



## CONTACT

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Tony Best	Chairman
James Routh	Chief Executive Officer
Rob Hart	Chief Financial Officer
Mat Hubbard	Chief Operating Officer



- Proven track record of growing international, engineering based businesses in a FTSE 250 environment
- Broad-based experience across a range of sectors including aerospace, defence and industrials
- Chartered Mechanical Engineer and PhD in Engineering
- Wide experience of acquisitions and operation of international companies
- Particular strengths in R&D, product development, operational improvement and commercial development

Anthony Best returns to role of Non-Executive Chairman

## Financial highlights

- Revenues increased 51% to £37.05m (FY17: £24.57m)
- Reported profit before tax increased 78% to £7.95m (FY17: £4.47m)
- Profit before tax, excluding share option costs, increased 45% to £8.61m (FY17: £5.94m)
- Cash flow from operations increased by £7.8m to £9.9m (FY17: £2.1m)
- Basic EPS increased 74% to 36.29p (FY17: 20.83p), Diluted EPS increased 70% to 35.03p (FY17: 20.56p)
- Proposed final dividend increased 10% to 2.20p per ordinary share (FY17: 2.00p)
- Strong balance sheet with net cash of £15.94m as at 31 August 2018 (31 August 2017: £9.62m)

## Operational highlights

- James Routh appointed as CEO, with effect from 1 October 2018
- AB Dynamics Europe GmbH facility established and operational
- Received first order for Advanced Driving Simulator (aVDS) to be delivered in Q1 FY19
- First orders received for new LaunchPad ADAS target platform
- Demand for track testing products continues at an all-time high
- Strong forward order book, providing visibility into Q3 FY19

AB Dynamics design, manufacture and supply advanced products to the global automotive industry, mainly for vehicle ride, handling and safety system development and testing.

- Founded in 1982 by Anthony Best
- Listed on London based AIM stock market in May 2013
- Continuous record of steady, organic and sustainable growth
- Over 95% of sales non-UK
- Strong focus on producing high end/high quality products
- Customer base includes all major automotive OEM's, Tier 1's, and service providers

“We help our customers design vehicles with improved safety systems and vehicle driving dynamics”



AB Dynamics products are split into two business areas:

- **Track Testing (Driving Robots and ADAS testing platforms)**

Products predominantly used on a test track for vehicle development in the areas of:

- Steering, braking, ride, and handling
- ADAS system development
- Autonomous vehicle development

- **Laboratory Testing**

- Quantitative vehicle suspension characterisation (SPMM 5000)
- Driver-in-the-loop driving simulators for testing of virtual vehicles (aVDS)
- End of Line powertrain data capture and analysis software (PLATO)



*Patented SR60 Torus steering robot*



*SPMM5000*

- Global spending on automotive R&D continues to grow
- New entrants to the automotive and mobility sectors need to acquire testing capability
- Development of new increasingly complex ADAS and semi-autonomous vehicle technology demands new testing technology

*“It’s frightening to see how many seemingly avoidable situations result in a collision or close near miss when these vehicles are running using active cruise control. The GST allows these tests to be conducted efficiently and safely.” (Andrew Pick, ABD Director, Oct` 2018)*

- Full vehicle autonomy is proving to be more difficult than some industry experts suggest. More testing and new testing methodologies will be required
- Additional desire to accelerate new vehicle development with greater dependency on virtual testing and simulation to complement physical testing



*Vehicle that can be controlled by ABD electronics without physical actuators*



*ABD's Flex-0 vehicle controller*

**AB**  
Dynamics

GST



# FLEX-0 CONTROLLER







European New Car Assessment Programme (EuroNCAP) is a member body that rates consumer vehicle safety and guides testing standards

2018	2020	2022	2024+
<p><i>(vehicle to vehicle)</i></p> <p><b>V2V features being tested:</b></p> <ul style="list-style-type: none"> <li>Autonomous Emergency Braking (AEB)</li> <li>Lane Support Systems</li> </ul>	<p><b>V2V features being tested:</b></p> <ul style="list-style-type: none"> <li>Junction Assist (turn across path)</li> <li>Autonomous Emergency Braking</li> <li>Autonomous Emergency Steering (driver initiated steering)</li> <li>Lane Support Systems</li> </ul>	<p><b>V2V features being tested:</b></p> <ul style="list-style-type: none"> <li>Junction Assist (turn across path and crossing)</li> <li>Autonomous Emergency Braking</li> <li>Autonomous Emergency Steering (vehicle initiated steering)</li> <li>AEB &amp; AES Head-on</li> </ul>	<p><i>(vehicle to everything)</i></p> <p><b>V2X features being tested:</b></p> <ul style="list-style-type: none"> <li>Scenario interactions with many other objects.</li> </ul>
<p><i>(Vulnerable Road User)</i></p> <p><b>VRU features being tested:</b></p> <ul style="list-style-type: none"> <li>Autonomous Emergency Braking (Pedestrians and Cyclists)</li> </ul>	<p><b>VRU features being tested:</b></p> <ul style="list-style-type: none"> <li>Autonomous Emergency Braking</li> <li>Autonomous Emergency Steering (Vehicle turn at crossing)</li> <li>AEB reversing vehicle over ped.</li> <li>AEB higher speed cyclists</li> </ul>	<p><b>VRU features being tested:</b></p> <ul style="list-style-type: none"> <li>Lane Support Systems</li> <li>Powered two wheel vehicle (PTW)</li> <li>Overtaking and oncoming</li> <li>AEB Junction assist (PTW)</li> </ul>	<p><b>“Swarm testing”</b> on both track and in the virtual world during development.</p>

.....future testing will require more driving robots, ADAS platforms and drive-by-wire vehicle control

- People
  - ABD currently has over 160 employees
  - We recruit high calibre individuals. Financially incentivised with profit related bonus scheme and share options
  - 8 apprentices currently undertaking “day release” educational activities to ensure we have technicians with suitable skills for future growth
- UK Facilities
  - Added space at our Holt site to increase ADAS platform manufacturing capability. (Doubling production from January 2019)
  - Reached planning stage for development of another 3,000m<sup>2</sup> facility adjacent to new headquarters (see following slide)



*Motivated staff*



*An apprentice at work testing driving robots*



2018 Headquarters, Middleton Drive

2020 "North Site" development

3000m<sup>2</sup>  
100 parking spaces  
Designed for future flexibility  
Planning application submitted



- Overseas ABD facilities
  - Provision of high quality, low latency support coupled with local knowledge is essential for future growth as vehicle testing becomes more complicated
  - Started **AB Dynamics GmbH** operations in Germany (see following slide). Planning transition of staff from existing Munich based representative into the ABD entity
  - Starting to move forwards with **AB Dynamics Inc** in 2019. Future manager of AB Dynamics Inc has been recruited, and process will be supported by existing representative
  - Investigating provision of direct support operations in **Asia** to complement/assist existing representatives

Workshop: 500m<sup>2</sup>  
Office: 467m<sup>2</sup>



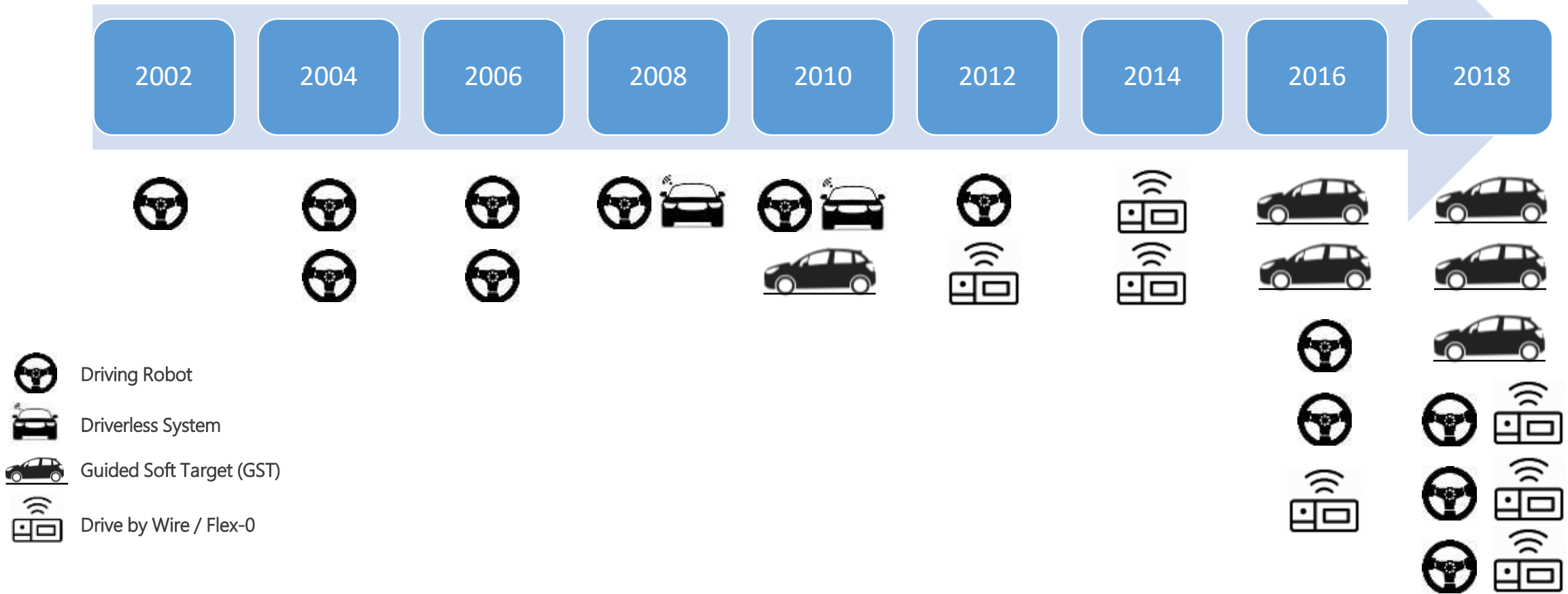
*External view (September 2018)*

- Located in Wetzlar
- 45 minute drive north of Frankfurt
- New build, leased
- Driving simulator assembly and demo facility
- Track test support facility
- Potential conduit for sales into Europe post March 2019



*Conference room (September 2018)*

Example European OEM Customer



*We have long term relationships with customers, and evolve our products as the requirements of customers change*

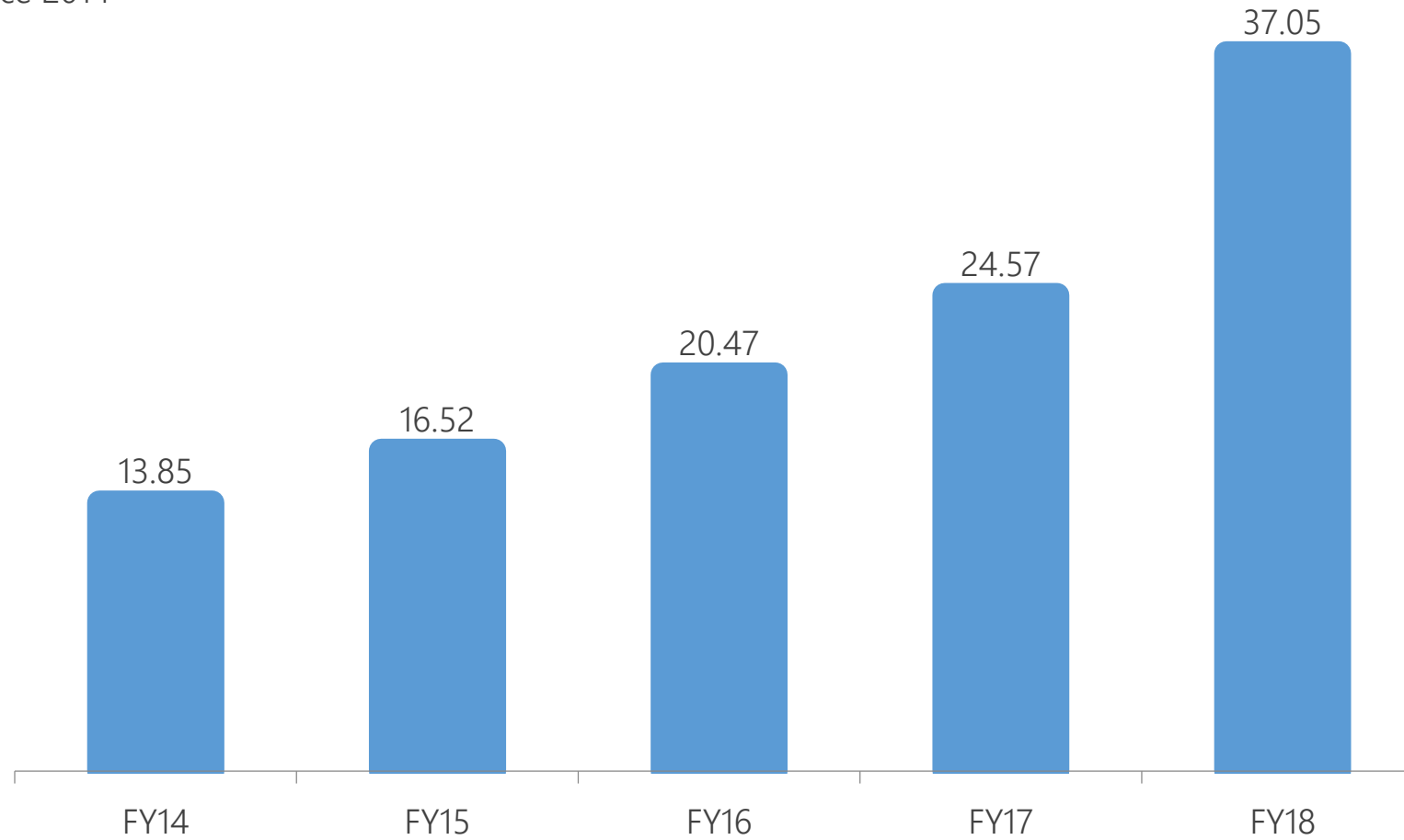


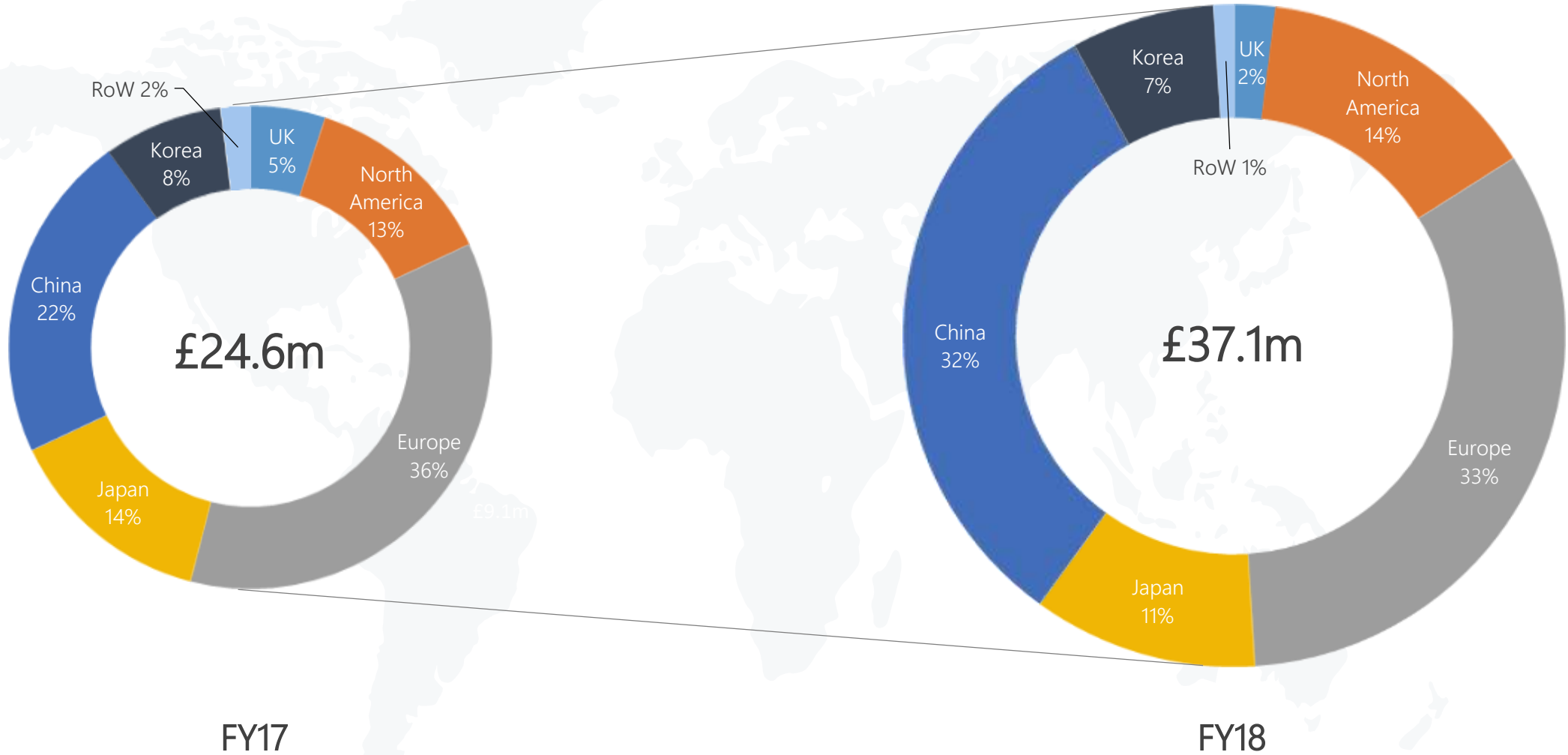


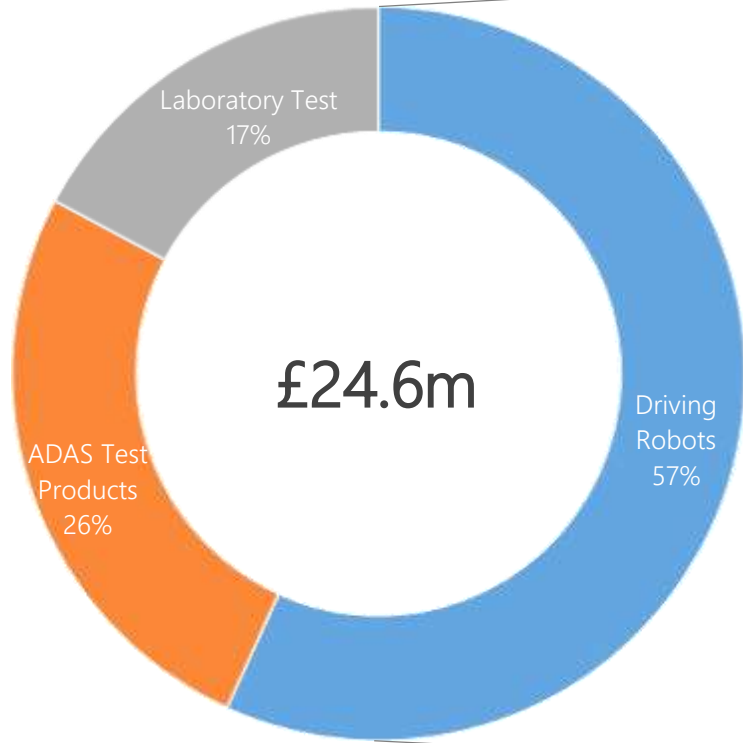
Twelve months ended 31 August

	2018	2017	
Revenue	£37.05m	£24.57m	+51%
Adjusted operating profit	£8.54m	£5.87m	+45%
Adjusted operating margin	23.1%	23.9%	-80bps
Adjusted profit before tax	£8.61m	£5.94m	+45%
Cash flow from operations	£9.94m	£2.12m	+369%
Capital expenditure	£3.70m	£8.04m	
Net cash	£15.94m	£9.62m	
Earnings per share - basic	36.29p	20.83p	+74%
Earnings per share - diluted	35.03p	20.56p	+70%
Total dividend per share	3.665p	3.331p	+10%

Increase of 50.8%  
CAGR of 27.9% since 2014

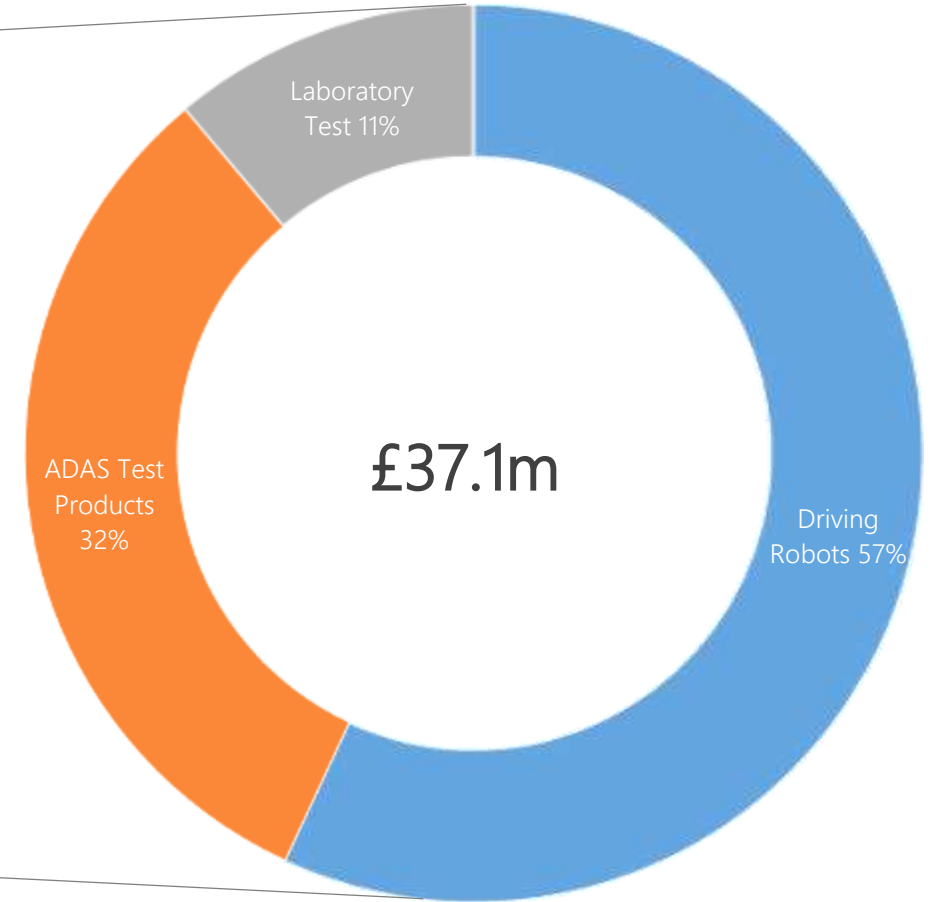






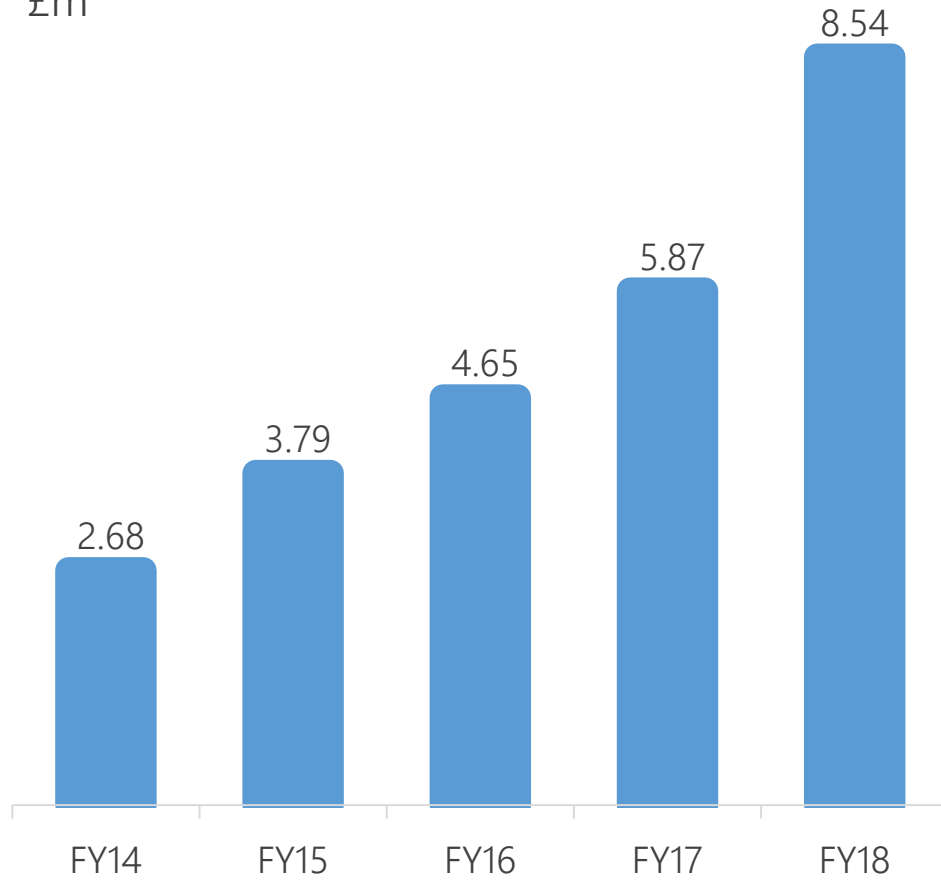
FY17

£m	FY18	FY17
Driving Robots	21.09	13.95
ADAS Test Products	11.85	6.40
Laboratory Test Products	4.11	4.22
<b>TOTALS</b>	<b>37.05</b>	<b>24.57</b>



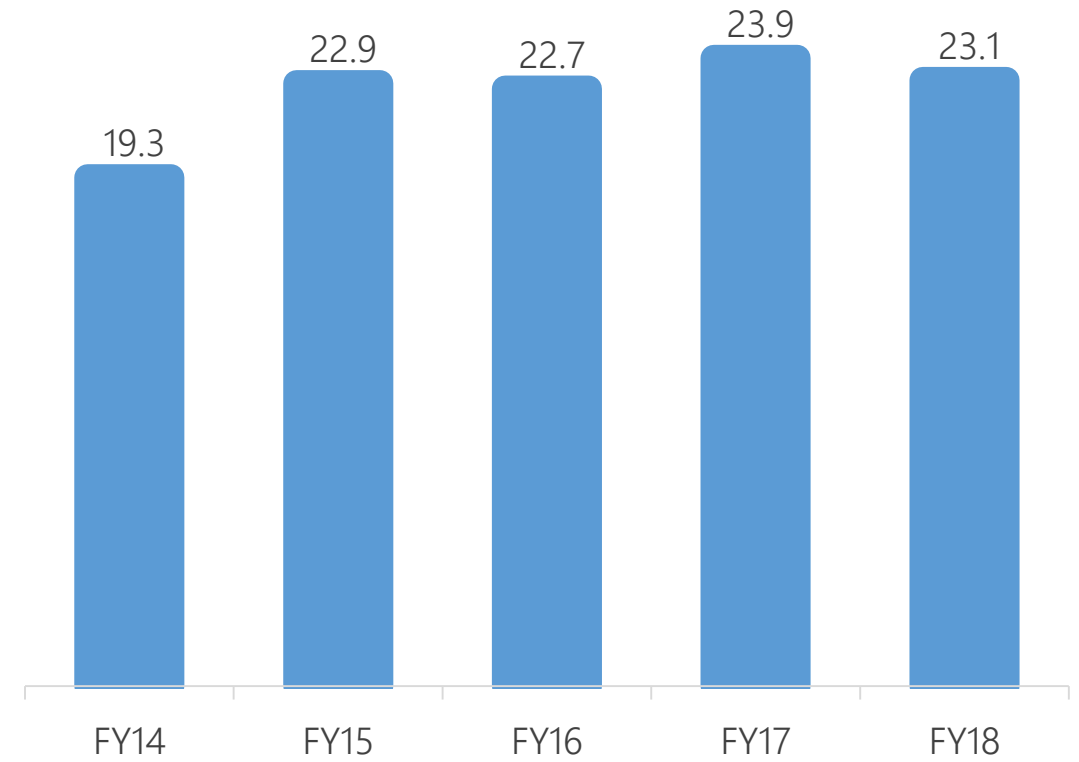
FY18

£m

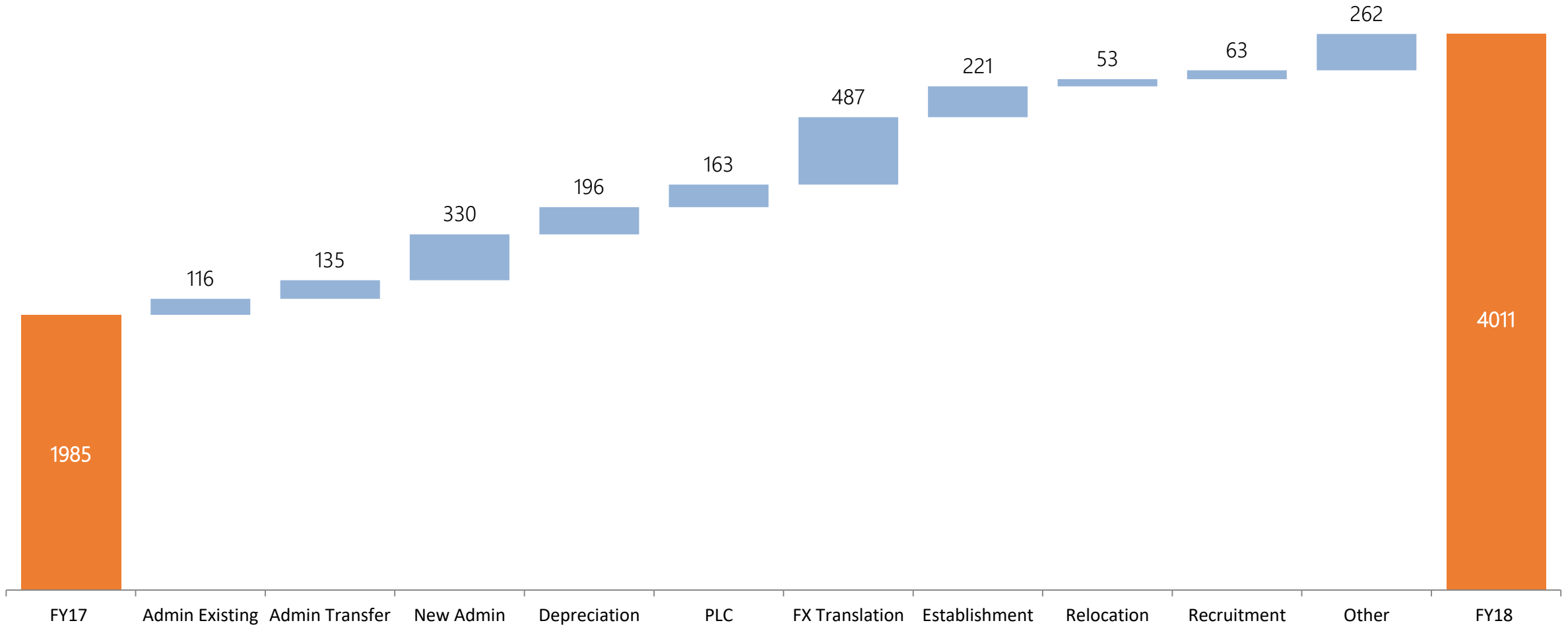


Operating Profit

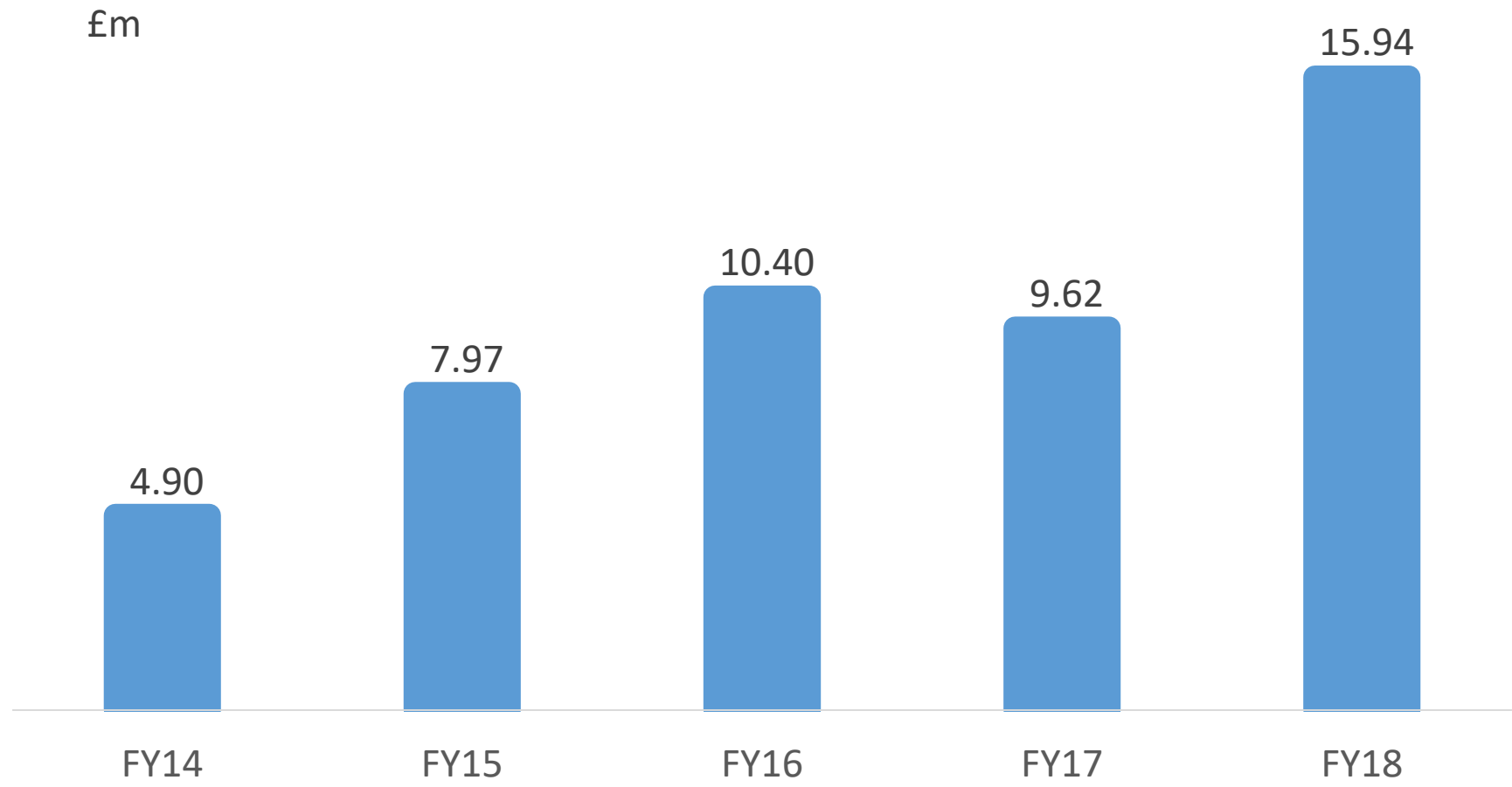
%



Operating Margin



Cash flow from operations £m	FY18	FY17
Profit before tax	7.95	4.47
<b>Adjustments for:-</b>		
Depreciation / Interest income etc.	0.41	0.13
Share based payment	0.66	1.46
Operating profit before working capital changes	9.02	6.06
Increase in inventories	(1.94)	(1.77)
Increase in trade and other receivables	(0.33)	(5.43)
Increase in trade and other payables	3.19	3.35
Fair value gain on derivative instruments	-	(0.09)
<b>Cash flow from operations</b>	<b>9.94</b>	<b>2.12</b>





	FY18	FY17
Effective rate of tax	11.7%	12.7%
ROCE	21.3%	15.6%
Earnings per share – basic	36.29p	20.83p
Adjusted EPS – basic	39.70p	28.65p
Earnings per share – diluted	35.03p	20.56p
Adjusted EPS – diluted	38.32p	28.28p
Final dividend per share	2.20p	2.00p
Total dividend per share	3.665p	3.331p

- Strong financial and operating performance with record order book providing visibility well into FY19
- Markets remain active across all geographies and sectors
- Continuing new product development programmes to support future growth
- Establishment of new overseas operations, strategically located in key markets
- Market dynamics and targeted investment provides a strong platform for future growth





	Year ended 31 August 2018 £	Year ended 31 August 2017 £
<i>Continuing operations</i>		
Revenue	37,051,145	24,570,050
Cost of sales	(24,497,241)	(16,654,153)
Gross profit	12,553,904	7,915,897
Administrative expenses	(4,011,336)	(1,985,069)
Fair value loss in respect of foreign currency forward contracts	-	(59,241)
<b>Adjusted operating profit before Share based payment costs</b>	<b>8,542,568</b>	<b>5,871,587</b>
Share based payment costs	(659,167)	(1,464,817)
<b>Operating profit</b>	<b>7,883,401</b>	<b>4,406,770</b>
Finance income	63,167	65,257
<b>Profit before taxation</b>	<b>7,946,568</b>	<b>4,472,027</b>
Corporation tax expense	(931,900)	(569,286)
<b>Profit after taxation</b>	<b>7,014,668</b>	<b>3,902,741</b>
<b>Other comprehensive income</b>	<b>-</b>	<b>-</b>
<b>Total comprehensive income for the year attributed to equity holders</b>	<b>7,014,668</b>	<b>3,902,741</b>

	2018 £	2017 £
<b>ASSETS</b>		
<b>NON-CURRENT ASSETS</b>		
Property, plant and equipment	13,679,409	10,464,904
Deferred tax assets	1,288,777	148,140
	<u>14,968,186</u>	<u>10,613,044</u>
<b>CURRENT ASSETS</b>		
Inventories	6,903,374	4,959,435
Trade receivables	6,489,393	7,115,351
Other receivables, deposits and prepayments	1,980,870	1,536,134
Amount owing by contract customers	2,188,770	1,675,508
Taxation	55,749	-
Cash and cash equivalents	15,941,961	9,619,345
	33,560,117	24,905,773
<b>TOTAL ASSETS</b>	<u>48,528,303</u>	<u>35,518,817</u>
<b>EQUITY AND LIABILITIES</b>		
Share capital	195,365	191,119
Share premium	10,257,615	8,579,265
Reconstruction reserve	(11,284,500)	(11,284,500)
Merger relief reserve	11,390,000	11,390,000
Retained profits	27,484,250	19,370,938
Total equity attributable to owners of the Company and total equity	<u>38,042,730</u>	<u>28,246,822</u>
<b>NON-CURRENT LIABILITIES</b>		
Deferred tax liabilities	339,040	-
<b>CURRENT LIABILITIES</b>		
Trade and other payables and accruals	10,146,533	6,951,803
Provision for taxation	-	320,192
	10,146,533	7,271,995
<b>TOTAL LIABILITIES</b>	<u>10,485,573</u>	<u>7,271,995</u>
<b>TOTAL EQUITY AND LIABILITIES</b>	<u>48,528,303</u>	<u>35,518,817</u>

	2018 £	2017 £
<b>Cash flow from operating activities</b>		
Profit before taxation	7,946,568	4,472,027
Adjustments for: -		
Change in accounting policy	-	(78,562)
Depreciation of property, plant and equipment	462,994	266,856
Loss on sale of property, plant and equipment	14,606	4,243
Interest income	(63,167)	(65,257)
Share based payment	659,167	1,464,817
	<b>9,020,168</b>	<b>6,064,124</b>
<b>Operating profit before working capital changes</b>		
Increase in inventories	(1,943,939)	(1,767,793)
(Increase) in trade and other receivables	(332,040)	(5,432,557)
Increase in trade and other payables and accruals	3,194,730	3,342,941
Fair value loss / (gain) on derivative instruments	-	(90,434)
	<b>9,938,919</b>	<b>2,116,281</b>
<b>Cash flow from operations</b>		
Interest received	63,167	65,257
Income tax paid	(1,002,057)	(351,476)
	<b>9,000,029</b>	<b>1,830,062</b>
<b>Net cash flow from operating activities</b>		
<b>Cash flow from investing activities</b>		
Purchase of property, plant and equipment	(3,698,478)	(8,040,906)
Sale of property, plant and equipment	6,374	-
	<b>(3,692,104)</b>	<b>(8,040,906)</b>
<b>Cash flow used in investing activities</b>		
<b>Cash flow from financing activities</b>		
Dividends paid	(667,905)	(576,805)
Proceeds from issue of share capital, net of share issue costs	1,682,596	6,002,471
	<b>1,014,691</b>	<b>5,425,666</b>
<b>Net cash flow used in financing activities</b>		
Net increase in cash and cash equivalents	6,322,616	(785,178)
Cash and cash equivalents at beginning of the financial year	9,619,345	10,404,523
Cash and cash equivalents at end of the financial year	15,941,961	9,619,345



Driving robots (used by all top 20 automotive manufacturers)

- Steering, pedal robots, gear change and clutch robots
- Complete driverless test systems for testing vehicles without a driver

Software, data capture and communications

- Track Fi Pro – track radio communications
- Synchro software – for coordination of multiple vehicles
- Capture + Review: synchronised data and image capture



*SR15 Orbit Steering robot*



*CBAR (combined brake and accelerator robot)*



*Flex-0 – Direct control of vehicle actuators*

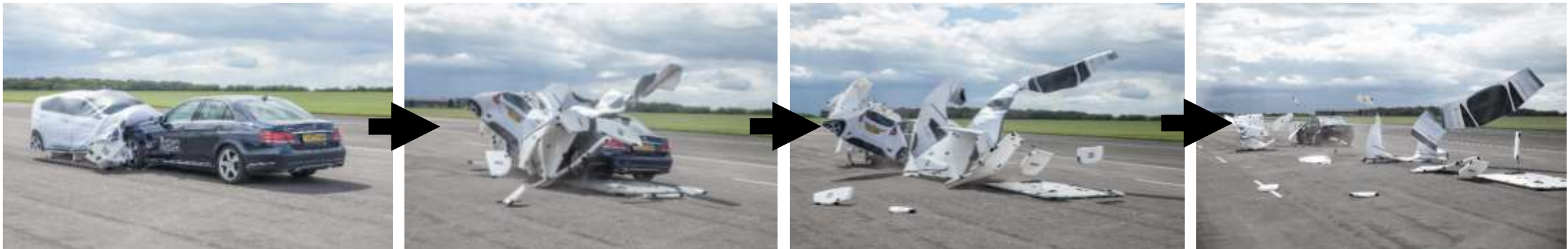


ADAS Soft Targets are used to evaluate active 'collision avoidance' and 'collision mitigation' systems on the test track. They can also be used to evaluate autonomous vehicle functionality

- Guided soft target (GST) for 'car-to-car' interactions
- LaunchPad. Small flat platform for soft pedestrians and bike targets
- Towed Pedestrian Target. Lower cost belt driven soft target carrier



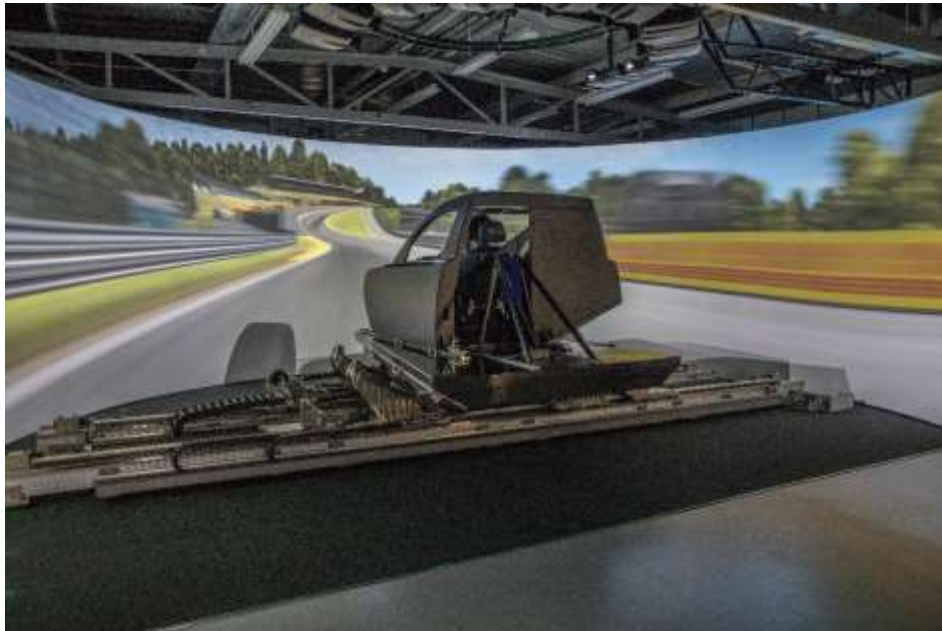
*LaunchPad*



*GST head-on collision sequence*

## Ride and handling development

High performance WAE engineered motion platform enables higher frequencies of motion and larger payloads than competitor products.



*Spa circuit, Belgium*

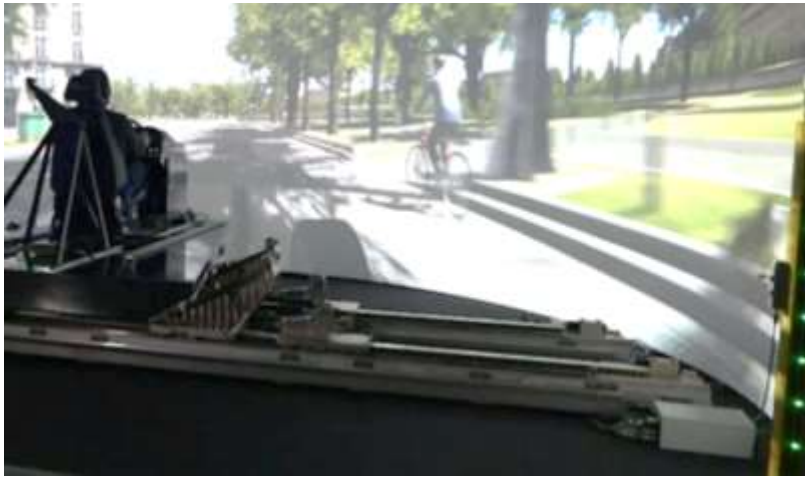


*Schwarzwald, Germany*

## ADAS development

Automatic driver assistance systems can be tested in the virtual world

Other moving objects such as vehicles, cyclists and pedestrians can be introduced into the driving environment



*Cyclist in virtual Paris environment*



*Interaction with other vehicles in virtual Paris environment*

## SPMM 5000

- Used primarily for vehicle suspension characterisation to:
  - Validate computer vehicle models
  - Benchmark competitor vehicles
  - Setup vehicle suspensions
- MIMS option enables vehicle centre-of-gravity and moments-of-inertia to be measured
  - For validation of CAD design data
  - Measurement of sub-systems



*SPMM5000 used for suspension characterisation*

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