book in key segments offsetting some challenging markets.

UNDERLYING REVENUE MIX



OE revenue	68%
Services revenue	32%

UNDERLYING REVENUE BY SECTOR

Marine	33%
Energy	33%
Industrial	21%
Defence and other	13%

A 20-cylinder MTU Series 4000 engine powers a Liebherr mining truck.

POWER SYSTEMS

Operational review

Financial overview

Underlying revenue of £2,655m was 1% lower at constant currency (11% higher including the impact of translational foreign exchange). Overall original equipment (OE) revenue declined 1%. Growth in sales of diesel and gas products to power generation and industrial customers offset reductions within markets where demand is linked to low oil and commodity prices, and reduced activity in naval markets.

Service revenues reduced 2%, largely reflecting weaker marine medium-speed markets, once again reflecting low oil prices.

Gross margin reduced by £28m in absolute terms and by 90 basis points, to 26.6% (2015: 27.5%) with good progress on cost reduction generated from transformation activity offsetting some of the impact of volume reduction, adverse changes in product mix and a reduction in the discount rate applied to the warranty provision.

Overall, underlying profit declined £27m or 14%, led by the reduction in gross margin. Costs below gross margin remained broadly unchanged on an underlying basis. The £9m increase in commercial and

administrative costs was offset by a £5m reduction in R&D reflecting a more focused approach to future product development activity together with reduced underlying restructuring costs. An exceptional charge of £45m has been taken for restructuring activity.

Investment and business development

Power Systems' customers span a range of markets from power generation and defence to marine, industrial and construction markets. This end-market diversity has enabled the business to mitigate some of the weak market environments and as a result, the order book ended the year at £1.8bn (2015: £1.9bn).

2016 order intake of £2.4bn (2015: £2.5bn) was 2% down at constant currency, with the year-on-year reduction being mainly in oil & gas and commodity-related markets including marine, together with lower government project orders. This was offset by improvements within power generation, agricultural and industrial markets.

Within power generation markets, we delivered 200 gensets (a package of engine and generator) to the Asian VPower Group, one of our strategic partners in the region. We have continued to strengthen our position in the growing market for back-up power for larger mission-critical applications.

Order intake later in the year was healthy for solutions to support data systems in both Europe and the US and also for independent power customers. We have also agreed to establish a 50/50 joint venture with Yuchai Machinery Company Ltd for the production under licence of MTU Series 4000 diesel engines in China, targeting the Chinese off-highway market.

Demand for our marine products remained good. Naval orders included gensets for the UK Royal Navy's Type 26 Global Combat Ship and a supply contract for the Italian Navy relating to a new multi-purpose ocean-going patrol vessel. Within the land defence markets, there was a follow-up order for use in a German armoured vehicle.

In other areas, we continued to attract new customers in new regional markets including Japanese high-tech crane producer Kato. We also made progress within the rail market in both Europe and Asia. This included a notable order from Hitachi Rail Europe for over 100 MTU PowerPacks® for use in the UK and an order to remanufacture (an in-house process, known as Reman, to refurbish and extend the life of existing systems) around 400 MTU PowerPacks for Transdev Group in Germany.

Innovation was again strong with some notable new products coming to market in the year. We launched new advanced diesel and gas propulsion systems which meet new IMO and EPA emissions standards.

ORDER BOOK

£1.8bn

At the same time, we launched advanced propulsion systems for the construction and industrial markets which satisfy new emission standards in those industries. Finally, we launched a hybrid power pack and energy pack battery system for the rail market.

Power Systems also made progress with the transformation programme, targeting reductions in product costs as well as strengthening sales and service resources and leveraging digital capabilities to develop value adding services.

Power Systems outlook

The outlook for Power Systems remains steady. The business finished the year with a strong order book for several of its key markets. Whilst some markets, particularly those impacted by oil and commodity prices, remain difficult, we expect the business to deliver modest growth in revenue and profit in 2017.

POWER SYSTEMS | KEY FINANCIAL DATA

£m	2015*	Underlying change	Foreign exchange**	2016
Order book	**1,928**	**(113)**	**–**	**1,815**
Underlying revenue	**2,385**	**(25)**	**295**	**2,655**
Change		*-1%*	*+12%*	*+11%*
Underlying OE revenue	1,618	(9)	201	1,810
Change		*-1%*	*+12%*	*+12%*
Underlying services revenue	767	(16)	94	845
Change		*-2%*	*+12%*	*+10%*
Underlying gross margin	**656**	**(28)**	**79**	**707**
Gross margin %	*27.5%*	*-90bps*		*26.6%*
Commercial and administrative costs	(296)	(9)	(35)	(340)
Restructuring	(4)	4	–	–
Research and development costs	(162)	5	(20)	(177)
Joint ventures and associates	–	1	–	1
Underlying profit before financing	**194**	**(27)**	**24**	**191**
Change		*-14%*	*+12%*	*-2%*
Underlying operating margin	**8.1%**	**-110bps**		**7.2%**

* 2015 figures have been restated as a result of costs previously reported in 'cost of sales', being reclassified as 'other commercial and administrative costs' to ensure consistent treatment with 2016.
** Translational foreign exchange impact.

Market review

The markets served by Power Systems are driven by long-term global trends such as increasing population growth, rising demand for energy, natural resources and food as well as stricter emissions legislation. Despite an unprecedented downturn in commodity prices in recent years, the utilisation rates in the exploration and production industry are showing some early signs of recovery. Demand for high-specification system solutions such as power for data centres and rail power packs has proved robust. We remain confident of long-term growth in our principal markets. Power Systems continues to invest in new technology, improved customer solutions and aftermarket services to address market developments and new requirements.

Key Rolls-Royce differentiators

- Technology leadership and reputation with market-leading performance and system solutions; new product innovation (eg. hybrid/e-drive and mobile gas solutions); and high level of customisation.

Market dynamics

- Population growth and increasing urbanisation are driving demand for clean, efficient power and infrastructure investments.
- Global GDP development with particular growth in Asia and Africa.
- Increasing global and regional trade and transport of goods.
- Geopolitics and migration are driving modest defence budget growth (1-2%) in NATO countries with higher growth in emerging markets and the Middle East.
- Increasing focus on renewable energy sources requires decentralised and clean energy solutions (eg. back-up power).
- Increasing environmental legislation and efficiency requirements help drive emission and efficiency technologies.
- Current weak environment in certain end markets (eg. oil & gas and mining), due to current low oil and commodity price levels.

Business risks

- Economic: some of our markets, especially oil & gas and mining, continue to be impacted by low commodity prices – this has been partially offset by a resilient performance in other sectors (eg. power generation and rail).
- Political: increasing political tensions and uncertainties, and remaining sanctions limit levels of global trade and customer access in certain regions.
- Competitive: increasing activities of Asian competitors and new market entrants in our core power range of MTU Series 4000 engines potentially influence volumes and margins.
- Technological: emerging new technologies with falling costs (eg. battery and solar) might influence existing solutions such as back-up power generators.

Competition

- Fragmented competitor landscape in off-highway engine markets which varies depending on specific market segments – multiple players although a few dominate.
- Continuing industry consolidation results in strong, large-scale and integrated players.
- Expansion of western competitors in our specific core engine markets.
- Competition from Asia increasingly focusing on higher power ranges where MTU operates.
- While traditional competition has been limited to engine suppliers, solution providers are becoming more relevant.

Opportunities

- Regional growth, especially in China, India and South East Asia.
- Leveraging partnerships to expand geographical reach and extend product scope in core market segments.
- Stricter global emission legislation strengthens demand for emission and efficiency technologies (eg. exhaust after treatment).
- Enhancement of system competence and solutions to create customer value through optimised total system functionality and performance.
- Growth in service and digital offerings to serve complete lifecycle solutions and improve customer operations.
- Growth through extended key engine component offering, including turbochargers.
- Leveraging trend towards increasing electrification through strengthening electric capabilities (eg. hybrid and diesel-electric propulsion systems).

MTU drives for key British railway projects

The Intercity Express Programme (IEP) is one of the biggest transport projects in the UK: 122 new high-speed trains built by Hitachi Rail Europe are scheduled to go into service on the East Coast Main Line and Great West Main Line routes from 2017.

Rolls-Royce is supplying more than 330 MTU PowerPacks each producing up to 700 kilowatts for these super express trains. At the heart of the drive system is the state-of-the-art, fuel efficient MTU 12V 1600 R80L engine, which meets the stringent EU Stage IIIB emission standard thanks to an integrated selective catalytic reduction system. MTU will maintain and guarantee the availability of the engines throughout the entire 27-year lifetime of Hitachi's contract for IEP.

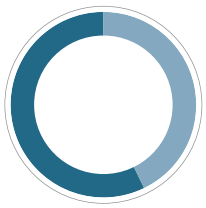
READ MORE AT WWW.ROLLS-ROYCE.COM

Summary
Marine is a leading provider of propulsion and handling solutions for the maritime offshore, merchant and naval markets. The offerings range from standalone products to complex integrated systems including ship design. The business has more than 4,000 customers, with 70 naval forces and over 30,000 commercial vessels using our equipment.

Key highlights

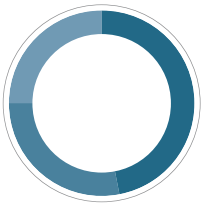
- Underlying revenue down 24%; weak offshore markets impacting both OE and service revenues.
- Underlying profit before financing negative; lower volumes and reduced overhead absorption.
- Net restructuring benefits from current and legacy programmes starting to improve performance.
- £200m impairment of goodwill reflecting a more cautious outlook; further weakness in offshore oil & gas markets offset by ongoing cost improvements as we refocus the business.

UNDERLYING REVENUE MIX



OE revenue	**57%**
Services revenue	**43%**

UNDERLYING REVENUE BY SECTOR



Offshore	**47%**
Merchant	**28%**
Naval	**25%**

The Bergensfjord, a ferry operating between Norway and Denmark, has won awards for environmental performance thanks to four Bergen pure gas engines and a Rolls-Royce propulsion and steering system.

MARINE

Operational review

Financial overview

Underlying revenue of £1,114m was 24% lower on a constant currency basis. Within this, original equipment (OE) and services revenues were 26% and 21% lower respectively. This reflected continued weakness in offshore and merchant, as ship owners deferred overhaul and maintenance on the back of reduced utilisation of their vessels.

Gross margin was £236m, an improvement of 170 basis points versus 2015, but £(44)m lower in absolute terms, as a result of the lower volume. The improved gross margin percentage partly resulted from cost reduction actions. Overall this resulted in a net loss of £27m.

The announcement in December 2016 of further organisational changes and headcount reduction in 2017 has led to an exceptional £5m restructuring charge. In addition, £200m of the Group impairment of goodwill was in Marine and mainly related to the acquisition of Vickers in 1999.

Investment and business development

Overall, the Marine order book declined 29% during the year at constant currency, reflecting adjustments for a number of postponed or cancelled orders and very weak offshore markets. Orders for new vessels, projects and services were all sharply lower than 2015 and, as a result, order intake was only £715m, 29% down on the previous year at constant currency.

The offshore market was extremely challenging, driven by a low oil price and reduced capital expenditure within the upstream oil exploration and related services sectors. Several merchant segments were also subdued, reflecting generally weak conditions in the global marine industry. The business focused on using its strengths as a system integrator to leverage across adjacencies, including designing and equipping the UK's new polar research ship, RSS Sir David Attenborough. It also landed a major deal to design and equip Hurtigruten's new explorer cruise ships, along with battery solutions to make full electric propulsion possible.

The business announced a contract to supply the world's first automatic crossing system to ferry operator, Fjord 1, and also launched our new Azipull Carbon thruster with yacht builder Benetti, reflecting the increasing importance of newer technologies. The fishing segment remained strong, with contracts won for a range of vessels. The naval business was focused on further development work and supporting customers across Asia, Europe and the US. These included supporting successful sea-trials for the US Navy's most advanced warship the USS Zumwalt, further MT30 orders for new Italian helicopter landing craft and selection by the New Zealand Navy for ship design of its MSC programme.

The Marine business continues to lower its cost base and build flexibility into the organisation, particularly across back-office and operational activities. The restructuring programmes announced in 2015 have led to a reduction of around 1,100 headcount with £65m of annual savings recognised from 2017.

Reflecting the ongoing subdued and increasingly cost-conscious market environment, in December further restructuring to take place in early 2017 was announced, targeting annualised savings of around £50m. This included a further headcount reduction of around 800 across operations and back-office functions as the business continues to shrink footprint, reduce indirect headcount, and consolidate manufacturing activity.

At the same time, investments were made in the strategic enablers of the future, including upgrading our azimuth thruster production facility in Rauma, Finland. The £44m project will create a state-of-the-art production facility for one of our most important product groups.

ORDER BOOK

£905m

The pace of technology change in the sector is accelerating, and we continue to invest in pioneering research into ship intelligence technologies focused on data-driven, value-added services that facilitate full ship automation in the long term.

Marine outlook

Overall, the outlook for Marine remains cautious. We expect that the market will continue to feel the impact of low oil prices, and the general overcapacity in several segments will take time to reach equilibrium. This will impact the demand for our products and services. We will sustain our active cost reduction programmes, focusing on manufacturing, supply chain and overhead costs, in order to drive a more competitive business adapted to the current market conditions.

MARINE | KEY FINANCIAL DATA

£m	2015	Underlying change	Foreign exchange*	2016
Order book	**1,164**	**(337)**	**78**	**905**
Underlying revenue	**1,324**	**(312)**	**102**	**1,114**
Change		*-24%*	*+8%*	*-16%*
Underlying OE revenue	773	(198)	56	631
Change		*-26%*	*+7%*	*-18%*
Underlying services revenue	551	(114)	46	483
Change		*-21%*	*+8%*	*-12%*
Underlying gross margin	**260**	**(44)**	**20**	**236**
Gross margin %	*19.6%*	*+170bps*		*21.2%*
Commercial and administrative costs	(201)	(6)	(17)	(224)
Restructuring	(16)	19	(1)	2
Research and development costs	(28)	(11)	(2)	(41)
Underlying profit before financing	**15**	**(42)**	**–**	**(27)**
Change		*-280%*		*-280%*
Underlying operating margin	**1.1%**	**-380bps**		**-2.4%**

* Translational foreign exchange impact.

Market review

We forecast long-term growth opportunities across our commercial and naval market segments. Short-term performance will continue to be impacted by the weakness in offshore oil & gas exploration.

Key Rolls-Royce differentiators

- Unique domain knowledge, portfolio of products with overlaying levels of systems integration; joint value proposition within naval markets with Power Systems; continuous maritime innovation and technology leadership, and leadership in emerging digital marine markets.

Stealth power

The commissioning of the world's most advanced naval ship, USS Zumwalt, took place in October. Powered by two Rolls-Royce MT30 main gas turbine generators and two auxiliary turbine generators, and driven by two fixed pitch Rolls-Royce propellers, the USS Zumwalt is an all-electric ship at the cutting edge of naval technology.

Rolls-Royce technicians joined the ship throughout an extensive period of sea trials to ensure a successful entry into service.

READ MORE AT WWW.ROLLS-ROYCE.COM

Market dynamics

- We operate in three key markets – offshore, merchant and naval – with growth fundamentally driven by GDP, trade, oil price and defence spending.
- Population growth, urbanisation and industrialisation support growth in demand for energy and trade, in turn driving demand for offshore and merchant vessels.
- Exploration and production spending cuts result in the offshore segment experiencing very low fleet utilisation, declining charter rates, lay up of vessels (impacting services revenue) and increased scrapping.
- We expect exploration activity to return to growth over time to compensate for the depletion rate of current wells. However, there is unlikely to be a positive impact in 2017.
- Merchant segment facing overcapacity and weak earnings in most cargo segments; however, good opportunities in cruise and passenger vessels, and a stable tug and workboat market.
- Expect strong efficiency and cost focus when merchant and offshore markets rebound.
- Naval market is forecast to remain stable as defence expenditure remains consistent.
- Overcapacity in shipbuilding and vessel fleets leading to consolidation at customer level.
- Asian yards are expected to continue playing a major role in shipbuilding with further increased regional vessel ownership, particularly in China.
- Continuing trend of supply chain moving east to where the majority of ships are built.

Business risks

- Markets: continuing low oil price results in sustained pressure in the offshore market with customer groups reducing costs and capital commitments, thereby delaying market recovery.
- Competition: competitors react to a depressed market by cutting costs, pricing aggressively and partnering with other players.
- Contracting: order delays and cancellations impact our revenue, cash and profit but also put our supply chain under financial stress.
- Customer and supply chain financial pressure: continuing market downturn leaves some customers and suppliers exposed to consolidation and/or market exit.
- Technology: failure to invest in the right technologies to meet customer future demand.
- Product failure: risk of failure in the field resulting in the need for intervention to rectify the issue with financial and/or reputational consequences.

Competition

- Array of competitors is diverse but falls generally into two main groups: systems integrators with broad portfolios and specialists in narrow product categories.
- Competitors reacting to current market dynamics with cost reduction programmes.
- Cross-industry electrical specialists increasingly active in several vessel segments to capitalise on marine vessel electrification trend.
- Key competitors looking to grow into digital offerings with investment and niche acquisitions.
- Increased pricing pressure with competition for fewer orders in challenging market.

Opportunities

- Continue growth in merchant segments (eg. ferries, tugs and short-sea cargo) and adjacent offshore markets (eg. special purpose and offshore wind) with more advanced offerings.
- Continue to leverage the joint value proposition in naval markets together with Power Systems.
- Leverage local partnerships to generate regional growth in Asia, especially China.
- Owners are increasingly interested in solutions to improve efficiency and environmental impact as well as safety in more diverse and complex operations.
- Increasing role of data and analytics in optimising asset operations and reducing costs.
- Growth in intelligent shipping with greater integration of propulsion and electric systems.
- Increased modularisation and standardisation as well as advanced manufacturing methods.
- Increased uptake of long-term service agreements to create greater value within the market.

Summary

Nuclear is a leader in propulsion system design and development for the Royal Navy's nuclear submarine fleet and is the sole provider and technical authority, managing all aspects of plant design, safety, manufacture, performance and through-life support.

In civil nuclear we provide nuclear reactor vendors and utility operators with integrated, long-term support services and solutions spanning the whole reactor lifecycle, from concept design through to obsolescence management and plant-life extension. Safety-critical systems have been supplied to around 50% of the global nuclear power plants in service. We have been a key player in the nuclear industry for more than 50 years.

Key highlights

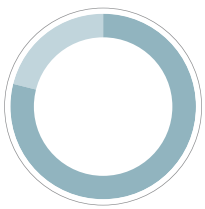
- → Underlying revenue 11% higher; strong revenues led by increased submarine work.
- → Underlying profit before financing 37% lower; adverse margin mix in submarine projects, lower R&D credit than 2015 and R&D spend on small modular reactor concept development.
- → 2017 outlook: focus on further delivery improvements and investing to address future opportunities.

The Royal Navy Astute class is the latest submarine powered by a Rolls-Royce designed nuclear propulsion unit.

UNDERLYING REVENUE MIX

OE revenue	46%
Services revenue	54%

UNDERLYING REVENUE BY SECTOR



Submarines	79%
Civil nuclear	21%

NUCLEAR

Operational review

Financial overview

Underlying revenue increased by 11% to £777m, led by growth in several key programmes in the submarines business, including support for the next generation Dreadnought class submarines (the successor to the Vanguard class), various refuelling projects and decommissioning activities. Volumes on key civil instrumentation and control programmes in both France and Finland were also good.

Gross margin was lower at 15.6%, reflecting the revenue mix favouring lower margin government-led submarine projects. Below gross margin, the change in treatment of R&D credits, which significantly impacted the full year in 2015, produced an R&D credit of £7m in 2016. This was offset by additional costs to support the higher volumes and to improve delivery performance. In addition, there were extra payroll costs, as well as additional R&D to support the initial design phase for small modular reactors (SMRs).

As a result, underlying profit before financing excluding the R&D credit was £37m at constant currency, 27% below the prior year (2015: £51m adjusted for the R&D credit). After the R&D credit and including a £1m foreign exchange benefit, underlying profit was £45m.

Investment and business developments

Order intake of £385m was 8% higher than 2015. Notwithstanding, the closing order book of £1.8bn was 17% below 2015, reflecting the business working through the large multi-year orders, particularly in submarines, received in prior years.

Submarine activities focused on continuing our support to the Royal Navy's current operational fleet of nuclear-powered submarines, as well as delivery of propulsion systems for the remaining Astute class submarines and for the Dreadnought programme. As well as implementing a range of performance improvement initiatives during the year, we also completed delivery of the nuclear propulsion system for the fourth (of seven) Astute class submarine and have made good progress both in the preparation for the refuelling programme of HMS Vanguard and for decommissioning the Naval Reactor Test Establishment in Scotland. In conjunction with the UK's Ministry of Defence and BAE Systems, we have also advanced discussions around a long-term alliance framework for the Dreadnought programme. Once concluded, this new framework should ensure that the delivery structure and commercial benefits are clarified for all key partners in this £31bn investment programme.

The civil nuclear business successfully concluded the first phase of its major instrumentation and control modernisation programme at Fortum's Loviisa plant in Finland, using our Spinline® technology. It also continued with its upgrade programme across the French civil nuclear fleet as part of a multi-year contract.

The UK government announced final approval for the Hinkley Point C nuclear power station in September, where our Nuclear business was awarded preferred bidder status for contracts covering waste treatment systems, heat exchangers and diesel generators.

The business also announced the strengthening of the strategic collaboration, started in 2014, with the China National Nuclear Corporation, including engineering and training services. The Chinese market is expected to sustain strong growth and we are well positioned with relevant technology.

During the year we started an R&D programme, together with a number of partners, to scope out the initial design phase for SMRs. These smaller, more flexible nuclear power generation units offer the potential for a more flexible power generation in future decades and directly build on the knowledge and specialist skills of our Nuclear business. Any significant further development work will be dependent on government support for this technology.

ORDER BOOK

£1.8bn

Nuclear outlook

The long-term outlook for Nuclear remains positive, supported by confirmation from the UK Government of the ongoing investment in the Dreadnought class submarines. Together with renewed activities in the civil market, particularly in the UK and China, these provide encouraging growth opportunities.

Performance in 2017 will be impacted by the loss of R&D credits on investments and further modest increases in the investment in SMR technology. As a result, profit is expected to be around half that achieved in 2016.

NUCLEAR | KEY FINANCIAL DATA

£m	2015	Underlying change	Foreign exchange*	2016
Order book	**2,168**	**(379)**	**1**	**1,790**
Underlying revenue	**687**	**74**	**16**	**777**
Change		*+11%*	*+2%*	*+13%*
Underlying OE revenue	251	95	8	354
Change		*+38%*	*+3%*	*+41%*
Underlying services revenue	436	(21)	8	423
Change		*-5%*	*+2%*	*-3%*
Underlying gross margin	**111**	**6**	**4**	**121**
Gross margin %	*16.2%*	*-80bps*		*15.6%*
Commercial and administrative costs	(53)	(14)	(3)	(70)
Restructuring	(2)	2	–	–
Research and development costs	14	(20)	–	(6)
Underlying profit before financing	**70**	**(26)**	**1**	**45**
Change		*-37%*	*+1%*	*-36%*
Underlying operating margin	**10.2%**	**-440bps**		**5.8%**

* Translational foreign exchange impact.

Market review

Respected global energy forecasts continue to predict that nuclear power will play a significant role in providing low-carbon, continuous, secure power. More than 80% of today's civil nuclear capacity is in the Organisation for Economic Co-operation and Development (OECD) member countries; however non-OECD countries, including some new to nuclear, will account for the bulk of growth whilst mature markets will focus on current operations and life extension.

Key Rolls-Royce differentiators

⊕ Unique key technology capability in defence and civil nuclear with substantial credibility (more than 50 years' experience); broad mix of offerings over the whole lifecycle; reactor independent portfolio; capable of global reach.

Market dynamics

- Population growth and improved living standards in emerging markets are driving a rise in demand for electricity.
- Within the future energy mix, low-carbon energy is expected to increase, with nuclear energy accounting for a significant share.
- In the US, lower energy prices are putting nuclear operating costs under pressure.
- Market conditions have changed, notably the slowdown in western new build programmes. China and Russia dominate large reactor new build projects.

Business risks

- If we experience a major product failure in service, then this could result in loss of life and significant damage to our reputation.
- Delivery: failure to meet customer expectations or regulatory requirements.
- Markets: if civil nuclear markets do not grow as anticipated due to political or other external events then business will be diminished.
- Customer strategy: if programmes are cancelled as a result of strategic decisions, or vertical integration by reactor vendors, then future revenues will be diminished.
- If we suffer a major disruption in our supply chain, then our delivery schedules may be delayed, damaging our financial performance and reputation.

Competition

- In civil nuclear the competitor landscape is fragmented and comprises reactor vendors, original equipment manufacturers, diversified industrial companies and nuclear operators in service.
- Plant operators increasingly outsource service activities.
- Key competitors and independent data service providers are investing and acquiring capabilities to further enhance their digital offerings.

Opportunities

- Increasing the pace of growth of the civil nuclear business.
- Focusing on growth regions beyond current core markets.
- Strengthening our position with the rapidly growing importance of China in the civil nuclear market.
- Capturing a higher share of the nuclear service market through extension of our geographic reach.
- Exploiting our historical data acquisition coupled with digital investment to launch a digital service portfolio that enables growth into asset management.
- Our capabilities in nuclear can be applied to the development of SMRs for civil power stations.

Small modular reactors

SMRs can provide safe, reliable and affordable low-carbon electricity. An SMR programme presents the opportunity to create a UK nuclear plant through the design phase, to construction and delivery; establishing a sustainable skills base and supply chain capability that demonstrates the UK's overall nuclear excellence to international export markets. Compared with current large-scale reactors, SMRs can deliver significant programme risk reduction through controlled offsite modular manufacturing, compact passive safety systems and easier financing.

With our unique position and over 50 years' experience in developing nuclear technologies, Rolls-Royce has the capability to develop proprietary SMR nuclear reactor technology and bring together its UK industrial and academic partners to deliver an SMR plant solution which will offer lower build, through-life and decommissioning costs, as well as increased regulatory and programme certainty.

A Rolls-Royce led UK consortium offers a significant opportunity to position the UK as a global leader in innovative nuclear technologies.

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