



## Charged for growth

15 November 2018



# AGENDA

15:00	What is TT now	Richard Tyson, CEO
	Leveraging R&D to differentiate and grow	Tim Roberts, Sensors and Specialist Components
	Expanding our capabilities in power solutions	Tom Garvey, Power
	Q&A	
	Coffee break	
16:05	Our new offering: connectivity	Charlie Peppiatt, Connectivity
	Business development and strategic partnerships	Michael Leahan, Global Manufacturing Solutions
	TT's position for the future	Richard Tyson, CEO
	Q&A	
17:00	Product showcase	All leadership team



Richard Tyson



Mark Hoad



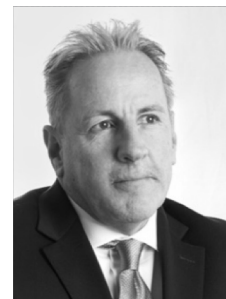
Tim Roberts



Tom Garvey



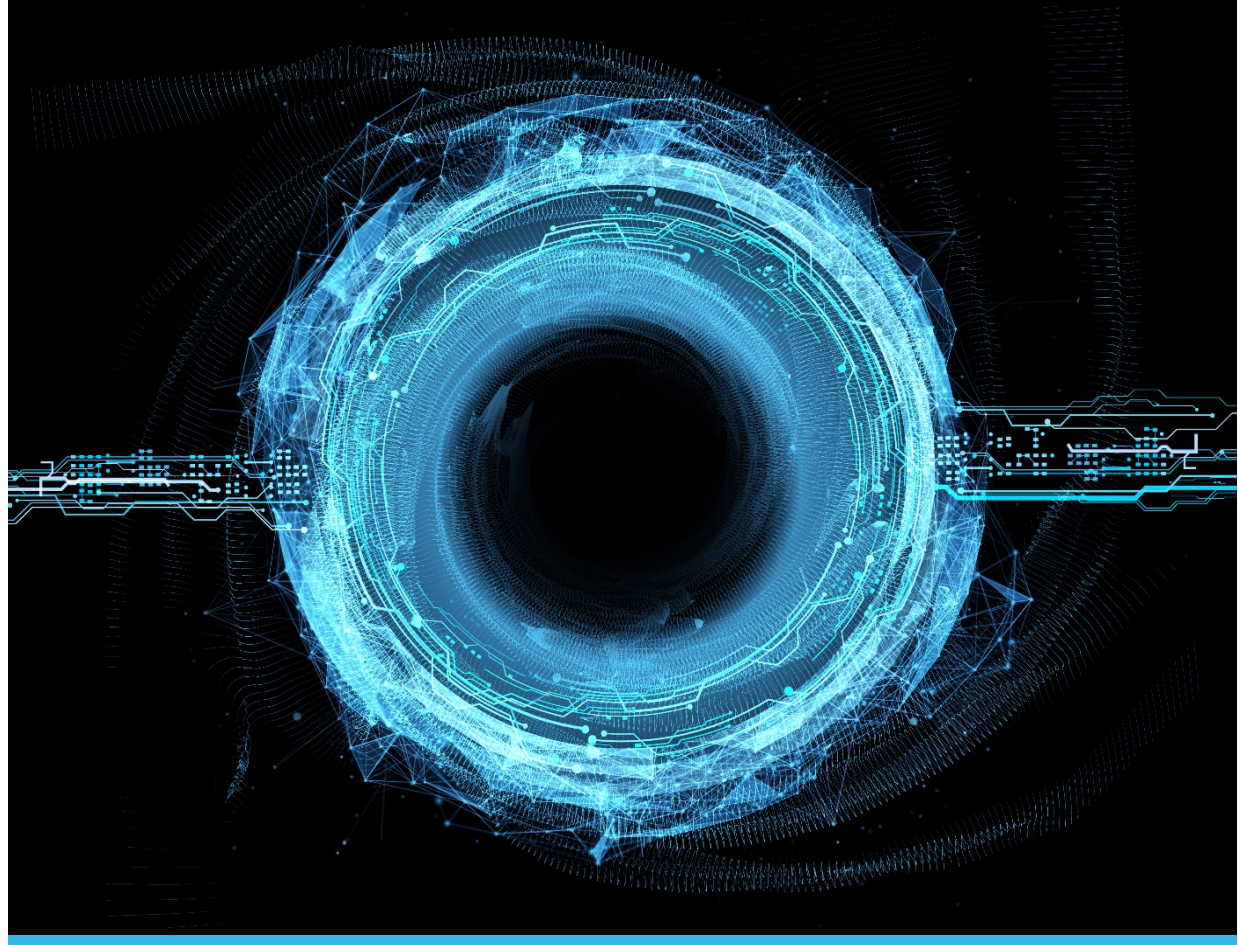
Charlie Peppiatt



Michael Leahan

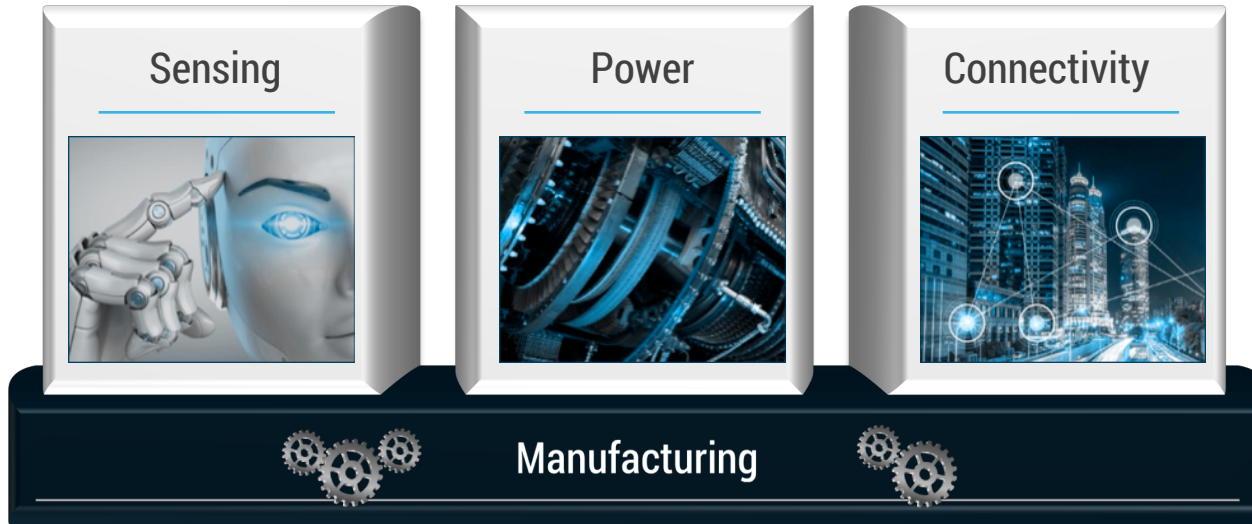
# What is TT now?

Richard Tyson







## TT's capabilities now

TT is a global provider of engineered electronics for performance critical applications



# Market growth driving demand for our solutions

Structural growth drivers leading to increasing sales for our sensing, power management and connectivity capabilities

	% revenues as at HY18	Example end application	Key macro trend
 Industrial	46%	<ul style="list-style-type: none"><li>Automation and control</li><li>Energy and smart devices</li><li>Infrastructure</li></ul>	<ul style="list-style-type: none"><li>Robotics and industrial automation</li><li>More efficient energy usage</li><li>Connectivity</li></ul>
 Medical	22%	<ul style="list-style-type: none"><li>Advanced surgical devices</li><li>Imaging and direct patient care</li><li>Laboratory automation and diagnostics</li></ul>	<ul style="list-style-type: none"><li>Population growth and ageing</li><li>Innovation in diagnostics and direct patient care</li><li>Medical device connectivity</li></ul>
 Aerospace and Defence	18%	<ul style="list-style-type: none"><li>Commercial and military aircraft</li><li>Space and satellite</li><li>Defence systems and vehicles</li></ul>	<ul style="list-style-type: none"><li>Growing passenger numbers</li><li>Electrification of aircraft to reduce size, weight and power consumption</li><li>Increased defence spending</li></ul>
 Transportation	14%	<ul style="list-style-type: none"><li>Electric and hybrid electric vehicles</li><li>Electronics on rail</li></ul>	<ul style="list-style-type: none"><li>High-speed rail infrastructure</li><li>Global asset and logistics tracking</li><li>Shift away from fossil fuels</li></ul>

# Our strategy is delivering

**1** Positioned in structural growth markets

**2** Create differentiated capabilities

**3** Work with our customers to solve their toughest electronic challenges



Reshaped portfolio

7.5% margin, up from 4.2% 3 years ago

We are growing at 5%

Clear focus on capabilities, markets, and customers

Embedded culture

**...and we have  
set TT up to  
deliver more...**



# Advancing our strategy through our four strategic priorities

1 Positioned in structural growth markets

2 Create differentiated capabilities

3 Work with our customers to solve their toughest electronic challenges





**Tim Roberts**

Leveraging R&D to differentiate and grow



**Tom Garvey**

Expanding our capabilities in power solutions



**Charlie Peppiatt**

Our new offering: connectivity



**Michael Leahan**

Business development and strategic partnerships

# Leveraging R&D to differentiate and grow



Tim Roberts



## Meeting our customers needs

- Our customers' core needs
  - Speed to market for new products
  - Engineering expertise and product understanding
  - Superior power management and sensing technology
- Why our customers choose us
  - Trusted long-term partner
  - Platform products with customised solutions
  - Rapid speed to market



## Platforms combined with customised solutions

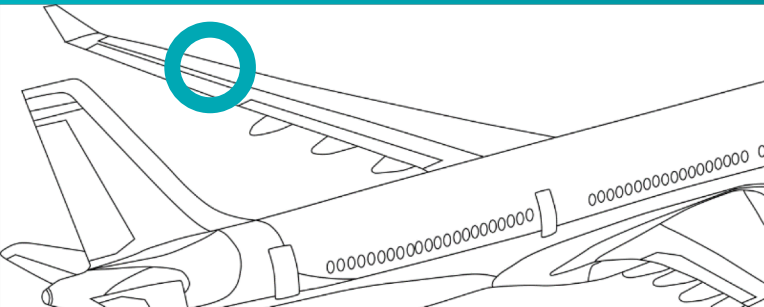
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- Developing new platforms can take 3 years to develop
  - Supports customer products for 7-10 years+, underpinning growth
  - Credibility as innovators and investor in R&D
- Custom solutions; capturing more value
  - Dedicated engineers focused on custom development
  - Designed into customer product; often single sourced
  - Increasing proportion of revenue

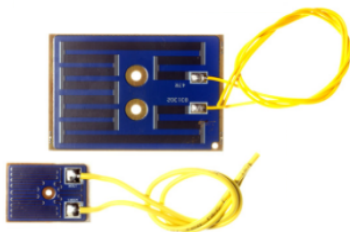




**Market: Aerospace and defence**



**Application: Flight control actuator**



**TT product: Power management - resistor**

## Application of a new material to take capabilities to aerospace

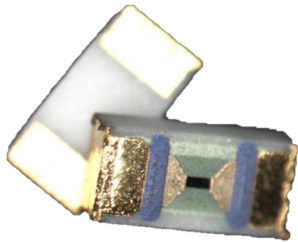
- Market growth from the more electric aircraft
- New process developed; resistors printed onto steel instead of ceramic
- Reduced weight; improving aircraft fuel efficiency
- Greater reliability; withstands temperature cycling and dissipates heat
- Same technology applied to different aircraft and applications
  - Airbus A350 and Boeing 787 Dreamliner



**Market: Industrial**



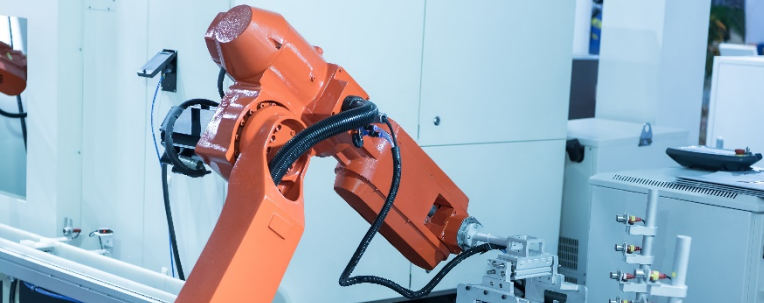
**Application: Detonators for demolition and mining**



**TT product: Power management - signal conditioning**

## Scalable platform approach for revenue growth across multiple markets

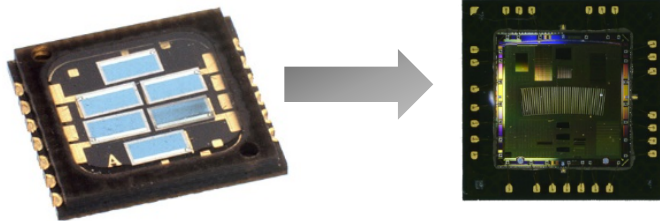
- Launched a major new platform for signal conditioning in 2015 following 2 years of development
- New technology delivering
  - Extreme precision
  - Leading moisture resilience
- Technology for aerospace and defence applied to industrial applications



**Market: Industrial**



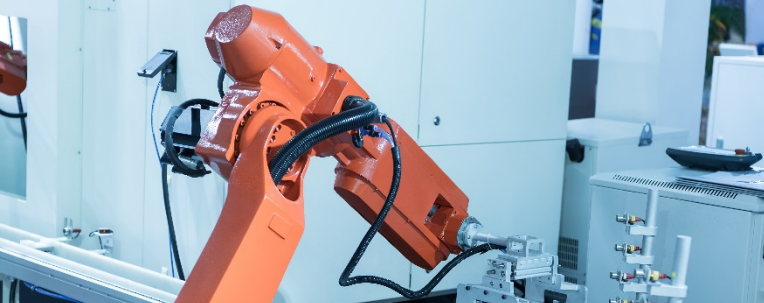
**Application: Robotic arm in automated production**



**TT product: Sensor – optoelectronic encoder**

## Aligning R&D to structural growth markets

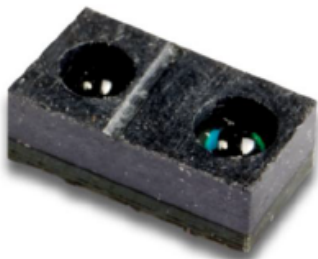
- c.6% CAGR in automation and control to 2023
- Over 20 years experience in industrial automation; over 10 million units shipped
- High resolution sensor optimises robot performance
- Next platform development underway; 2019 launch schedule



**Market: Industrial**



**Application: Industrial printing**



**TT product: Sensor – optoelectronics**

## Technical capabilities driving growth

- Launched major new infrared light sensor platform in 2017
- New capability developed; calibrated sensor to detect colours and transparency as well as position
- Miniaturised technology; ultra-small space saving solution
- Worked with Datacard for 10+ years providing 40+ custom solutions
- Joint customer with Global Manufacturing Solutions



## New joint venture announced with Uniroyal

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- Uniroyal is the world's second largest manufacturer of resistors
- Longstanding relationship; more than 10 years
- Uniroyal brings manufacturing scale and broader Asia sales presence
- TT brings technical expertise and worldwide distribution channels
- Higher volume opportunities including with existing customers
- Revenue expected H2 2019

## Leveraging R&D to differentiate and grow

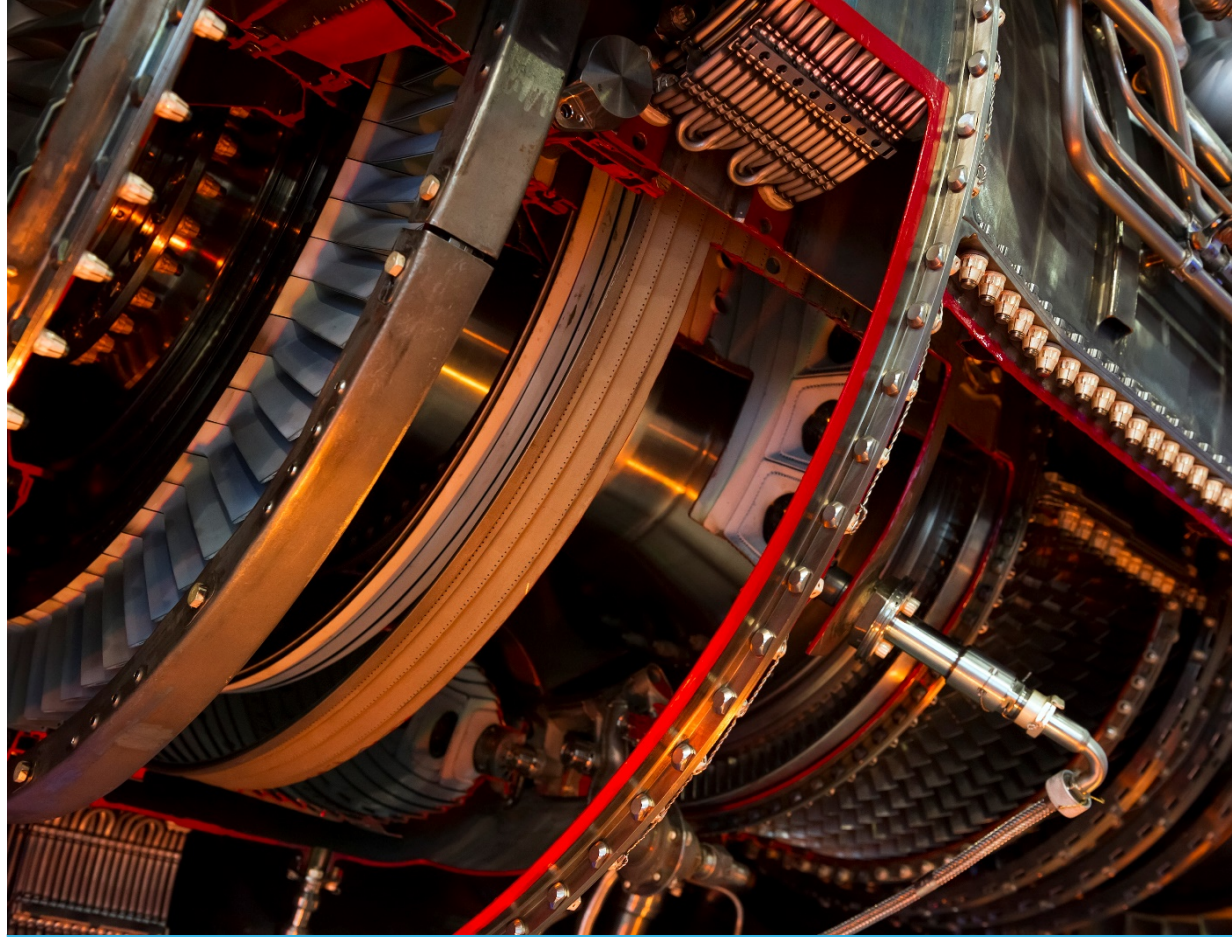
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- Focused on markets with structural growth drivers
- Differentiated technology and deep engineering talent
- Investing in new platforms and providing custom solutions faster
- Well positioned to win more business with more customers



# Expanding our capabilities in power solutions

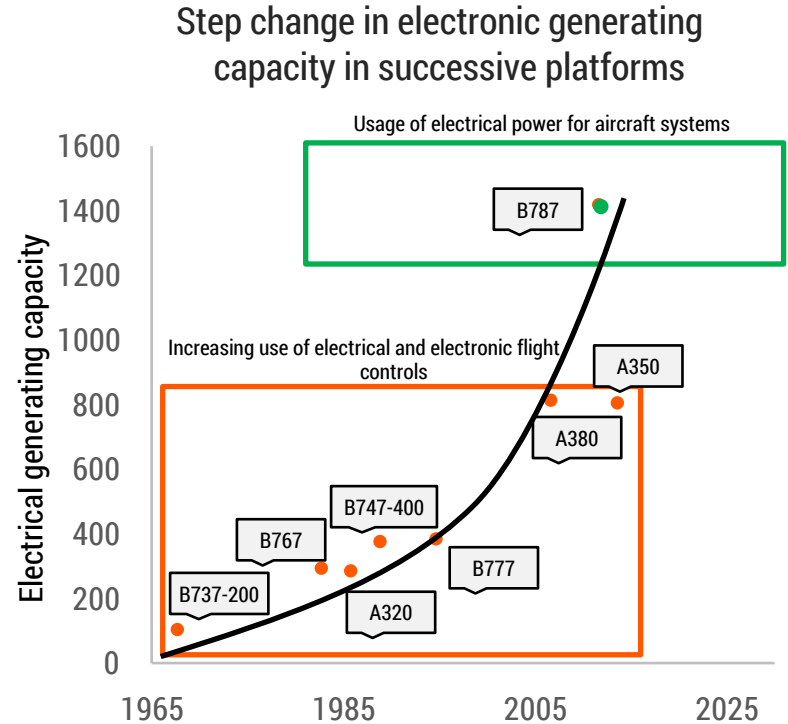
Tom Garvey





## Electrification of aircraft means growing demand

- Hydraulics and pneumatics replaced with electrical systems
- Electrification increasing exponentially
- 1% weight decrease results in c.10% increase in profits
- Aviation electronics expected to grow at c.7% CAGR to 2022



Source: TT Electronics and Roland Berger



## Our pedigree and how we can build on our position

- Market leading customers in airframe, engine and avionic systems
- Core capabilities at the heart of system requirements
  - Electromagnetics, hybrid microcircuits and power modules
  - c.1,000 people, 3 continents, c.125 engineers
- Focused on leveraging:
  - Component heritage
  - Strategic customer relationships
  - New North American footprint

ELECTROMAGNETICS

HYBRID MICROCIRCUITS

POWER MODULES





POWER AND CONTROL  
MICROCIRCUIT

SWITCHED MODE POWER  
SUPPLY MAGNETICS

DIGITAL ENGINE CONTROL UNIT



## Meeting Rolls-Royce's technical challenges

- Strategic partner to Rolls-Royce for the brain of the aircraft engine
  - Provide electromagnetic and power and hybrid microcircuit solution
  - Chosen to work with Rolls-Royce because we could:
    - Improve yield
    - Reduce cost, weight and size
    - Manage product transfer from Rolls-Royce
    - Provide technical support
  - TT given the “Trusted to Deliver Excellence Award” for our respective category by Rolls-Royce in recognition of our achievements and the depth of our relationship



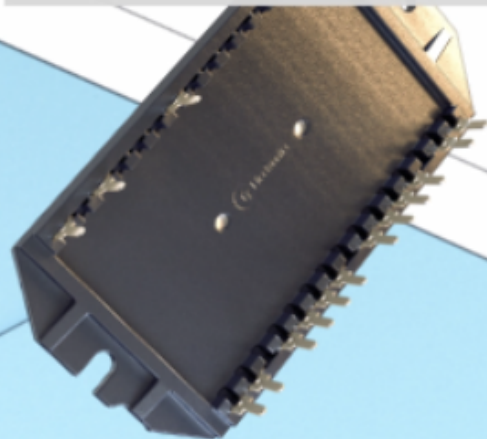
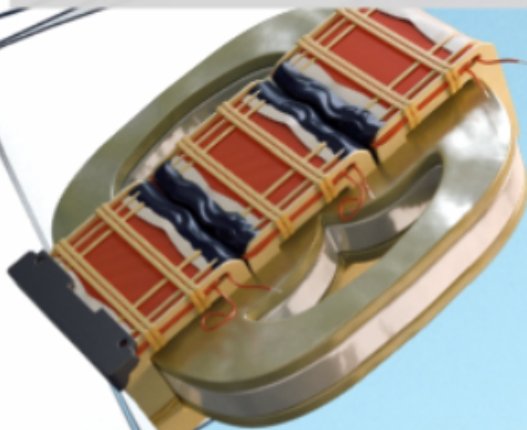
ELECTRIC LOW PRESSURE  
FUEL PUMPING SYSTEM



TRANSFORMER RECTIFIER UNIT



RUGGEDISED PLASTIC  
POWER MODULE



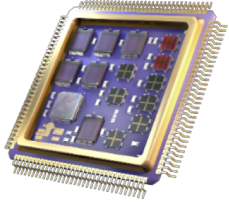


## Developing a strategic partnership with Eaton

- Solved technical challenge for Eaton on A380 fuel pump
- Expanded relationship with Eaton
  - Our engineers act as the go-to partner for technical challenges
  - Won positions on MC21 and other business jet platforms
- Exposure across multiple customers and platforms places us in a unique position

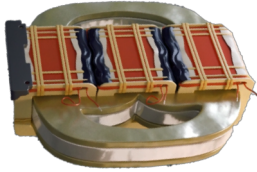
# Moving up the value chain

## Component heritage



Power and Control  
Microcircuit

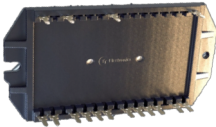
Transformer  
Rectifier Unit



Flyback  
Transformer



Ruggedised  
Power Module



Wound  
Components



Manufacturing and  
system design  
support

## TT Designed Prototypes



ATRU (Auto Transformer  
Rectifier Unit)

## Value Added Products



Power Distribution Panel

## Acquisitions provide new geographic reach in North America

- Cletronics (2017) and Precision (2018) provide new opportunity for growth in North America
- Large North American market provides new opportunities, particularly in defence
- Precision's electromagnetic products add a differentiated capability in medical
- Electronics market applied to medical is estimated to be growing at c.5% to 2022





## Further opportunity in North America, and to move up the value-chain

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- Building a significant aerospace and defence capability
- Strong customer relationships in the UK
- Growth potential in North America
- Customers starting to pull us up the value-chain



# Q&A

# Coffee Break



# Our new capability: connectivity

Charlie Peppiatt





## Integration of Stadium ahead of plan

- TT enhances Stadium's opportunities:
  - Increased R&D investment
  - Greater scale
  - Optimised supply chain
  - Global operating footprint
  - Prospects for cross-selling



## What is connectivity?

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Technology to wirelessly network devices allowing you to exchange information that is enabling the digital transformation of enterprises.

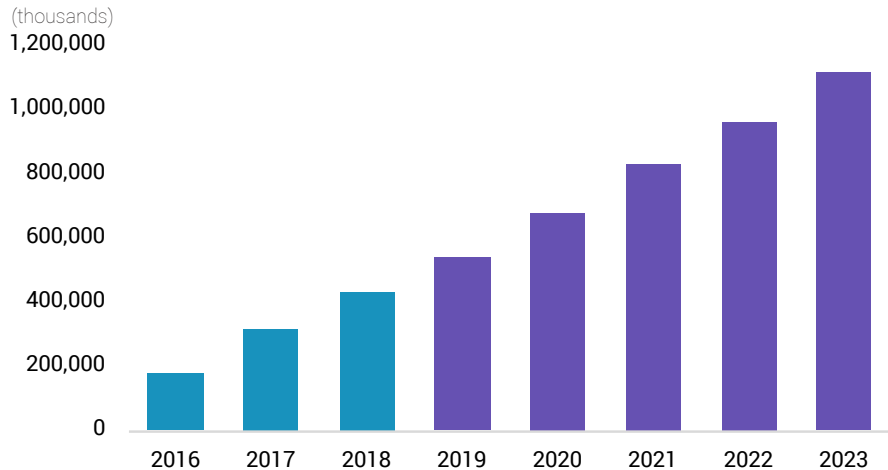
## What connectivity brings to TT

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- Huge, growing industrial connectivity market
- Connectivity offering is a new capability for TT
- Potential synergies with power and sensing offerings
- Pipeline of new design projects

# Positive market fundamentals in Industrial IoT

Cellular IoT device shipment forecast (World 2016–2023)

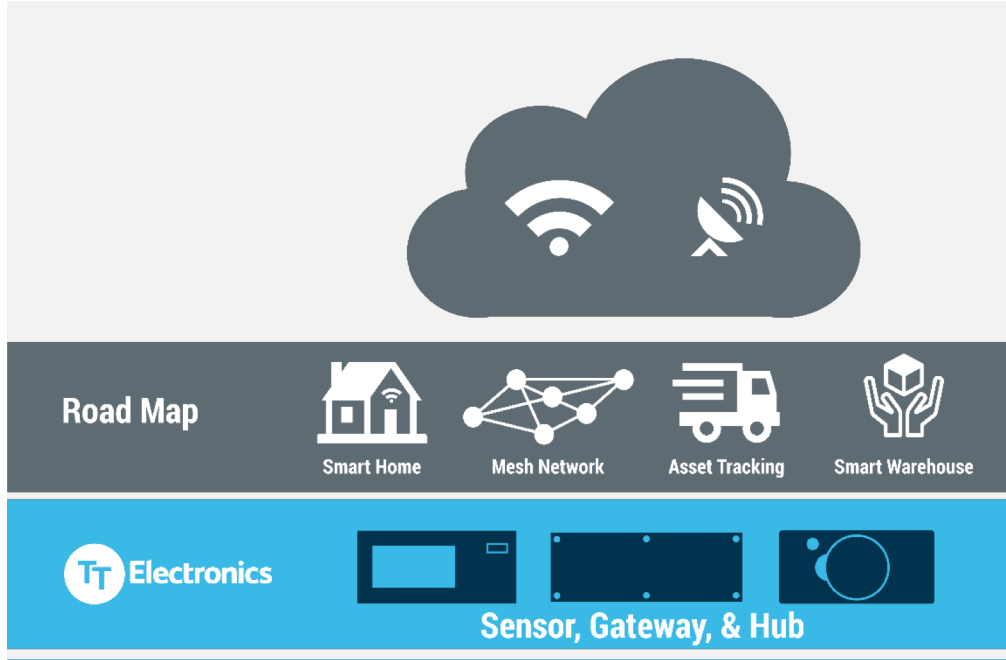


Berg Insight Research

- Large, established market; adoption underway and accelerating
- Exponential growth; appetite to monitor and manage data to improve efficiency

# Connectivity roadmap

Hardware requirements from consumer electronics now become mainstream in Industrial IoT

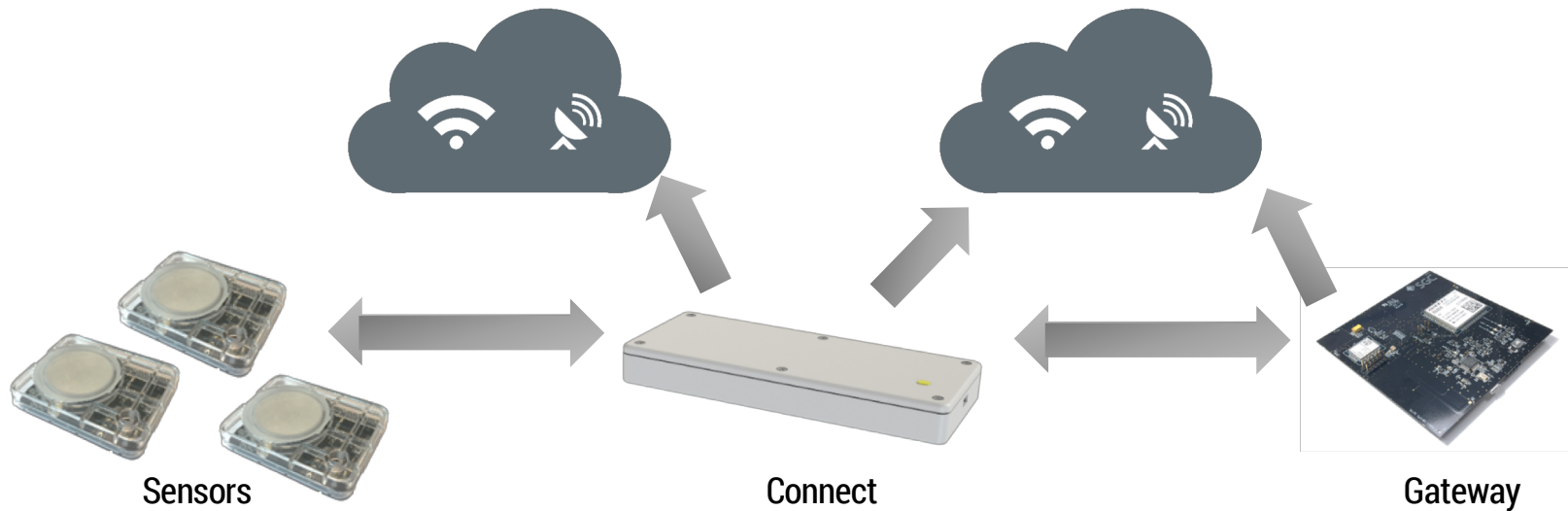


## Roadmap focused on:

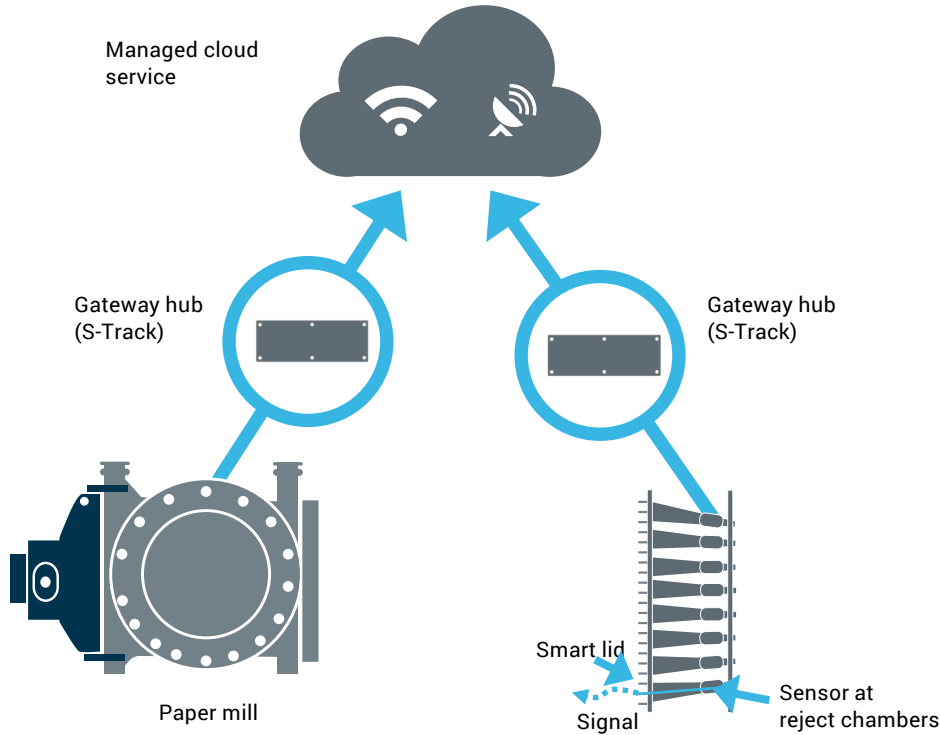
- Increasing miniaturisation
- Feature-rich devices
- Higher operating speeds and associated memory capacity
- Better power management and battery efficiency
- Reliable wireless connectivity

# Our technology and where we operate in connectivity

Clear end-market focus across industrial, medical and transportation



# Industrial connectivity in action



## Example: Paper mill

### What

- Developing a connectivity solution for preventative maintenance in a paper mill
- Ability to monitor filtration cylinders for blockages

### How

- Custom connectivity device can be linked to pressure sensor from Sensors division

### Value to customer

- Reduced downtime
- Improved yields
- Optimised preventative maintenance

## Connectivity capabilities

- Two R&D centres in wireless design hubs
- Speed to market
  - Developing core platform products; c.75% standardised, 25% customisable design
  - Reduces time to market by c.6-12 months
  - Two connectivity platforms launched in 2018
- Technical talent



Shenzhen, China, R&D centre



Kista, Sweden, R&D centre

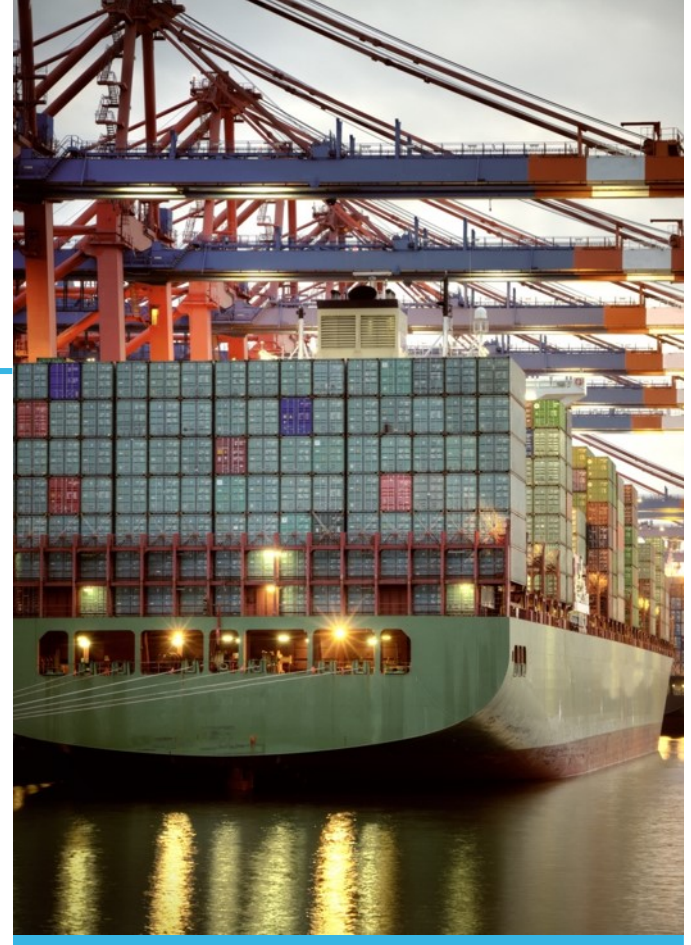
## Platform strategy in action

- **Trend:** Increased need for efficient maintenance of rail infrastructure
- **Application:** Fitted on underside of train carriages to sense, detect and transmit movement of the train across the track to signal track damage
- **Benefit:** Enables customer to identify precisely where the track might require repair, improving efficiency and cost



## Platform strategy in action

- **Trend:** Government agencies, logistics providers and insurance companies managing and monitoring assets remotely
- **Application:** Device placed on assets to track location and quality of goods
- **Benefit:** Improved efficiency and cost-saving by monitoring and managing vital signs to prevent asset loss or deterioration





## Well positioned for sizeable opportunity

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- Large fast moving industrial connectivity market
- Talent and technical capabilities to address demand
- Differentiated go-to-market strategy; ability to execute at speed
- Global operating footprint

# Business development and strategic partnerships

Michael Leahan





## What makes us different

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Instead of being transactional and tactical, TT offers:

- Business partnering approach
- Testing and value-engineering services
- World-class operational excellence

## Exciting progress

6%

Organic revenue growth (HY18)

13

New customers won so far this year  
(up from 7 in 2017)

20%

YoY growth with globally managed  
strategic customers

7%

Operating profit margin  
(HY18, up from 3.3% HY17)

## What makes us different?

“ **TT really gets our business.** They’ve helped us achieve our own strategic growth goals by **streamlining our supply chain** and taking the burden off some of our engineers so that they can focus on R&D. In fact, our **engineering teams often work collaboratively** on new designs or product refreshes, which has helped us stay competitive – because speed to market is everything. ”

Bruce Graham, Director, Global Sourcing, Thermo Fisher



## Target customers

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- Focused on parts of underserved low volume high mix markets
  - Aerospace and defence
  - Medical
  - High-end industrial
- The “right fit” customers matter
- Engineers supporting complex end-product and systems manufacturing

## What makes us different?

“ *TT Electronics has truly become an extension of our engineering organisation. Their **extensive technical capabilities** coupled with a collaborative approach to **supporting the product development** cycle has set them apart from the competition.* ”

Mark Walker, Director EMEA Operations, Spirent Communications



## Our focus on business development

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Starting to deploy sophisticated approach to business development across TT:

- Company-wide training program
- Business development council
- Key account management program

## What makes us different?

**“** *At TT, world-class customer service isn't just a tag line, its embedded in their culture and visible throughout the organisation. From the line operators to senior leadership, the organisation is truly committed to **delivering the best service possible.*** **”**

Jacintha Walsh, European Supply Chain Manager, Waters Corporation



## Growing existing customer relationships

**Trend:** market for smart labels projected to grow at c.17% CAGR to \$10bn by 2021

- The “right fit” customer: global industrial labeling and packaging device company
  - Growing business with global footprint
  - New product pipeline requiring support from a manufacturing partner
  - High-end products with lots of electronic content
  - Industry leaders in a market we know well
- Provided a tailored manufacturing solution to develop new products faster

**Result:** Awarded 5-year contract for full systems manufacturing in China. Tripling size of customer account



## Cross selling with TT's blue-chip customers

**Trend:** supply chain consolidation in aerospace and defence

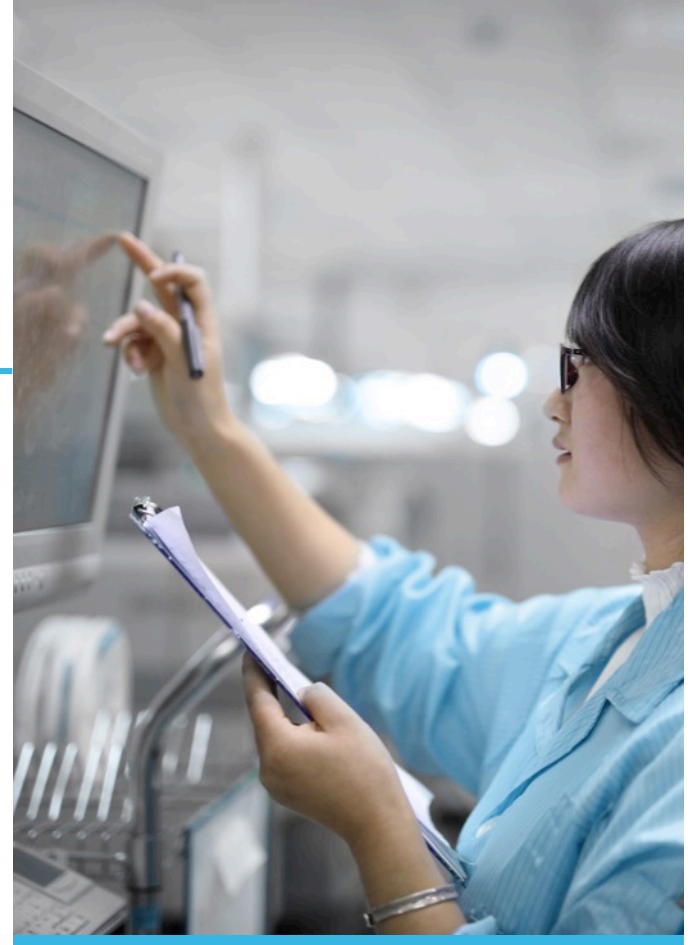
- The “right fit” customer: leading aerospace and defence manufacturer
  - Existing strategic relationship with our Power business
  - Customer had problems with operational performance in pre-existing supply chain
  - Leading manufacturer in aerospace and defence, an industry we know well
- Worked collaboratively with the Power business to secure introduction

**Result:** Awarded contract to manufacture navigational processors for several commercial aircraft

## Supporting TT's product capabilities

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- TT's product divisions are moving up the value-chain, requiring greater manufacturing capability
- Connectivity is vertically integrated
- More opportunity for Global Manufacturing Solutions to operate as TT's global manufacturing foundation





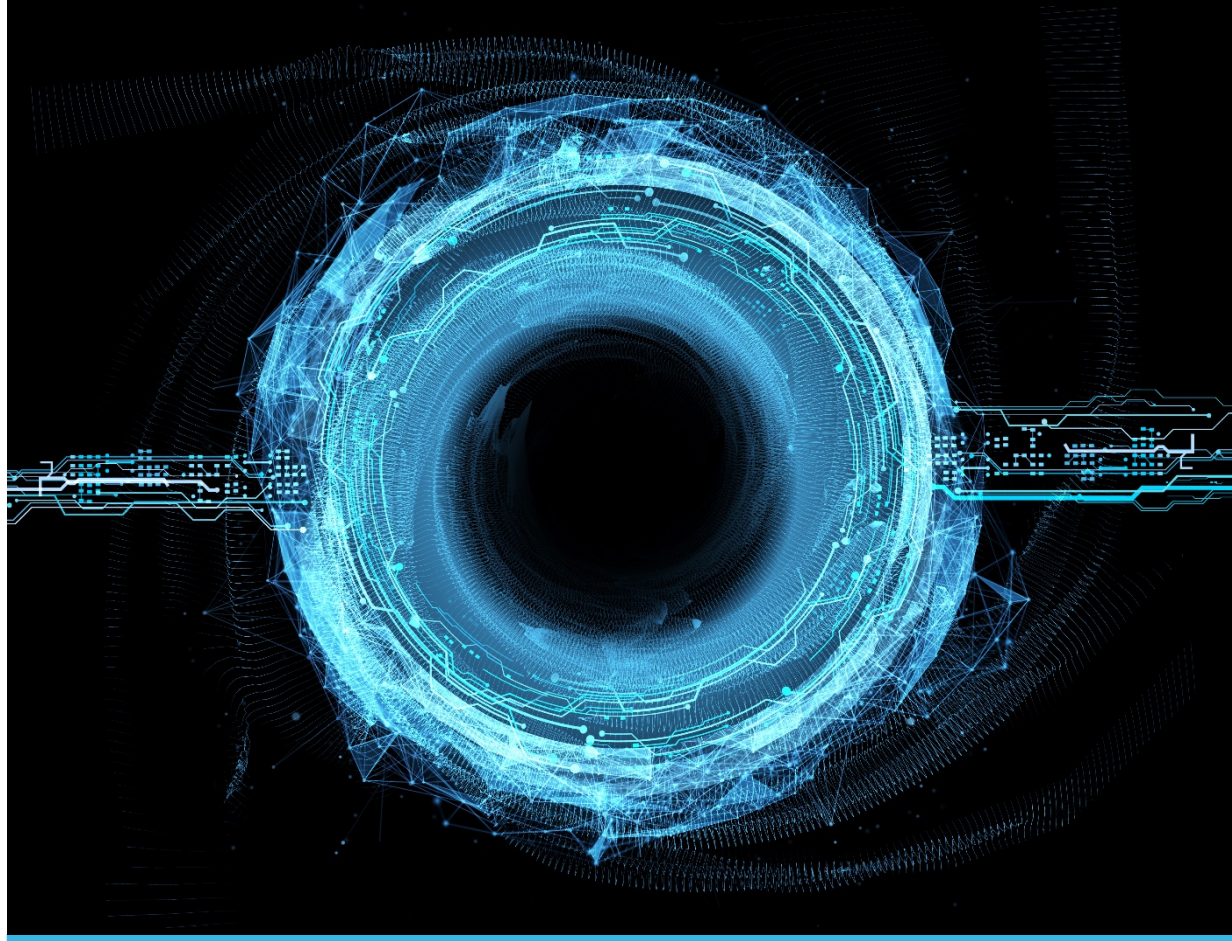
## Global Manufacturing Solutions delivering value

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- Proven business development approach winning new business and growing our existing relationships
- Value-added services for customers with highly complex products
- World-class operations
- Delivering results...more to come

# TT's position for the future

Richard Tyson



## Well positioned for growth and margin progression

- Higher-quality, higher-margin business
- Well placed in growing markets
- Investing to enhance capabilities





# Q&A