



SENIOR PLC CAPITAL MARKETS DAY 20th MAY 2019



NOTICES

Safety



Cautionary Statement

This document contains certain forward-looking statements. Such statements have been made in good faith based on information available at the time of the Capital Markets Day 2019 on 20 May 2019. These statements should therefore be treated with caution due to the inherent uncertainties, including both economic and business risk factors, underlying such forward-looking information.

TODAY'S KEY OBJECTIVES

Deeper insight into Senior and its end markets

Substance of Senior's technology & IP

The common technology themes across the Group

Future proofing the business

ROCE targets and improvement path

AGENDA

2:00pm	SENIOR PLC	<ul style="list-style-type: none">- Introduction to Senior- Our Strategy- Our Markets- Technology Themes	David Squires, Group CEO
2:25pm	FLUID CONVEYANCE	<ul style="list-style-type: none">- Understanding Bellows Technology- Fluid Conveyance Technology- Flexonics Technology Update	Mike Sheppard, Flexonics CEO Launie Fleming, Fluid Systems CEO Shaz Malik, Business Development, Flexonics Ryan Collins, Director of Engineering, Senior Flexonics Bartlett
	Q&A		
3:25pm	COFFEE BREAK		
3:45pm	STRUCTURES	<ul style="list-style-type: none">- Know-How & Technology Development	Joe Mockus, Structures CEO Parag Hegday, Director of Technology – Structures
4:15pm	ADDITIVE MANUFACTURING		Krist Khodjasaryan, VP, Engineering and Program Management, SSP
4:30pm	NEW PRODUCT INTRODUCTION & INDUSTRIALISATION		David Squires, Group CEO Launie Fleming, Fluid Systems CEO Joe Mockus, Structures CEO
4:45pm	OUR FINANCIAL FRAMEWORK		Bindi Foyle, Group Finance Director
5:00pm	CLOSING REMARKS AND Q&A		David Squires, Group CEO
5:30pm	DRINKS RECEPTION		

SENIOR PLC LEADERSHIP TEAM

Ian King
Chairman



David Squires
Group CEO



Bindi Foyle
Group Finance Director



Mike Sheppard
CEO
Flexonics Division



Launie Fleming
CEO
Fluid Systems Division



Joe Mockus
CEO
Aerostructures Division

David Beavan
Director of Business Dev, and Strategy



Andrew Bodenham
Group Company Secretary



Jane Johnston
Group HR Director



Michelle Yorke
Director of Risk and Compliance



Gulshen Patel
Director of Investor Relations and Corporate Communications



Mark Roden
Director of HSE & Sustainability

PRESENTERS

Krist Khodjasaryan

VP, Engineering and
Program Management
Senior Aerospace SSP



Parag Hegday

Director of Technology
Senior Aerospace Structures



Shaz Malik

VP, Business Development
Senior Flexonics



Ryan Collins

Director of Engineering
Senior Flexonics Bartlett



senior



SENIOR PLC

senior
Aerospace

Capital Markets Day 2019

senior
Flexonics



- Introduction to Senior
- Our Strategy
- Our Markets
- Technology Themes

David Squires
Group CEO

WHAT SENIOR IS

senior is an international, market-leading, engineering solutions provider

⇒ **Publicly Traded - London FTSE 250 as “SNR”**

⇒ **International manufacturing group:**

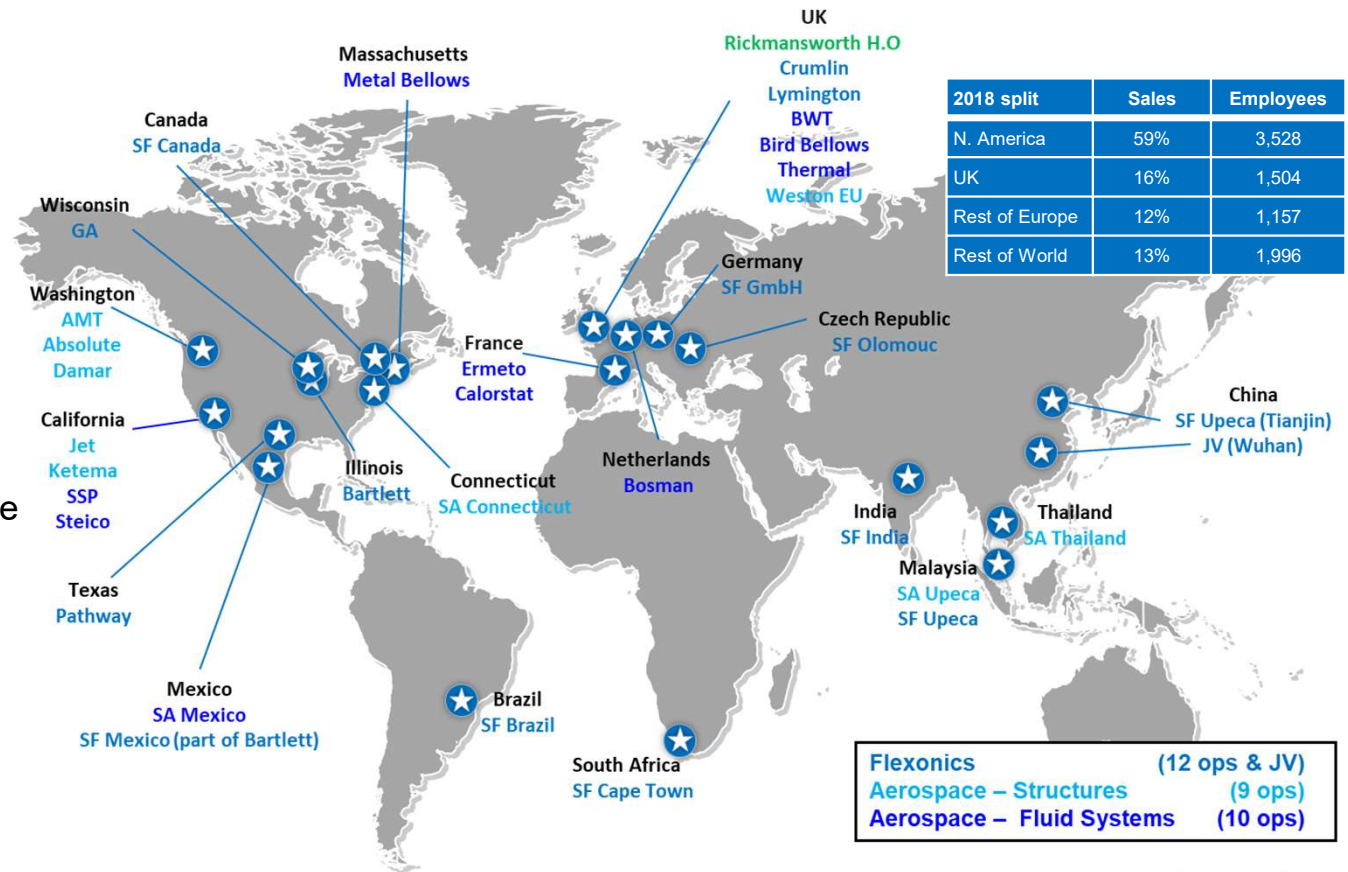
- 32 operations (including 1JV), across 14 countries servicing blue-chip customers
- 8,185 employees worldwide

⇒ **Engineering solutions provider:**

- Designs and manufactures highly engineered, technology rich components and systems for OEMs in global aerospace & defence, land vehicle and power & energy markets

⇒ **Two reporting (three management) Divisions:**

- **Aerospace** (Fluid Systems & Structures)
- **Flexonics**





EVOLUTION OF SENIOR



1836

Baxter Woodhouse and Taylor (BWT) was established in Manchester as a cotton goods trader.

1933

Senior Economisers Limited was incorporated.

1947

Senior Economisers Limited became a public company and listed on the London Stock Exchange.

1995

Acquisition of SSP, based at Burbank, California, and Ermeto in France.

1997

Acquired Ketema, based in San Diego, California. A South African automotive business is established in Cape Town.

2000

A new automotive factory at Olomouc, Czech Republic is built. Commenced disposal of various industrial businesses.

2006

Acquired Sterling Machine Co., Inc. and Aerospace Manufacturing Technologies, Inc. (AMT)

2007

Acquired Absolute Manufacturing, Inc.

2011

Acquired Damar Machine Company, Weston EU and Weston SEA.

1930s

1940s

1990s

2000s

2010s



1991

Calorstat SAS joined the Group.

1992

Acquired Flexonics, Inc. and its subsidiary Operations (Canada) Limited. Crumlin, South Wales, established.

1994

Acquired Metal Bellows and Christian Berghofer & Co.

1998

Acquired Bosman B.V. Gained control of India Private Limited. Acquisition of Jet Products. Brazilian automotive business is established.

1999

The holding company changed its name from Senior Engineering Group plc to Senior plc. Acquired Pathway, BWT and Bird Bellows.

2012

Acquired GAMFG Precision, LLC. Sold Hargreaves.

2013

Acquired Thermal Engineering Limited.

2014

Acquired UPECA Technologies Sdn. Bhd.

2015

Acquired Lymington Precision Engineering (LPE) Limited and Steico Industries Inc.

2019

Sold Senior Flexonics Blois SAS.

OUR BUSINESS MODEL

What We Do	How We Do It			Long-Term Sustainable Value
<p>Design and manufacture of highly engineered, technology rich products and systems for OEMs in the following markets:</p> <p>Aerospace & Defence </p> <p>Land Vehicle </p> <p>Power & Energy </p>	<p>Our Values</p> <p>Safety</p> <p>Integrity</p> <p>Customer Focus</p> <p>Respect & Trust</p> <p>Accountability</p> <p>Excellence</p>	<p>Our Strengths</p> <p>Organisation</p> <p>Financial</p> <p>Global Footprint</p> <p>People & Culture</p> <p>Innovation</p>	<p>Strategic Priorities</p> <p>Autonomous and Collaborative Business Model</p> <p>Focus on Growth</p> <p>High Performance Operating System</p> <p>Competitive Cost Country Strategy</p> <p>Considered and Effective Capital Deployment</p> <p>Talent Development</p>	<p>Create value for all our stakeholders through our business model</p> <p> Shareholders</p> <p> Customers</p> <p> Employees</p> <p> Our Communities</p>

Our vision is to be a trusted and collaborative high value-added engineering and manufacturing company delivering sustainable growth in operating profit, cash flow and shareholder value

OUR SIX STRATEGIC PRIORITIES

Strategic Priorities



OUR MARKETS



Power & Energy
14%



52% Civil Aerospace



Land Vehicles
16%



Other Aerospace
7%



11% Military Aerospace

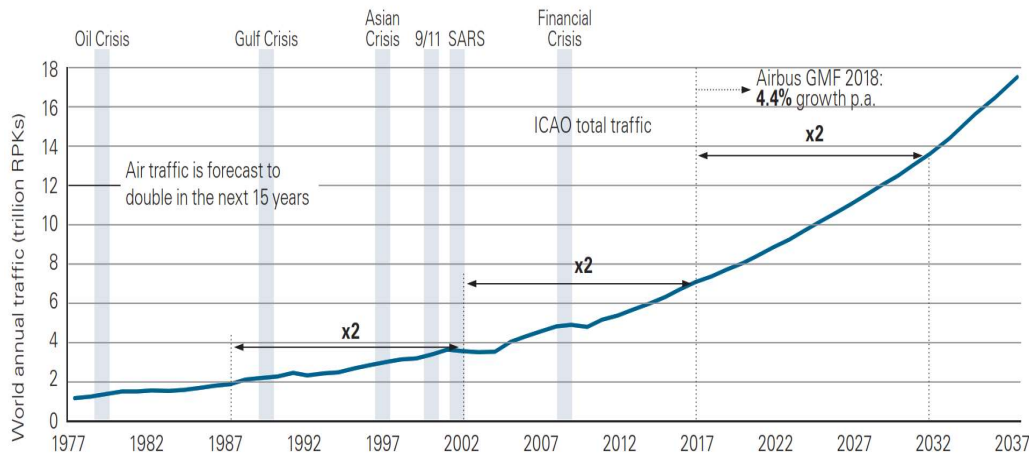
End markets composition based on 2018 revenue



CIVIL AEROSPACE (52% of Group)

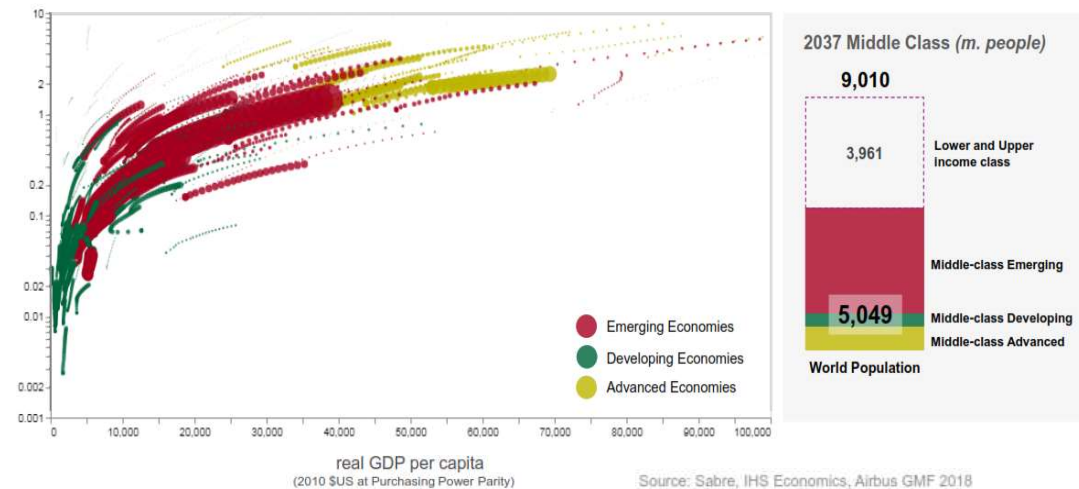
- ⇒ Demand for new civil aircraft remains robust
- ⇒ Boeing, Airbus and independent forecasters predicting air traffic to grow > 4% p.a. over the next 20 years
- ⇒ By 2037, approx. 85% of emerging country populations will fly (up from 30% in 2017)

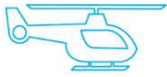
World Air Traffic



SOURCE: ICAO, Airbus GMF 2018

Trips per Capita (2017-2037)





MILITARY AEROSPACE (11% of Group)

- ⇒ Global defence spending to exceed \$2 trillion in 2022
- ⇒ The US continues to spend more on defence than the next 7 countries combined
- ⇒ Senior is well placed with good content on F-35, CH-53K and T-X Trainer

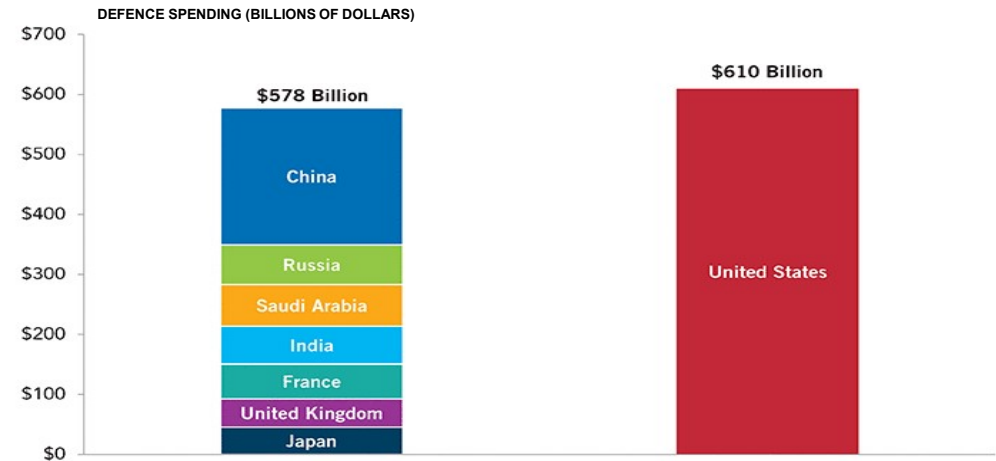
Global Defence Spending



Source: Deloitte analysis of data from Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, accessed in December 2017



The United States spends more on defence than the next seven countries combined



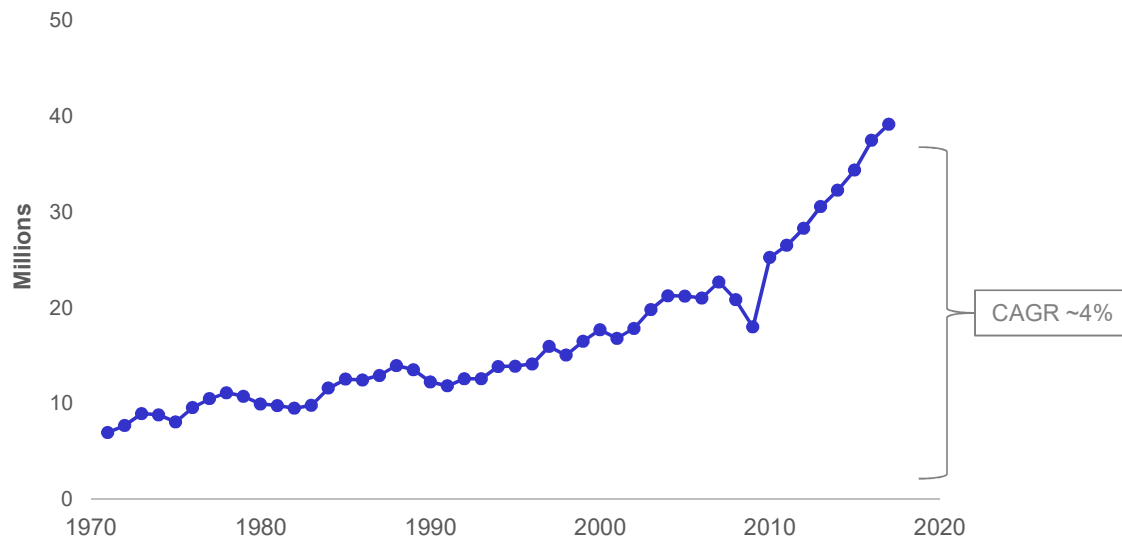
Source: Stockholm International Peace Research Institute, SIPRI Military Expenditure Database, May 2018. Data are for 2017. Compiled by PGPF. Note: Figures are in US dollars, converted from local currencies using market exchange rates.



LAND VEHICLES (16% of Group)

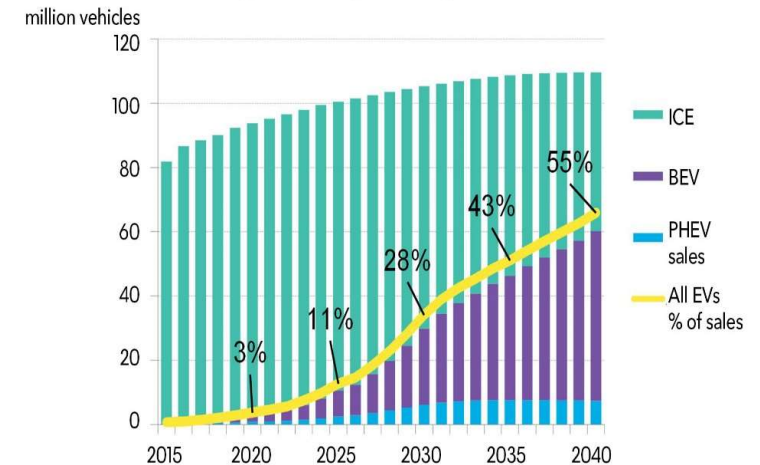
- ⇒ Commercial vehicles grow at 4% p.a. and passenger vehicles grow at 2% p.a. through the cycle
- ⇒ Growth in GDP and tighter emissions regulations increase demand for Senior's land vehicle products
- ⇒ Senior is addressing the changing landscape with innovative products

World Commercial Vehicles Production (1971-2017)



Source: Wards Intelligence, 2018

Annual global light duty vehicle sales



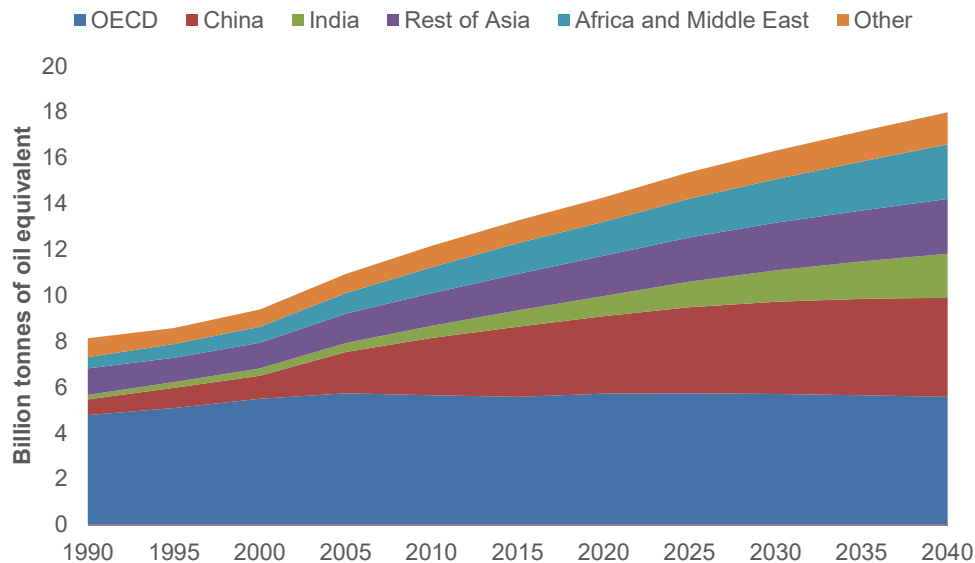
Source: Bloomberg New Energy Finance



POWER & ENERGY (14% of Group)

- ⇒ Projected increases in global energy usage, tightening emission control regulations and emerging changes in power generation will drive increased demand for Senior's power & energy products
- ⇒ Senior supplies into oil and gas and power generation, including nuclear and renewables

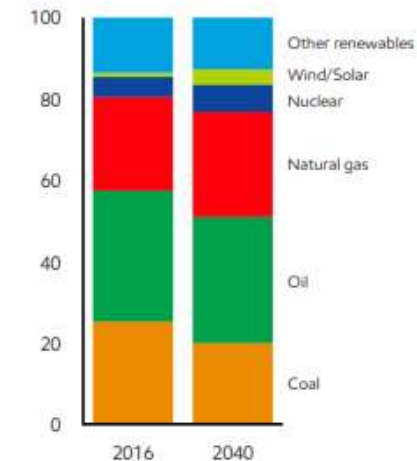
World Energy Demand



Source: BP Energy Outlook 2035

Global energy mix shifts to lower-carbon fuels

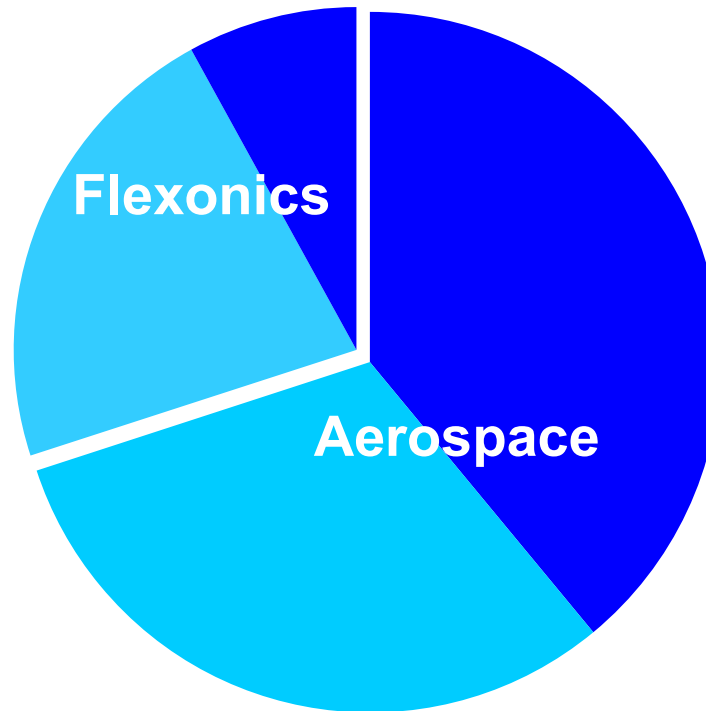
Percent of primary energy (%)



Source: Exxon Mobile 2018 Outlook for Energy

TWO TECHNOLOGY THEMES

Fluid Conveyance



Structures



World Class Mechanical Engineering Capabilities

TECHNOLOGY THEME ONE: FLUID CONVEYANCE



Aerospace

Aircraft

Low Pressure Ducting
High Pressure Ducting
Aerospace Control Products
Non-Aerospace Control Products

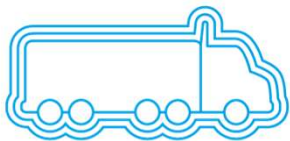
Gas Turbine Engines

Complex Ducts, Tubes & Pipes
Bellows Seals & Controls



Controlling the flow of fluids within systems

Extending the technology to numerous applications



Flexionics

Thermal Heat Exchangers
Common Rail Diesel
Exhaust Flexes
Engine flexes & tubes

Land Vehicle Emission Control

Expansion Joints & Dampers
Hoses, Flexes, Bellows
Fuel Cells, CHP, Solar Power & Heating



Industrial Process Control

TECHNOLOGY THEME TWO: STRUCTURES



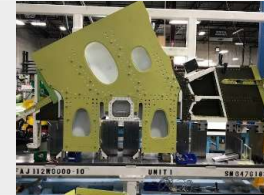
Aerospace

Airframe Structures & Assemblies

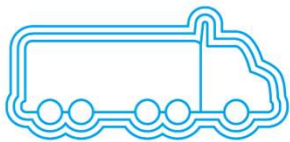
Airframe Structures
Airframe Assemblies
Helicopter Transmission Structures
Hard & Soft Metal Machined Parts

Engine Structures & Mountings

Nacelle Rings
Engine Casings
Aerofoils



Precision Machined Components and Assemblies



Flexionics

Land Vehicles

Fuel Injectors
Hydraulic Machined Components



Power & Energy

Oil & Gas Directional Drilling Equipment
Flow Control Valve Bodies
Oilfield Services Packers



INTELLECTUAL PROPERTY (IP) RICH BUSINESS

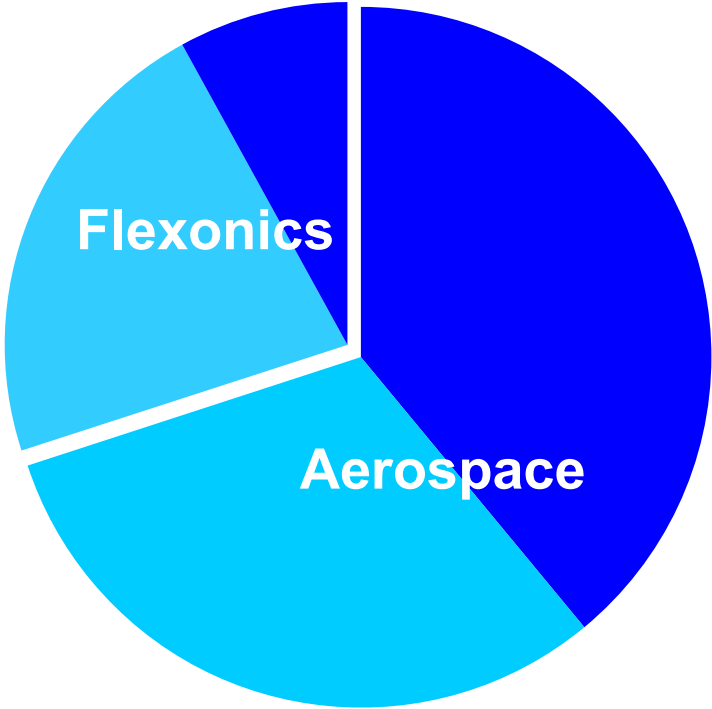


Structures

Complex Machining and Manufacturing Know-How: Process IP

Fluid Conveyance

Product and System Design & Manufacturing IP



IP is inherent in both design and manufacturing



FLUID CONVEYANCE



- **Understanding Bellows Technology**

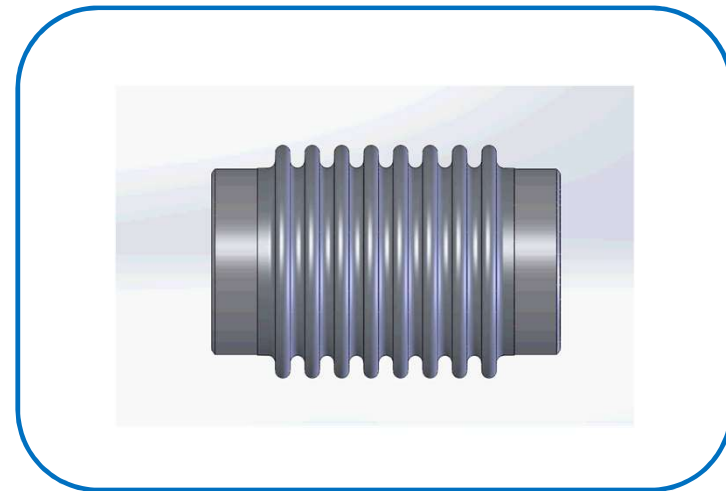
Mike Sheppard
Flexonics CEO

WHAT IS A BELLOWS?

A bellows is a *zero leakage* dynamic seal capable of a *range of motion*.

Made from thin gauge metal:

- ⇒ stainless steel, high nickel alloys, titanium or other alloys
- ⇒ ranging from 0.001" to 0.125" thick. Some multiple plies



BELLOWS TECHNOLOGY

Bellows are used for:

- ⇒ Thermal expansion/contraction
- ⇒ Absorbing vibration and/or motion
- ⇒ Seals
- ⇒ Heat transfer

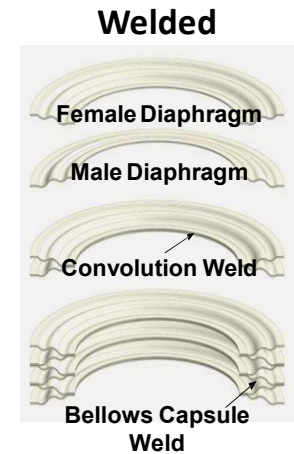
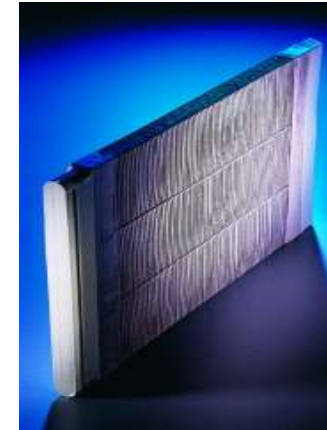
Senior has 100+ years of integrating Formed Bellows & Welded ...

- ⇒ Into higher value Medical, Aerospace, Oil & Gas, Industrial, Auto and Truck / Off-road applications for:
 - Exhaust
 - Accumulators, Actuators, Heat Exchangers, & Pumps
 - High & Low Pressure Duct systems
 - Valves, Sensors and Seals
 - Large Scale Industrial Expansion Joints

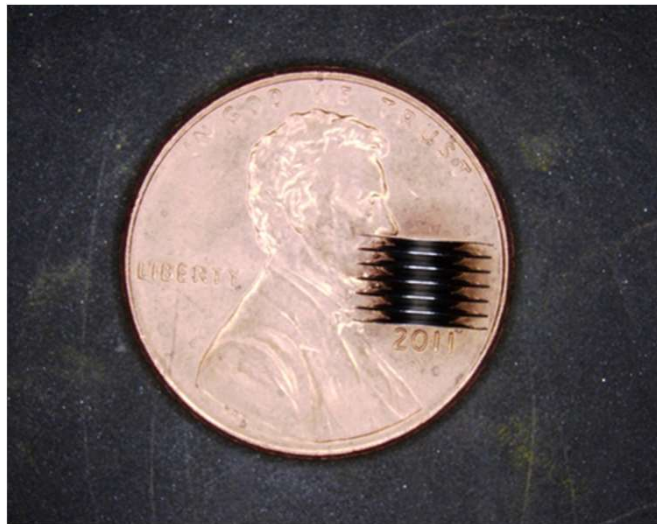


VARIETY OF BELLOWS

- ⇒ Formed or Welded
- ⇒ Round, Oval Rectangular,...
- ⇒ Metal, Fabric, Rubber
- ⇒ Metal Hoses



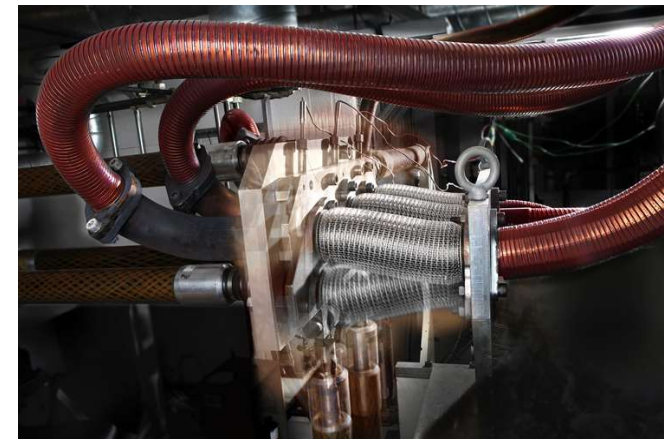
SENIOR'S BELLOWS COME IN A VARIETY OF SIZES



Bellows underpinning technology at the heart of our most successful businesses

UNIQUE CHARACTERISTICS TO SOLVE COMPLEX PROBLEMS

- ⇒ Critical Applications where Pressure, High Temperatures, and Motion require unique solutions
- ⇒ Bespoke Highly Engineered Designs
- ⇒ Senior provides Design, Modeling, and Validation - often customer does not really understand the actual requirements. What does One Million Mile Warranty mean?
- ⇒ Variety of Applications requiring High Volume & One-Off Manufacturing Capabilities



LEADS TO BROAD RANGE OF PRODUCTS AND INDUSTRIES

Aerospace



Land Vehicle



Refinery



Solar Power

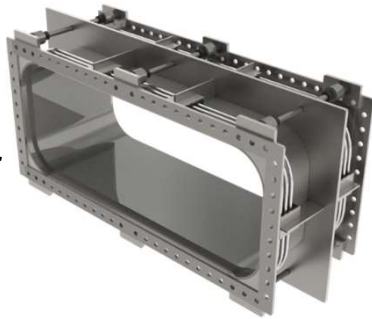


Oil & Gas

Semi-con



Nuclear



Aerospace



Land Vehicle





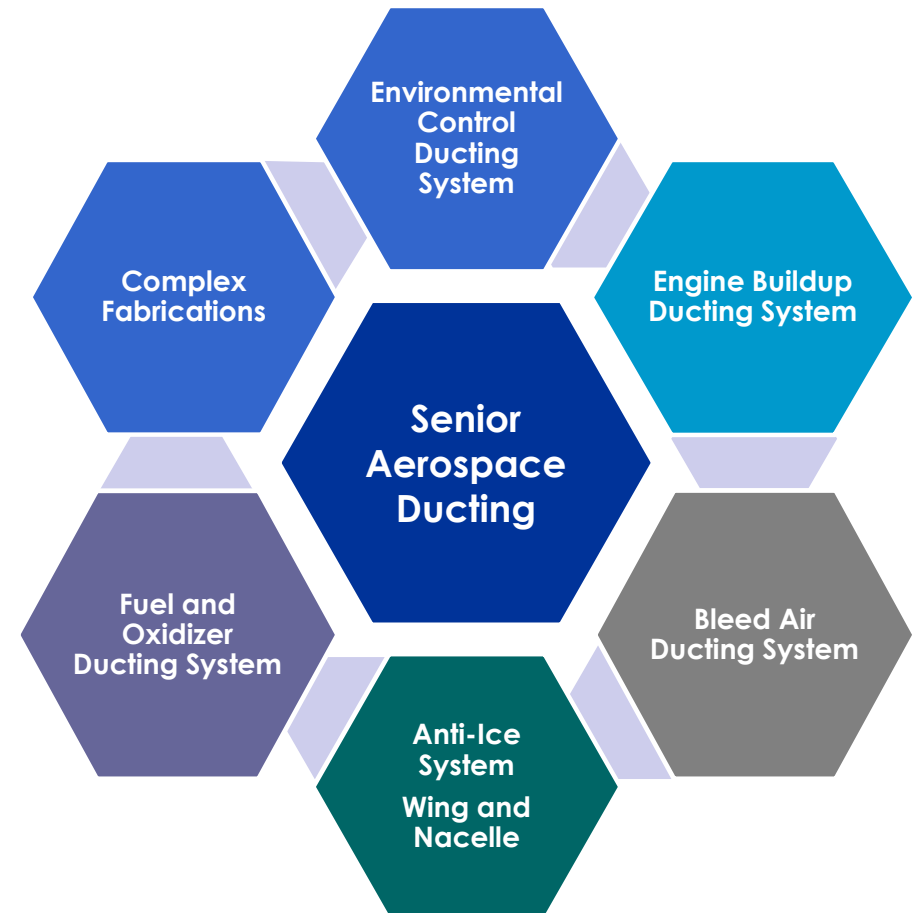
- **Fluid Conveyance Technology**

Launie Fleming
Fluid Systems CEO

HIGH PERFORMANCE DUCT SYSTEMS

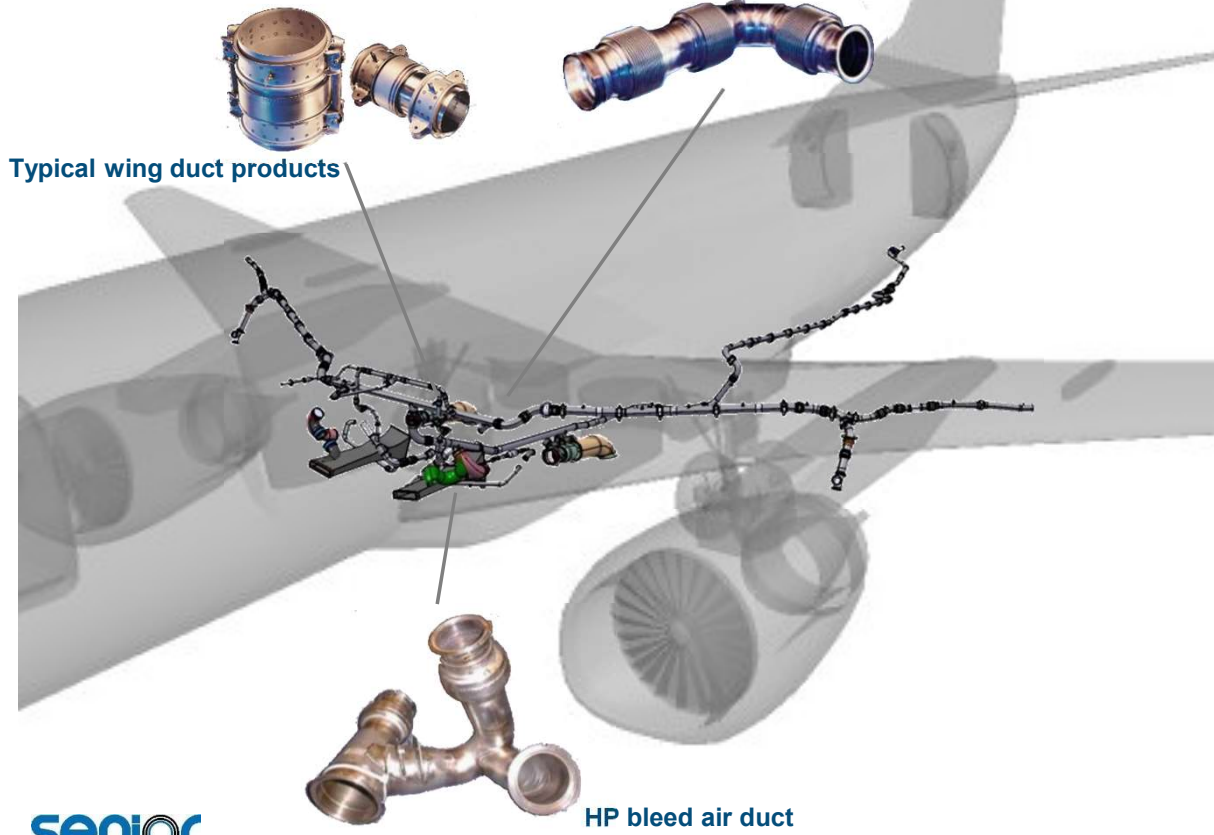
Total engineered systems resources

- ⇒ Effective solutions to complex fluid conveyance tubes, pipes and ducting requirements
- ⇒ Airframe and Turbine Engine duct system designs
- ⇒ Design, test & manufacture of High Pressure Ducting Systems, including Bleed Air, Anti-Ice, Engine Build Up (EBU), Environmental Control System (ECS), Fuel and Oxidizer Systems
- ⇒ Stainless Steel, Inconel, Titanium
- ⇒ Comprehensive engineering services from initial concept to certification, production, and aftermarket

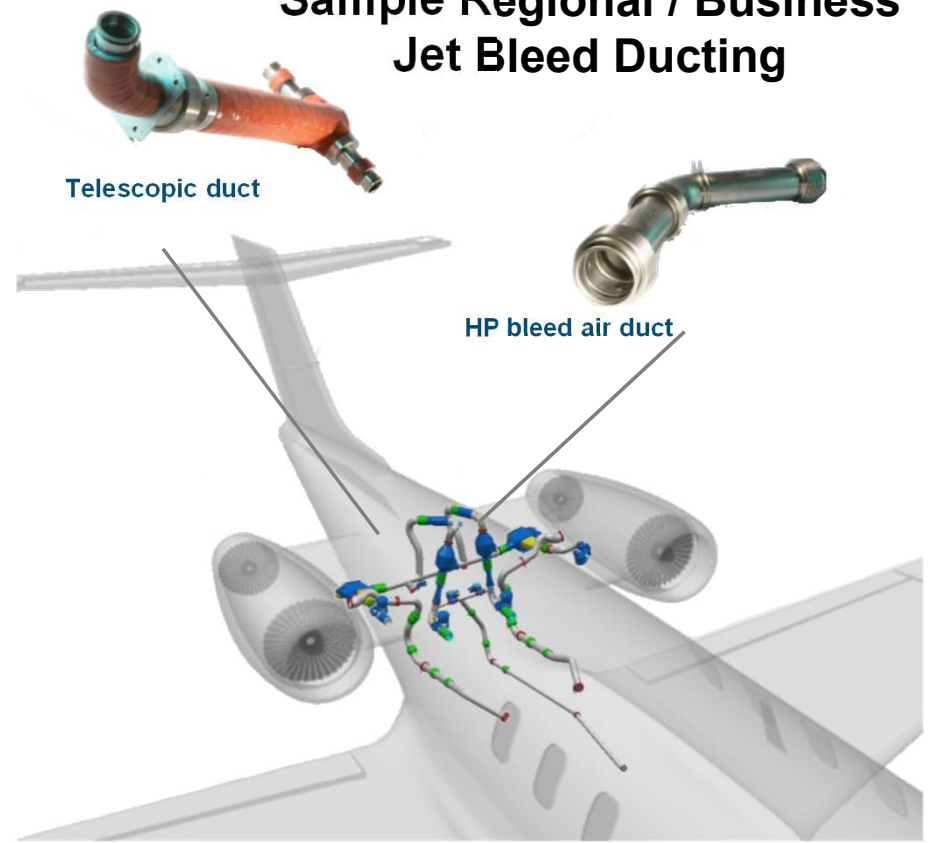


FLUID SYSTEMS HIGH PERFORMANCE DUCTS

Sample Transport High Pressure / Bleed Ducting



Sample Regional / Business Jet Bleed Ducting



FLUID SYSTEMS HIGH PERFORMANCE DUCTS

Custom Design / Build to Specification

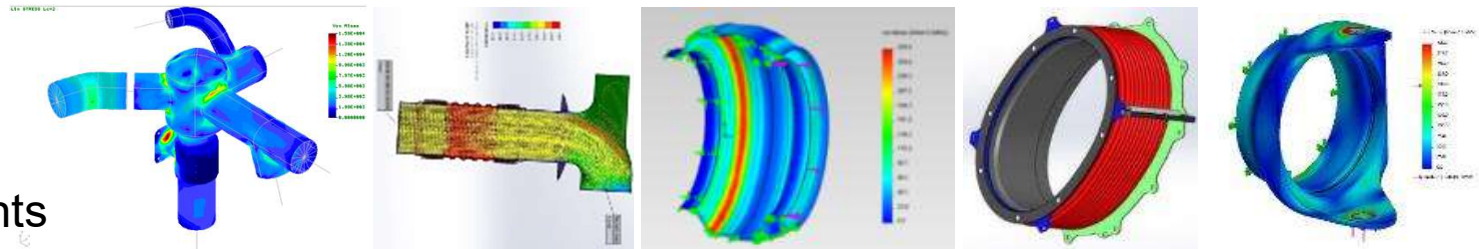
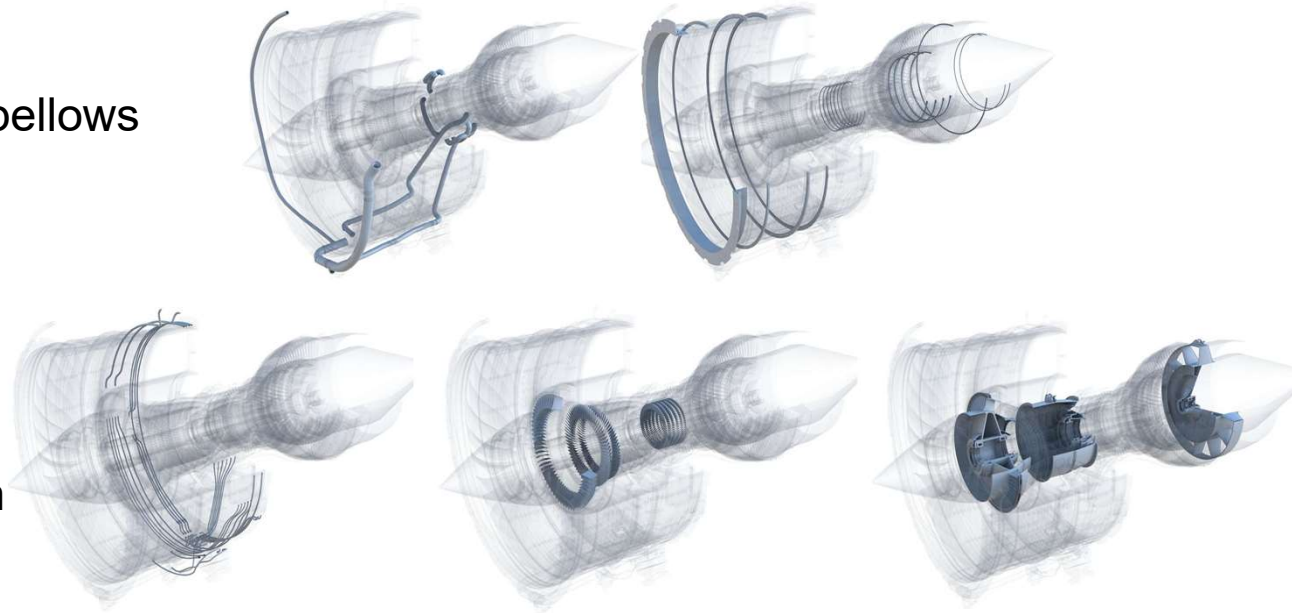
- ⇒ Titanium, Stainless Steel, Inconel® bellows
- ⇒ Formed or Edge-Welded Bellows

Conception to Qualification

- ⇒ Software simulation & analysis
- ⇒ Project management
- ⇒ Validation, Qualification, Certification
- ⇒ Technical Support

Service life

- ⇒ Design-to-Cost
- ⇒ Customer Support
- ⇒ Continuous Improvements



ENGINE BUILD-UP UNITS (EBUs)

Senior Aerospace is an expert EBU designer and manufacturer



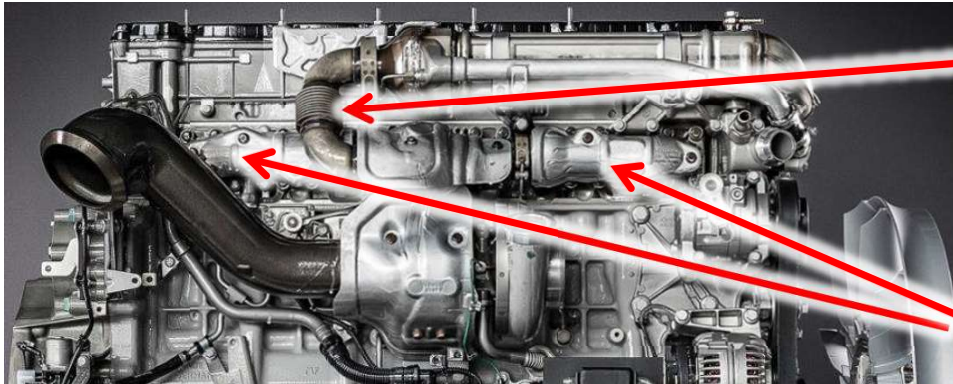
EBU system includes:

- ⇒ Starter Ducts
- ⇒ Bleed Ducts Fuel Lines
- ⇒ Fuel Lines
- ⇒ Leak Detection Systems for Hot Ducts
- ⇒ Hydraulic Lines
- ⇒ Oil Drains Lines



SENIOR FLEXONICS LAND VEHICLE

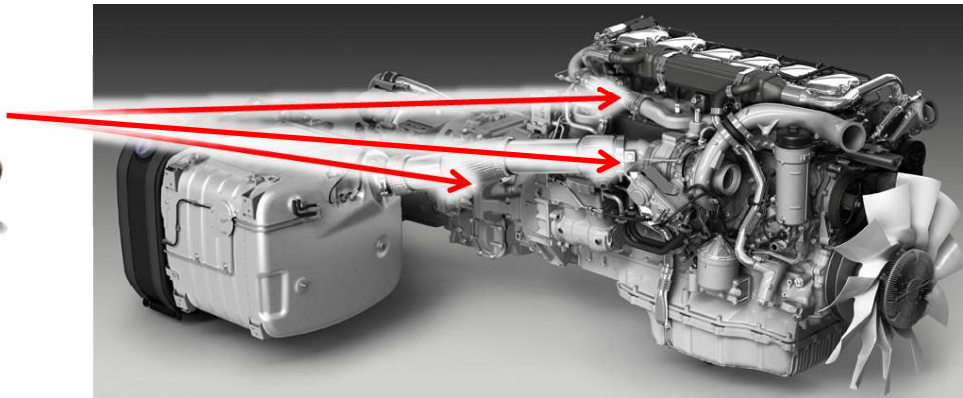
Daimler Heavy Duty Truck Engine



Senior supplies:

- ⇒ Exhaust Manifold Tubes
- ⇒ Exhaust Gas Recirculation (EGR) Lines
- ⇒ Turbo Charger Pipes
- ⇒ Exhaust System Components
- ⇒ Oil Drain Lines for Turbo Chargers

Scania Heavy Duty Truck Engine



PROCESS EQUIPMENT

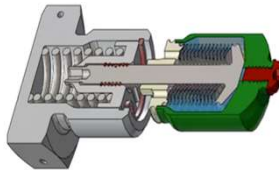
Renewable Energy



Heating & Ventilation



Valve Seals

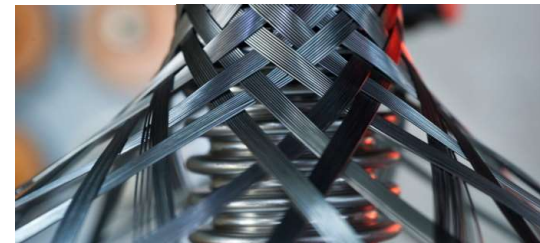


Lubrications Systems



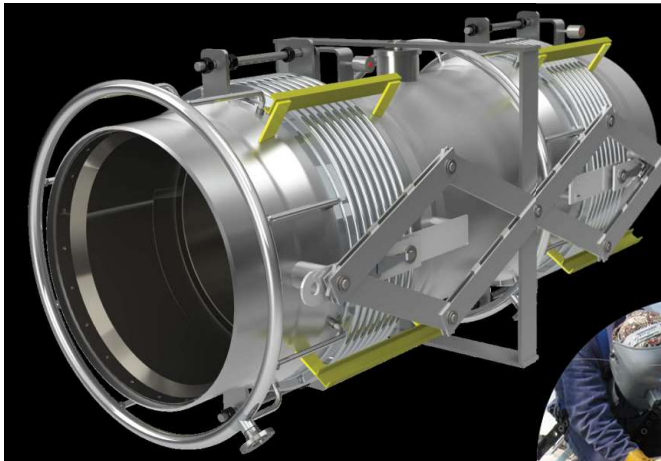
Instrument & Control Seals

Medical Equipment



Metal Hose for Industrial Technology

POWER & ENERGY EXPANSION JOINTS & DAMPERS



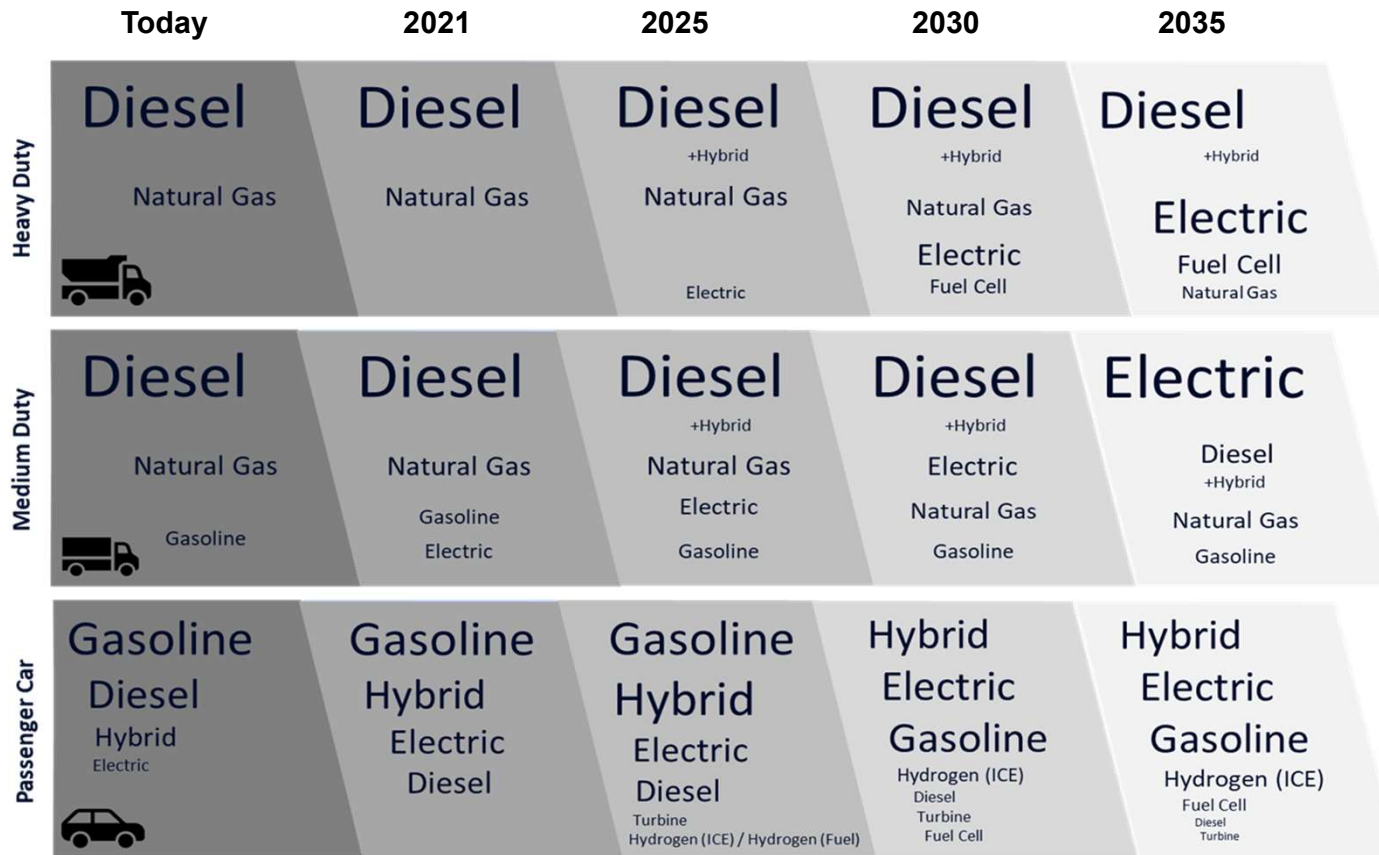


- **Flexonics Technology Update**

Shaz Malik
Business Development
Flexonics

Ryan Collins
Director of Engineering
Senior Flexonics Bartlett

LAND VEHICLE TECHNOLOGY TRENDS



Source: Senior plc, Cummins

EVOLUTION OF LAND VEHICLE POWERTRAINS

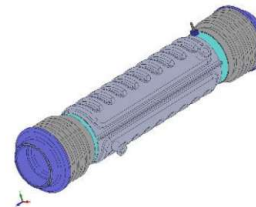
Addressing the Changing Landscape

⇒ **Developing New Products for Electrification**

Battery Cooling



Waste Heat Recovery



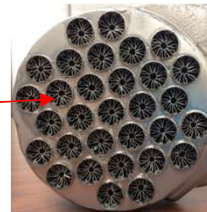
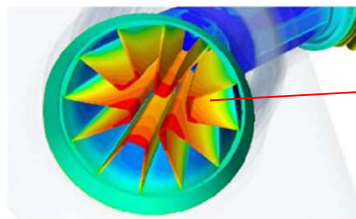
Heat Sink in Hybrid Cars



New Development – 3D Printed Thermal Plastic

⇒ **Improving Current Products For Future Needs**

Radial Fin EGR Coolers – Combining Highest Efficiency with Highest Durability



⇒ **Pursuing New Opportunities as Emissions Change Globally and in New Markets**

Passenger Cars



Off Highway



India for India, China for China



EGR COOLER JOURNEY – CHALLENGE

⇒ Landscape

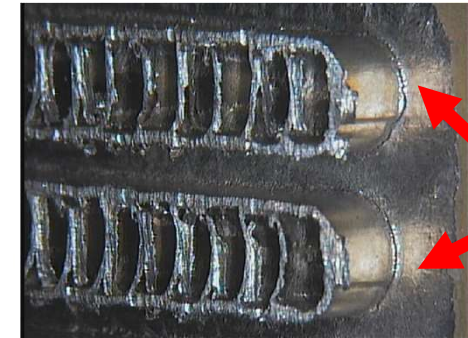
- ⇒ Commercial Vehicle OEMs must meet Emissions Legislation
- ⇒ Exhaust Gas Recirculation (EGR) is needed
- ⇒ Existing heat exchanger suppliers respond with their standard know how

⇒ Problem

- ⇒ Large warranty return rates for 1st generation systems
- ⇒ Root cause is thermal fatigue failure of standard know-how products

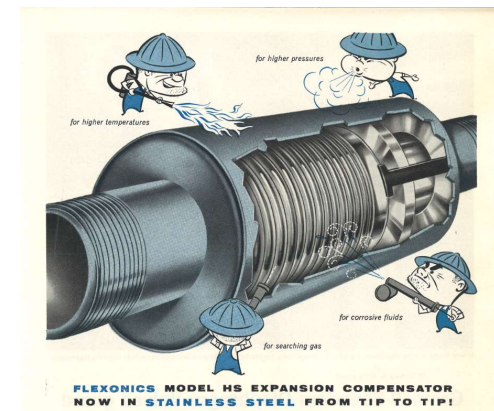
⇒ Engagement

- ⇒ Senior engaged by customers due to thermal compensation know-how and reputation



Cracks

Rectangular Tube/Fin Header (Failed)



Flexionics Ad May 1960

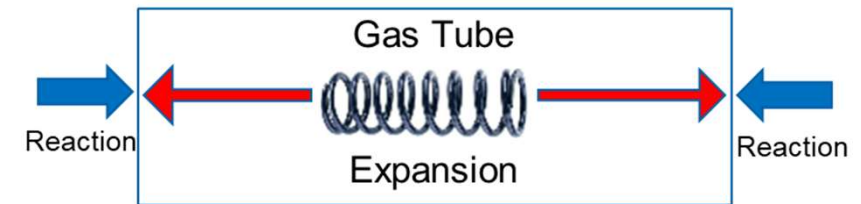
EGR COOLER JOURNEY – SOLUTION

⇒ Problem Solving

- ⇒ Senior Flexonics team leaned on 100 year history of thermal compensation
- ⇒ Issue was assessed and underlying failure mechanism quantified
- ⇒ Senior's Bend-a-Flex™ tube technology was utilised and assembled into a conventional, robust, shell and tube heat exchanger

⇒ Results and Next Steps

- ⇒ Senior manufactured 273,000 stainless steel EGR Coolers in 2018 for a variety of harsh applications
- ⇒ New style heat exchangers under development to meet tighter Commercial Vehicle emissions and anticipated Electrification needs

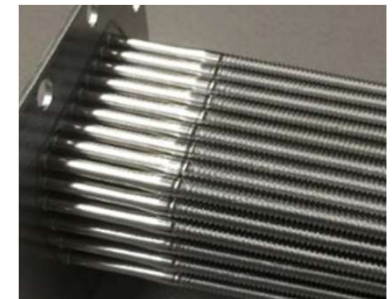


$$F = kx$$

F = Force applied on the spring
k = Spring constant
x = Extension of the spring



Bend-a-Flex™
Tube Technology



Flexible Core Design

LAND VEHICLE ELECTRIFICATION – CHALLENGE

⇒ Landscape

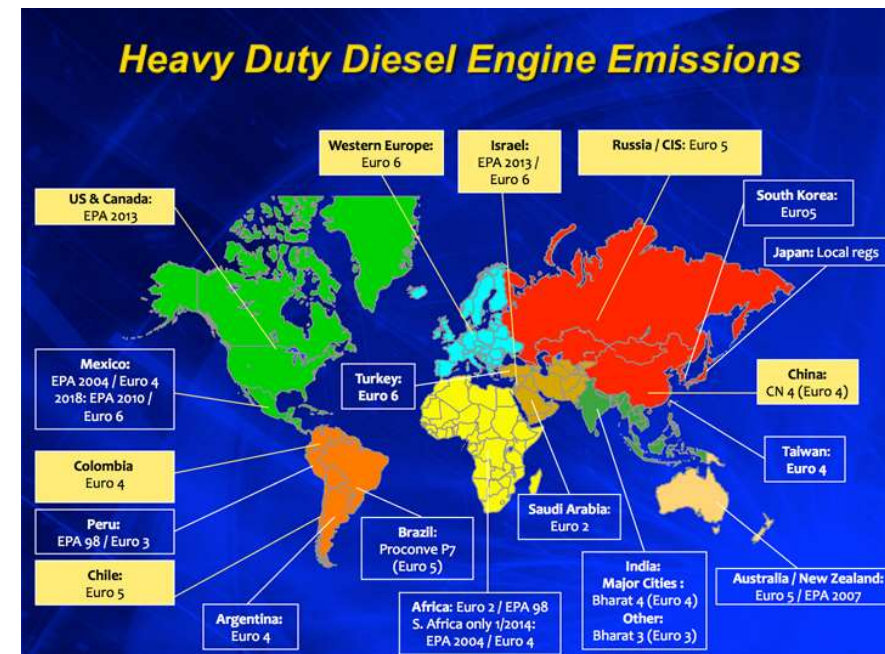
- ⇒ City governments are moving to ban/reduce vehicle NO_x
- ⇒ Climate change legislation will drive down permissible CO₂ levels
- ⇒ NO_x is a city problem, CO₂ is a global problem
- ⇒ Meeting 95g/km CO₂ combined with trend toward CUV

⇒ Problem

- ⇒ Electrification of land vehicles is A solution, not THE only solution
- ⇒ Who owns the last mile? Big question for Commercial Vehicles

⇒ Engagement

- ⇒ Customer engagement due to thermal management expertise
- ⇒ Customers must develop different solutions for different customers and different applications and continue to drive greater efficiency from internal combustion engines (EV/Fuel Cell/Hybrid)
- ⇒ OEM uncertainty



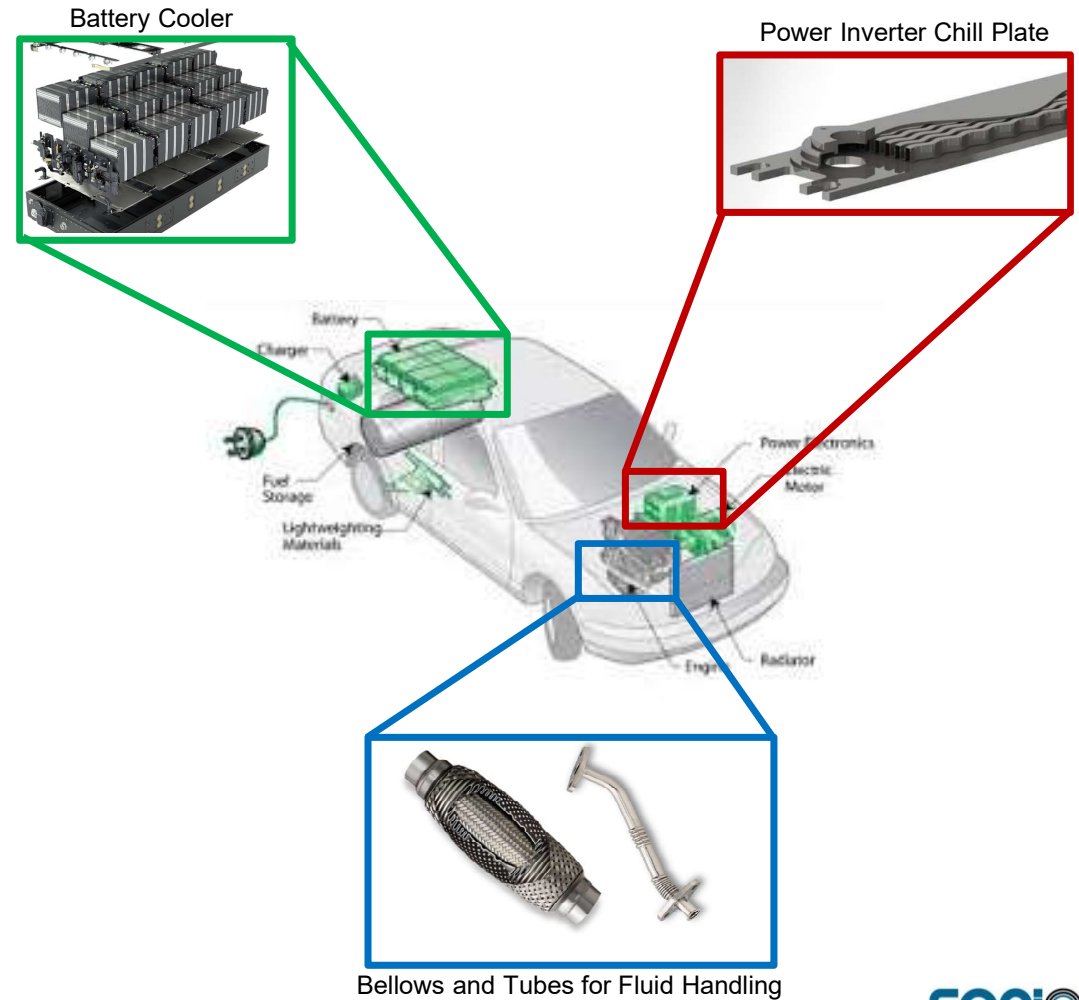
LAND VEHICLE ELECTRIFICATION – POWERTRAIN SOLUTION

⇒ Problem Solving

- ⇒ Thermal management is one of the key levers to battery performance
- ⇒ Efficiency, weight reduction, packaging, material selection are all areas within Senior's expertise

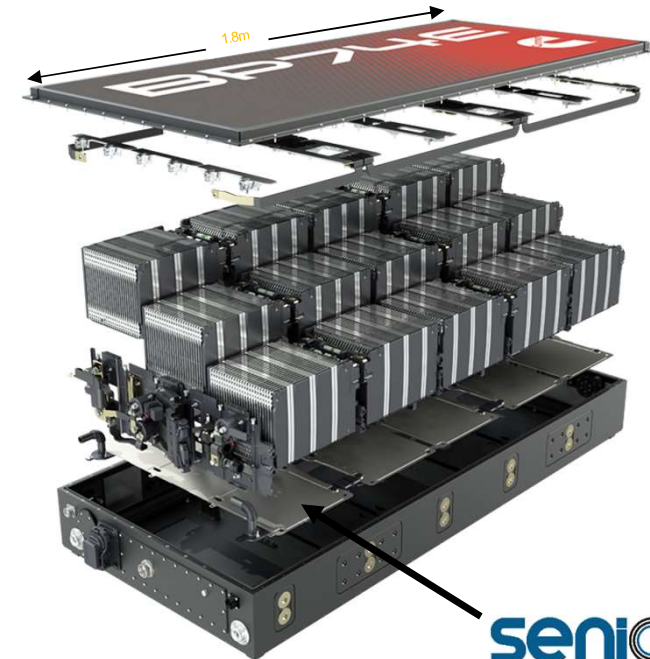
⇒ Current State

- ⇒ Passenger vehicle development of Inverter heat sink for hybrids
- ⇒ Commercial Vehicle Battery Coolers for BEV (battery electric vehicles) and hybrids
- ⇒ Fluid and air handling products such as tubes and bellows



LAND VEHICLE ELECTRIFICATION – POWERTRAIN SOLUTION

- ⇒ Senior Flexonics are working in close collaboration with our long term partner, Cummins, to develop a battery thermal management system for their 74kWh Goodwood battery module.
- ⇒ The system is designed in Crumlin and will be manufactured in Bartlett from late 2019.
- ⇒ It is designed to maintain the battery at its optimum temperature to ensure life and efficiency are maintained.
- ⇒ The batteries will ultimately be delivered to Gillig, the 2nd largest bus manufacturer in the USA, who announced their intention to launch a range of plug-in electric buses using the Cummins electrified powertrain.



senior
Battery Thermal
Management System



NEXT GENERATION TECHNOLOGY – RADIAL FIN COOLER

- ⇒ Future powertrains will have integrated electric machinery with reduced displacement and “last mile” capability
- ⇒ This environment will place significant space and performance constraints on engine heat exchangers such as EGR Cooler
- ⇒ Senior has developed and is rolling out its new Radial Fin Technology (patent pending)
 - ⇒ Power dense design can save roughly 45% of package space
 - ⇒ Long term performance stability ensures emissions compliance in real world conditions
 - ⇒ Best-in-class reliability for the most demanding applications
 - ⇒ Next generation manufacturing technologies employed to protect and expand margins



FLUID CONVEYANCE SUMMARY

⇒ Market leading Bellows technology is at the heart of many of Senior's proprietary products

⇒ That has evolved into higher level proprietary product and system offerings where we also lead the market

⇒ We are protecting and enhancing market leading positions by investing in exciting new projects and products

⇒ Senior is ideally placed to meet present customer requirements and to take advantage of medium and longer term technology trends



COFFEE BREAK



STRUCTURES



- **Structures Know-How**

Joe Mockus
Structures CEO

STRUCTURES

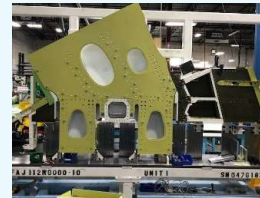
Precision machining, fabricating and assembling of
medium to high complexity build-to-print structures



Gas turbine engines
(rotating & structural)



Airframe



Power & Energy

Key differentiators:

Unique manufacturing processes

Proprietary Computer Numerical Control (CNC) code

State-of-the-art equipment

Design of proprietary fixtures and tooling

Lean manufacturing principles

Global footprint

INNOVATIVE PROCESS TECHNOLOGY: AERO STRUCTURAL COMPONENTS

⇒ Flash Butt Welding

⇒ Deliver lower costs via innovative manufacturing process solutions for nacelle

⇒ Typical manufacturing process uses ring forgings (significant waste)

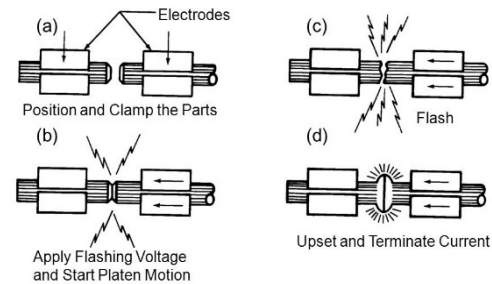
⇒ Flash-butt welding allows use of rolled extrusions

⇒ Aluminum and Titanium

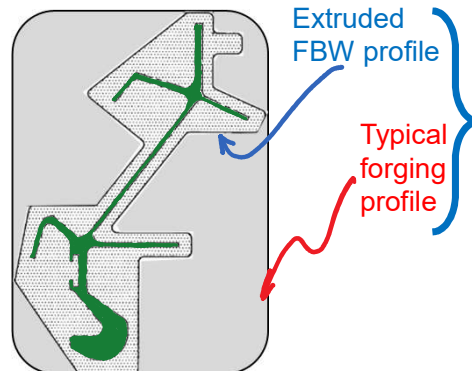
⇒ Mitigates constraints on supply chain (forgings)

⇒ Cost (raw material) & lead-time advantage

Flash Butt Welding Basics



[Reference: Welding Handbook, Volume 2, p.583, AWS]



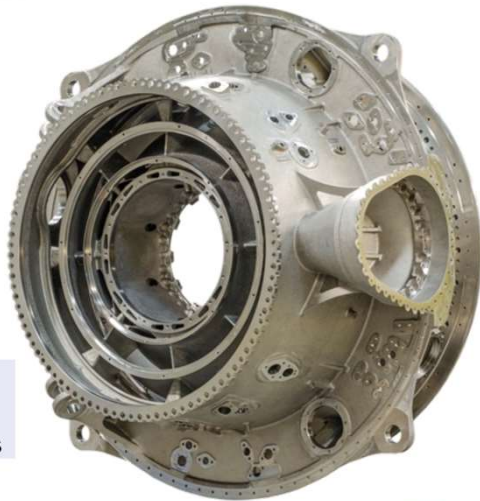
Significantly improved Fly-to-Buy weight ratio



STRUCTURES EXPERTISE



Intermediate Case
A350 - Trent XWB 97k



Final product with
9600 close
tolerance features



Raw Casting



Intermediate Case
B787 - Trent 1000

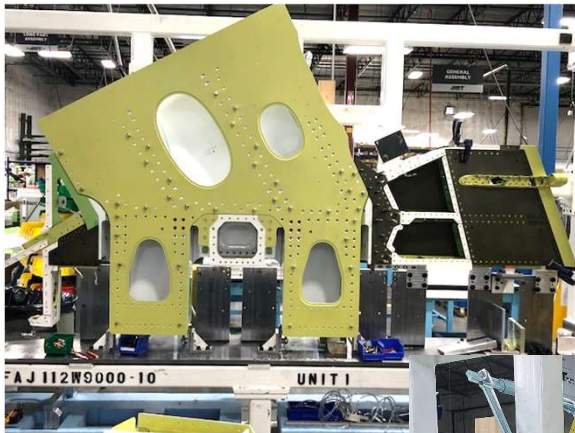


Final product with
7200 close
tolerance features

Common Manufacturing Processes

1. Complex 5-axis machining
2. Precision mechanical assembly
3. Precision cleaning and etching
4. Non-Destructive Testing
5. X-Ray & CMM inspection
6. Laser surface scanning

STRUCTURES EXPERTISE



Boeing 777X Folding Wing Tip – Extended Wing Box Assembly

- ⇒ Proprietary assembly jig designed in-house
- ⇒ Combines complex machining and assembly work
- ⇒ Automating key processes to reduce cost





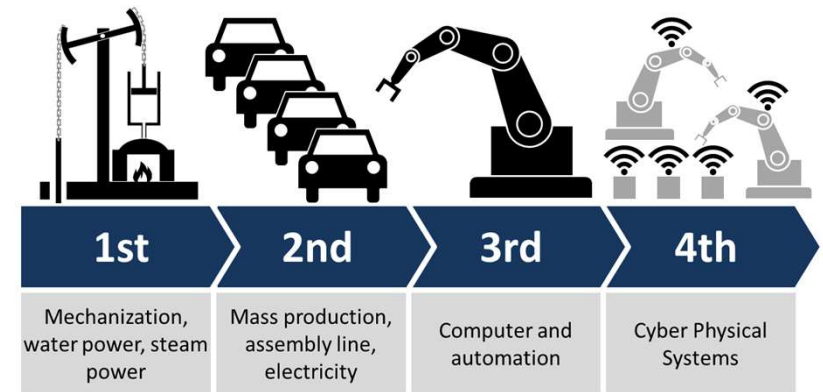
- **Structures Division Technology Development**

Parag Hegday
Director of Technology – Structures

STRUCTURES TECHNOLOGY DEVELOPMENT: FOCUS AREAS

Focus areas aligned with Group strategic priorities

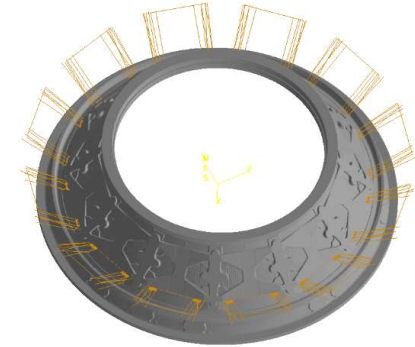
- ⇒ Common machine standards & sharing Best Practices
 - ⇒ Numerical Control (NC) Programming Standards / Optimisation
 - ⇒ Machines / Tooling / Equipment
- ⇒ Manufacturing 4.0 / Digitisation
- ⇒ Capex selection / implementation
 - ⇒ Preferred suppliers, long-term agreements (LTAs)
- ⇒ Novel manufacturing methods
- ⇒ External partnerships / relationships



IMPLEMENTING COMMON STANDARDS & BEST PRACTICES

⇒ NC Program Optimisation

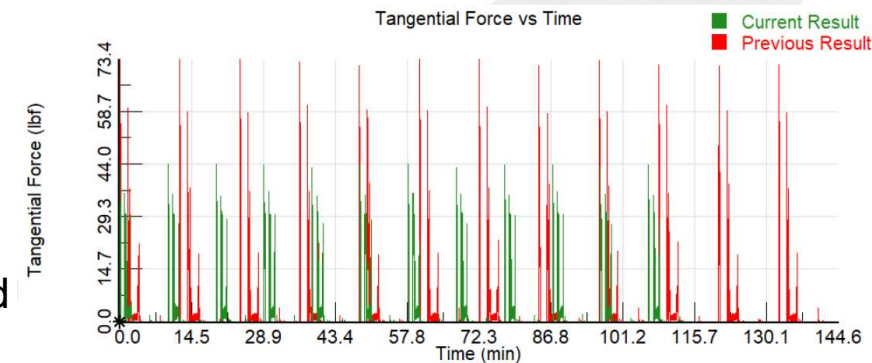
- ⇒ Collaborated with third-party to introduce proprietary software
 - ⇒ Simulates tool-path to predict cutting forces
 - ⇒ Optimises tool-path to reduce cutting time
- ⇒ Pilot showing good results
 - ⇒ Overall 15% cycle time reduction on first 11 programmes
 - ⇒ Capacity savings of 2000 hrs/yr from one pilot part



⇒ Machine Standards

- ⇒ Standardise machine tool purchases to reduce capital spend
- ⇒ Corporate Agreements with major equipment suppliers

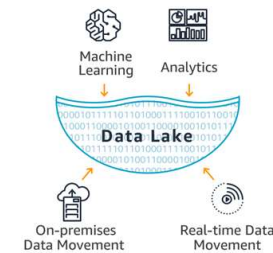
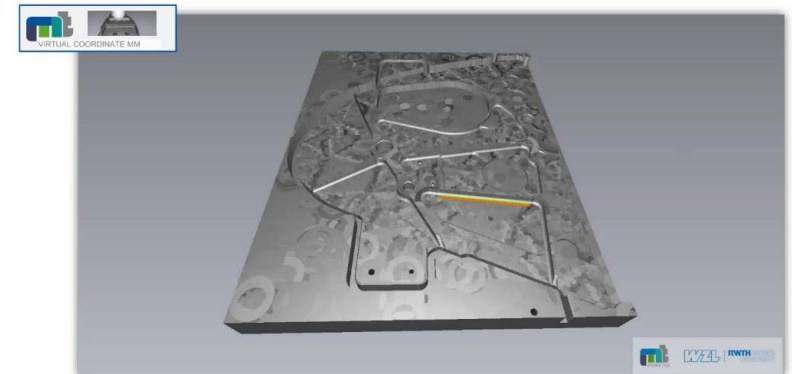
⇒ Standardising New Product Introduction processes using automotive model (APQP - advanced product quality planning)



MANUFACTURING 4.0 / DIGITISATION

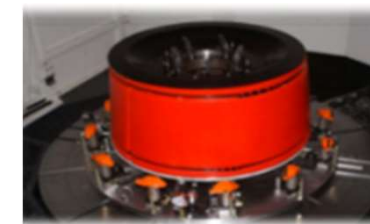
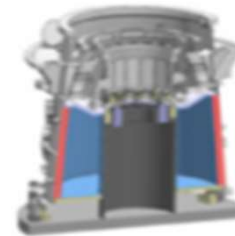
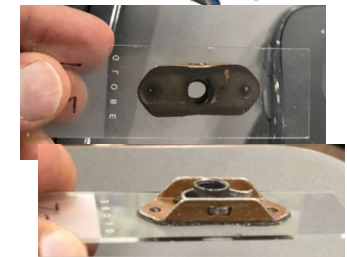
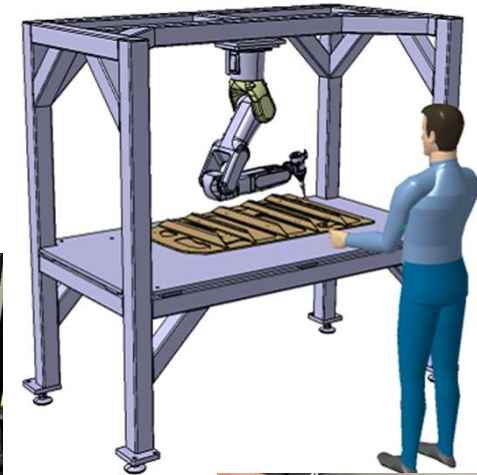
- ⇒ Various pilot initiatives with Internet of Things & Digital Thread
- ⇒ Initial Big Data project underway
 - ⇒ Long-term goal: reduce / eliminate coordinate measuring machine (CMM) inspection
 - ⇒ Uses high-frequency sampling to predict part conformance
- ⇒ Insights & automated decisions / actions
 - ⇒ Factory of Future vision
- ⇒ Technology and IT councils collaborating for future steps
 - ⇒ Volume of data generated, data security

Virtual measuring the part quality directly after the process



PROCESS TECHNOLOGY IMPROVEMENT (EXAMPLES)

- ⇒ Robotic Deburr
 - ⇒ Multiple sites using robots to replace manual operations
- ⇒ Robotic Assembly
 - ⇒ Developed & implemented metered adhesive dispensing for fasteners
 - ⇒ Full robotic assembly on complex modules in future (cobots)
- ⇒ Additive Manufacturing (AM)
 - ⇒ Production tooling and shop-aids via AM
- ⇒ Innovative tooling methods
 - ⇒ Adhesive fixturing for turbine blade machining
 - ⇒ Active damping for vibration suppression (collaboration with Advanced Manufacturing Research Centre)



FACTORY OF FUTURE (VISION)

⇒ Digital information thread (Manufacturing Execution Systems)

⇒ Best-in-class equipment & methods

⇒ Machining of Aluminium & Titanium, Fabrication

⇒ Automation

⇒ Mechanical Assembly

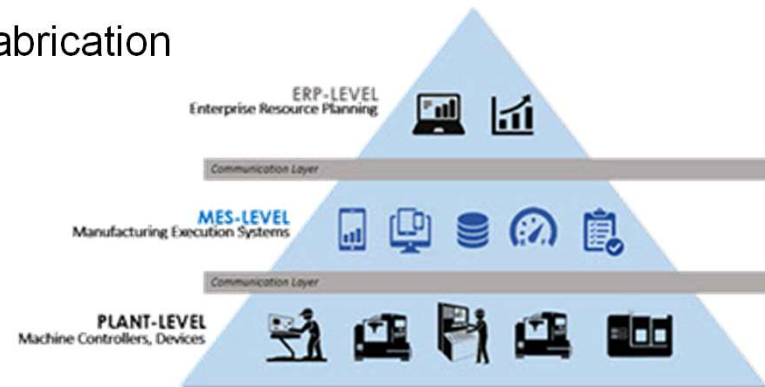
⇒ Augmented Reality

⇒ Robotics (deburr, assembly cobots)

⇒ Manufacturing 4.0 (Machine monitoring, part conformance, process stability & capability)

⇒ Additive Manufacturing (components, fabricated assemblies, tooling)

⇒ Collaboration via Group Technology Council





ADDITIVE MANUFACTURING

Krist Khodjasaryan
VP, Engineering and Program Management
SSP

WHY HAS SENIOR INVESTED IN ADDITIVE?

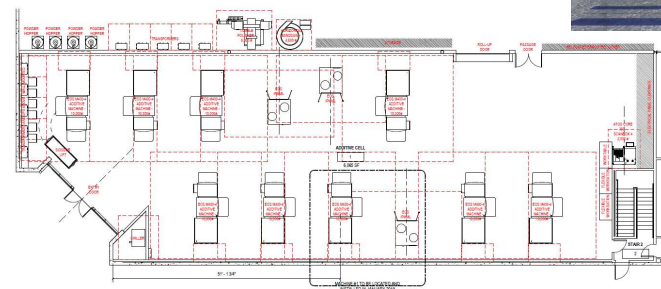
- ⇒ **Reduce Waste**
 - ⇒ Improved Buy:Fly Ratios
- ⇒ **Increased Supply Chain Control**
 - ⇒ Costs similar to casting without the headache of supplier management
- ⇒ **Improved Quality Control**
 - ⇒ Automated Processes
 - ⇒ Statistical Process Control
 - ⇒ Reduced Variability
- ⇒ **Reduced Cost**
 - ⇒ Increased automation and reduced labour content result in substantial cost reductions versus traditional methods
- ⇒ **Reduced Inventory**
 - ⇒ The ability to build hardware as required allows a transition to pull based delivery of hardware



FACILITY AND HARDWARE

Senior has invested in an Additive Manufacturing Technology Center in Burbank, CA to support all Senior additive initiatives and projects

- ⇒ Senior has selected the EOS M400-4
 - ⇒ More mature than other options on the market. Used in Aerospace production today
 - ⇒ Large build volume allows a variety of parts to be built
 - ⇒ First integrated M400-4 and Powder Reprocessing system in North America
- ⇒ Additive Facility planned to house up to 9 M400 class machines
 - ⇒ Actively working with several opportunities with external customers across various Senior businesses



QUALIFICATION TEST LAB AND MATERIAL ANALYSIS LAB



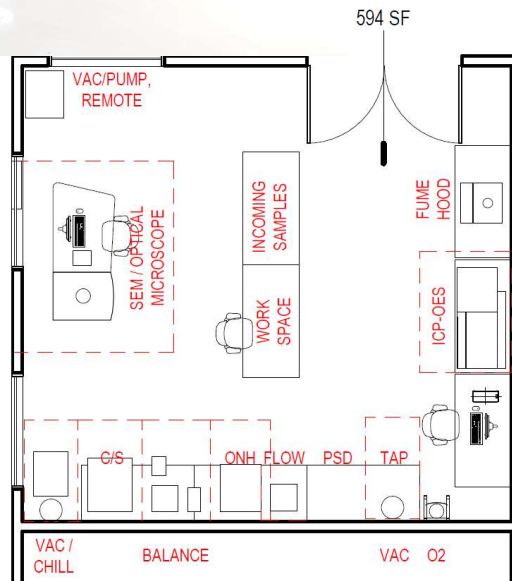
⇒ ISO17025 Certified Test Lab

⇒ Current Capabilities:

- Vibration, Endurance, Pressure, Temperature, Motion, Environmental

⇒ New Capabilities:

- Tensile Testing (300kn)
- Fatigue Testing (100kn)



⇒ Material Analysis Lab

⇒ Current Capabilities:

- Microstructure Analysis, Hardness

⇒ New Capabilities:

- Additive Powder Chemical Analysis
- Additive Powder Physical Analysis

DESIGN EXPERTISE / DESIGN AUTHORITY

⇒ Senior Fluid Systems companies have design, engineering, and integration capabilities:

- ⇒ System Level
- ⇒ Component Level

⇒ Importance of being the Product Design Authority

- ⇒ Equipped with engineering experience, analysis tools, and testing infrastructure to lead (re)design activities
- ⇒ Knowledge of operating environment and certification requirements
- ⇒ Ability to identify candidates and calculate benefits of additive selection
- ⇒ Material properties development
- ⇒ IP Protection (2 new patents filed)

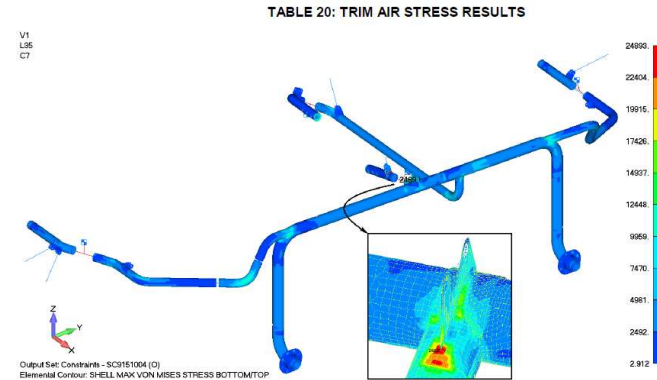
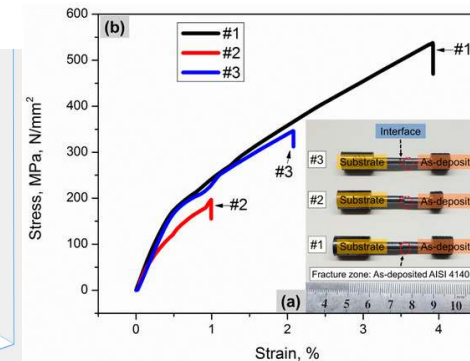
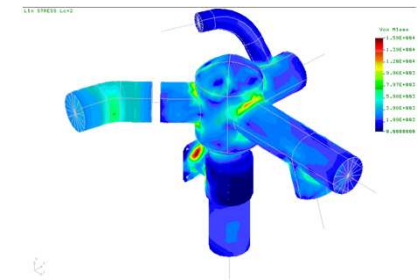
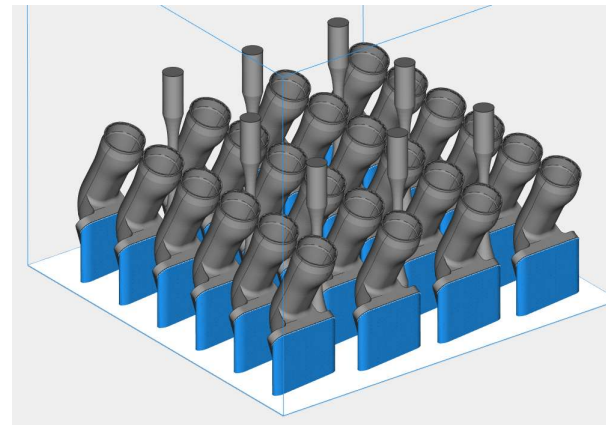
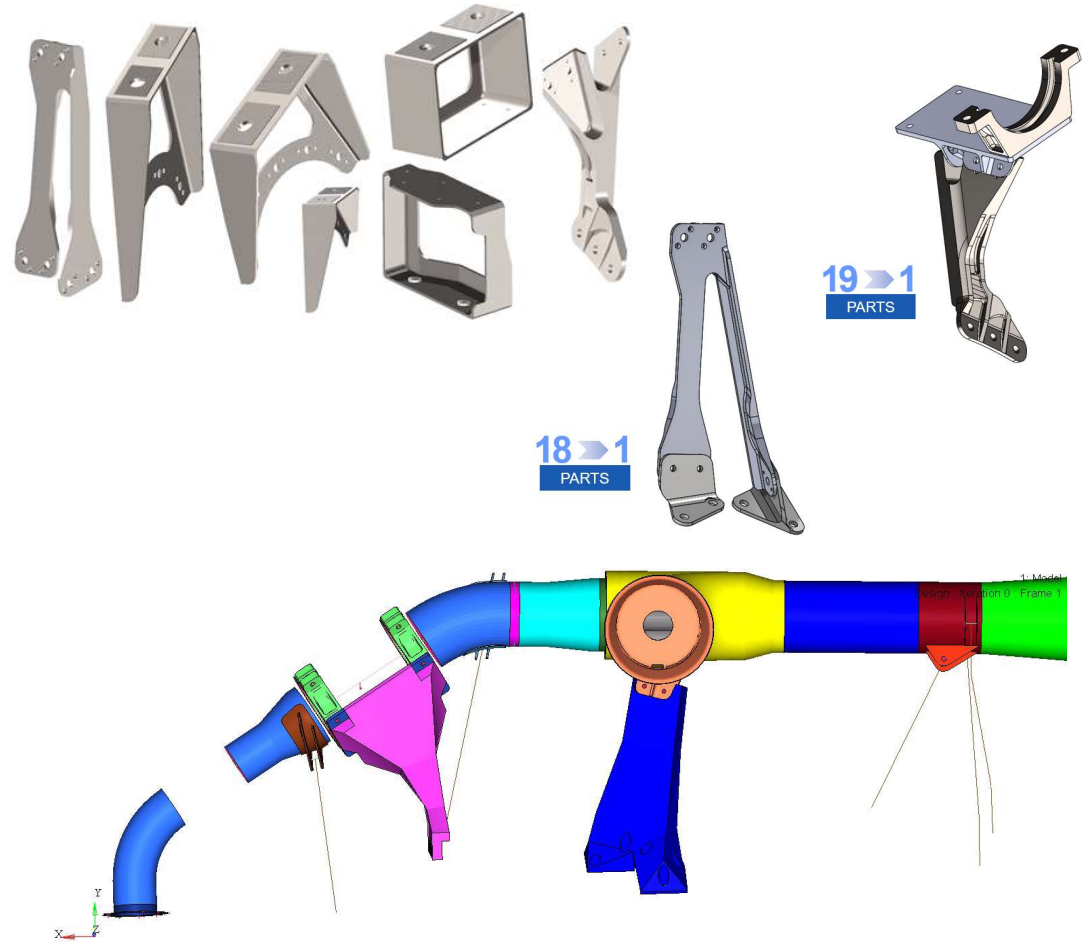


FIGURE 28: MIN MOS STRESS CONTOUR (TRIM AIR)



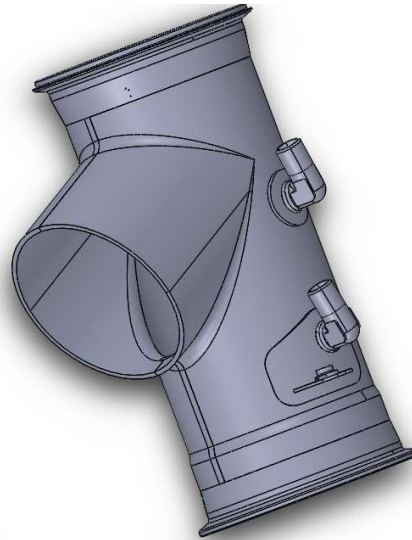
LAUNCH CUSTOMER

- ⇒ Memorandum of Agreement (MoA) signed with launch customer
 - ⇒ Machined titanium nacelle/engine brackets
 - ⇒ Cost/weight savings through bill of material (BOM) reduction and material optimisation
 - ⇒ Block 1 production slated to start in early 2020
- ⇒ Initial certification with launch customer will pave the way for future opportunities
 - ⇒ Builds confidence
 - ⇒ Provides concrete example for customers not as mature with additive
 - ⇒ Commences return on investment (ROI) savings



FUTURE OPPORTUNITIES

- ⇒ Several prime candidates within existing product portfolio
 - ⇒ Complex multi-component, multi-weld (sub)assemblies
- ⇒ OEMs looking for sub tier additive suppliers to complement internal capabilities
 - ⇒ Additional capacity for production scaling
 - ⇒ Risk reduction through dual source



STRUCTURES AND ADDITIVE SUMMARY

⇒ Our Structures business has significant IP

⇒ Market leading positions in our chosen sub-sectors

⇒ Investing for future growth and competitiveness

⇒ State of the art equipment and facilities

⇒ Processes and digitisation

⇒ Additive manufacturing - a game changer for certain products

⇒ Focus is on creating value for our customers and investors



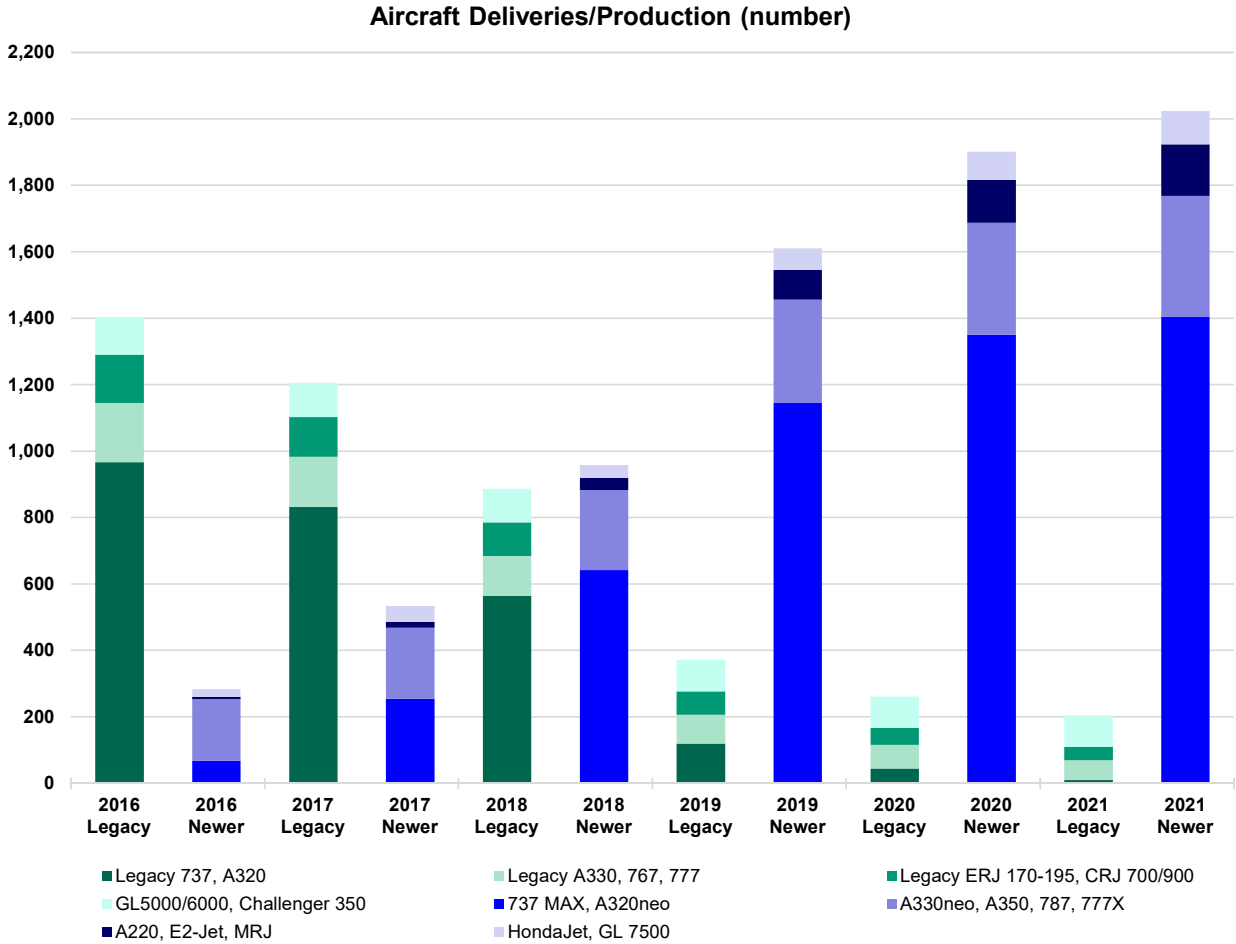
NEW PRODUCT INTRODUCTION & INDUSTRIALISATION



- **New Product Introduction (NPI)**

David Squires
CEO

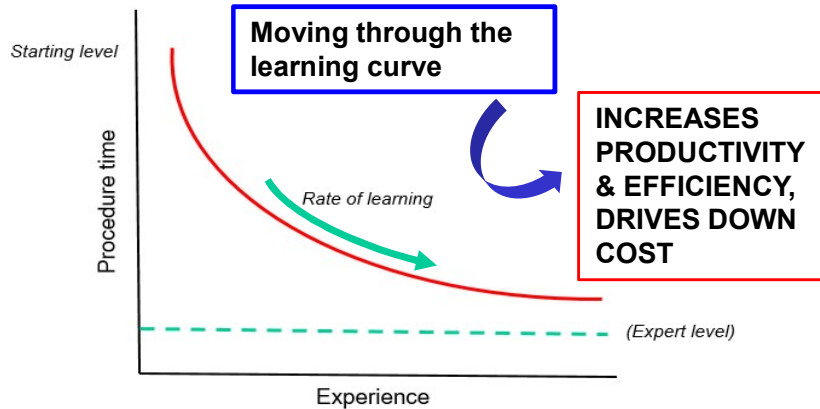
UNPRECEDENTED TRANSITION IN CIVIL AEROSPACE



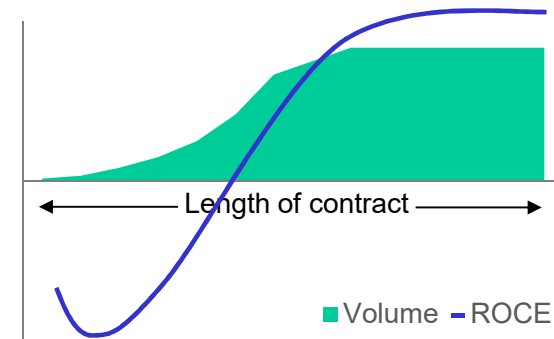
- ⇒ 2018 was the cross-over year for new and mature aircraft platforms
- ⇒ 2019 will be the peak transition year
- ⇒ Many thousands of new parts introduced for these new platforms
- ⇒ Outlook for civil aircraft continues to be strong with good visibility; Boeing, Airbus and Independent forecasters predicting air traffic growth in excess of 4% pa over next 20 years

DELIVERING PROFITABLE GROWTH

NPI and Industrialisation



Typical Aerospace Programme Profile



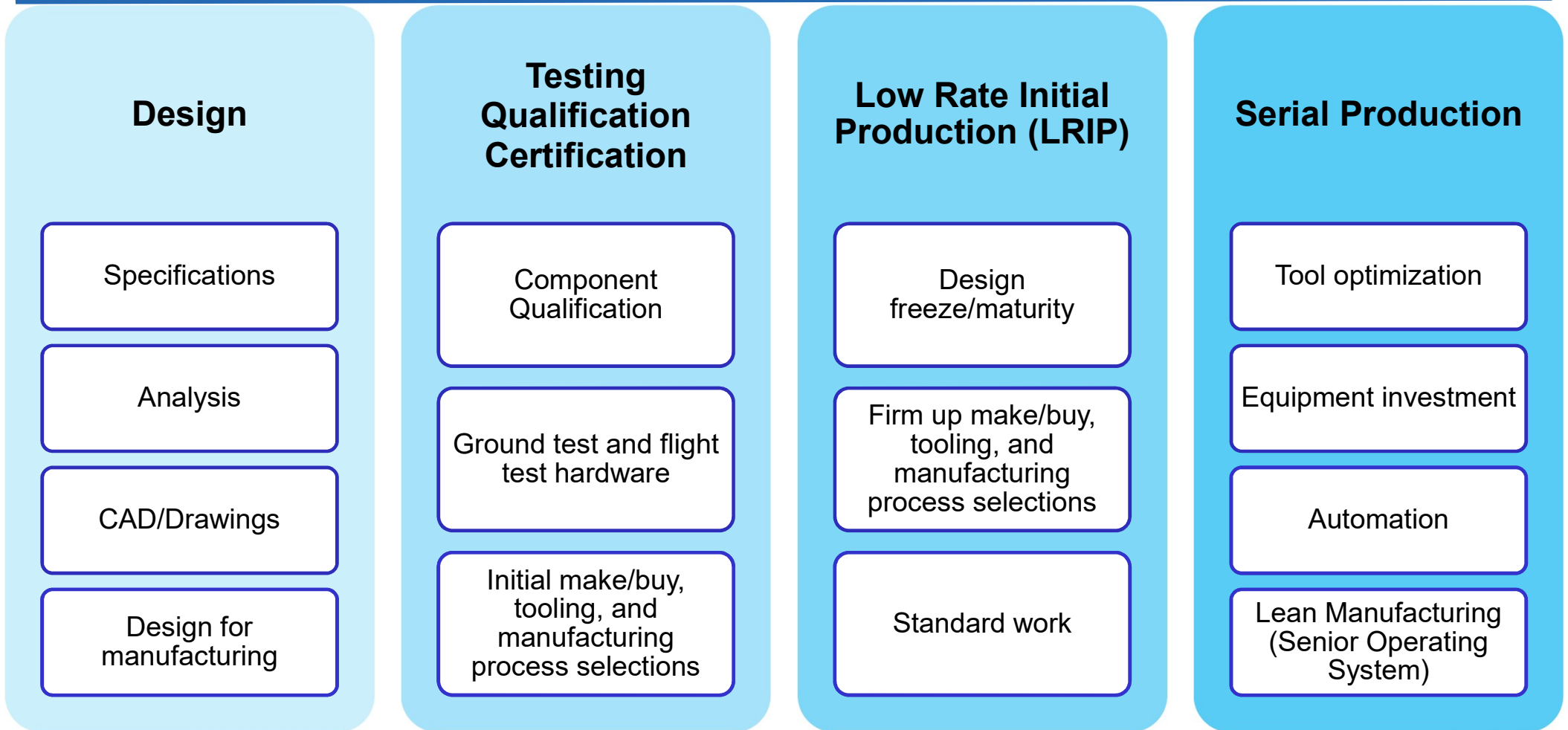
Capital expenditure investments



Focus on:

- ⇒ Delivering profitable growth
- ⇒ Driving shareholder value
- ⇒ Investments only approved if ROCE thresholds met

NPI Process





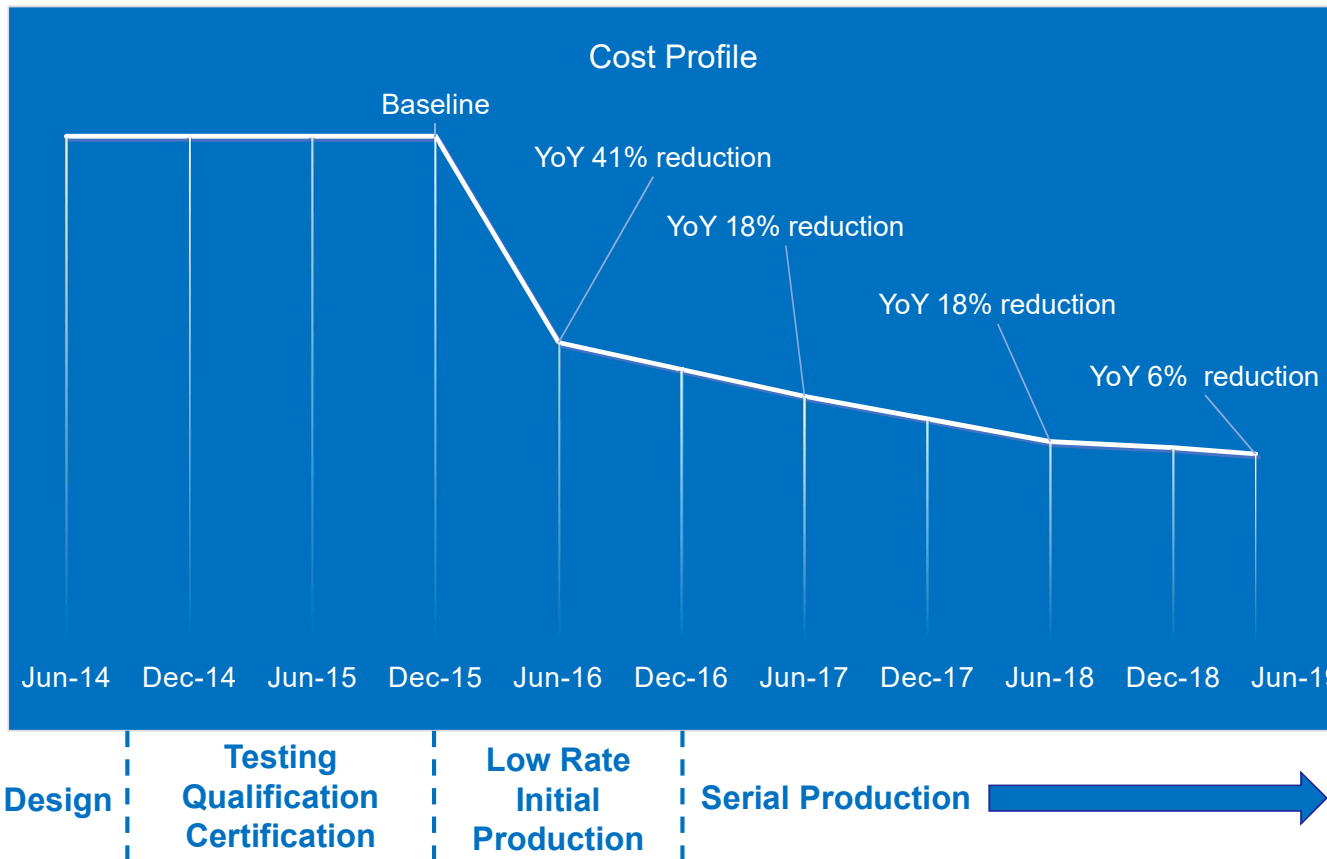
- **Examples of NPI Activity**

Launie Fleming
Fluid Systems CEO

Joe Mockus
Structures CEO

NPI – COMING DOWN THE COST CURVE

Complex Large Commercial Aircraft Fluid System



- ⇒ Learning curve improvements
- ⇒ Senior Operating System lean activities driving down labour hours (new tooling concepts, material flow reduction, scrap reduction, implementing standard work)
- ⇒ Sourcing components from Senior cost competitive country operations (Mexico and Malaysia)
- ⇒ Savings from capital investments in digital x-ray, robotic welding, automated pipe bending

NPI – IMPROVING GROSS MARGINS

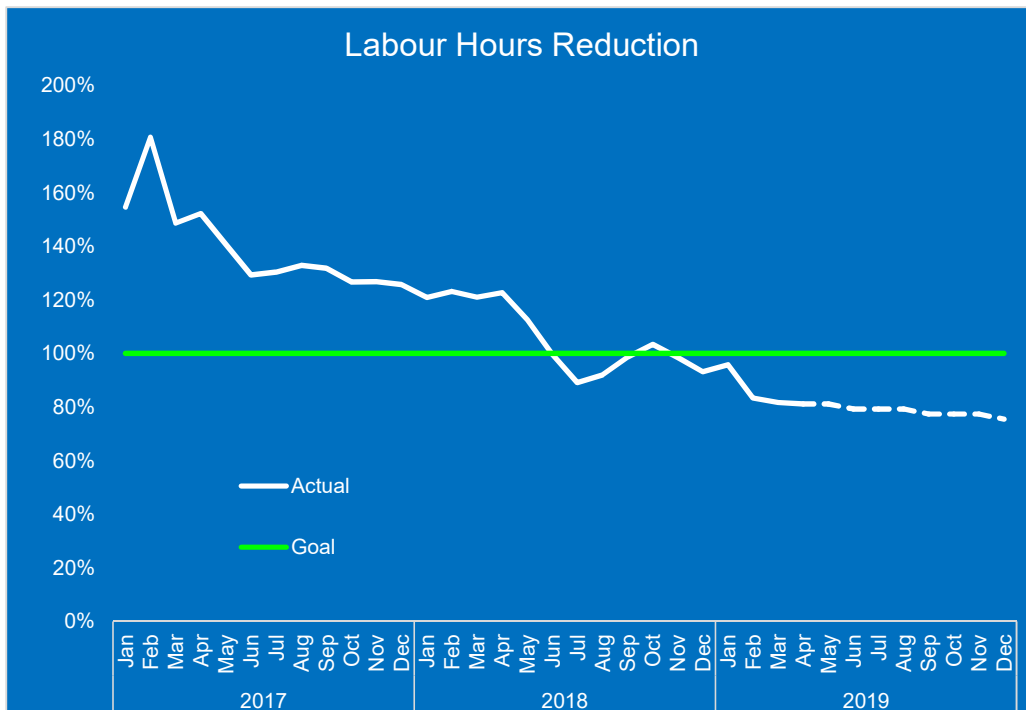
Thermal Valves



- ⇒ Learning curve improvements
- ⇒ Capital investment in an automated test stand that significantly reduced test times
- ⇒ Tool design and development to improve throughput
- ⇒ Leverage economies of scale in the supply chain

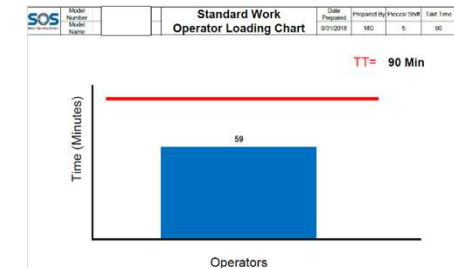
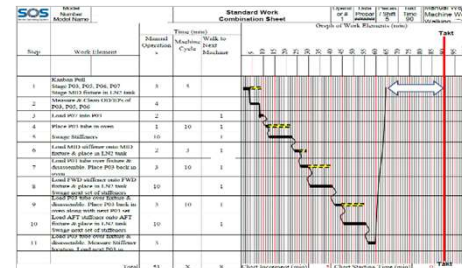
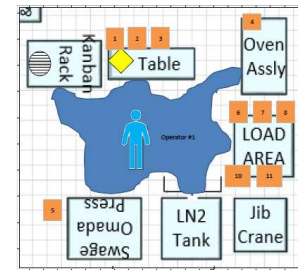
NPI – LEARNING CURVE IMPROVEMENT

Large Commercial Aircraft Engine Structure with Complex Fabrication & Assembly



Reduction in labour hours achieved through operational excellence:

- ⇒ Dedicated manufacturing cell
- ⇒ Senior Operating System with focus on lean
- ⇒ Standard work





OUR FINANCIAL FRAMEWORK

Bindi Foyle
Group Finance Director



FINANCIAL FRAMEWORK

The Group uses the following 5 financial metrics to measure progress in implementing our strategy:

Organic Revenue Growth

To grow organic revenue (at constant currency) faster than end-market growth

Return on Revenue Margin (OP%)

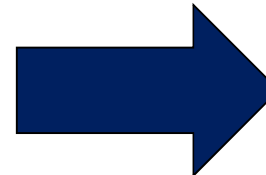
To increase the Group's adjusted operating profit margin over the medium term

Adjusted Earnings per Share

To increase adjusted earnings per share on an annual basis

Net Cash from Operating Activities

To generate sufficient cash to enable the Group to fund future growth and to follow a progressive dividend policy

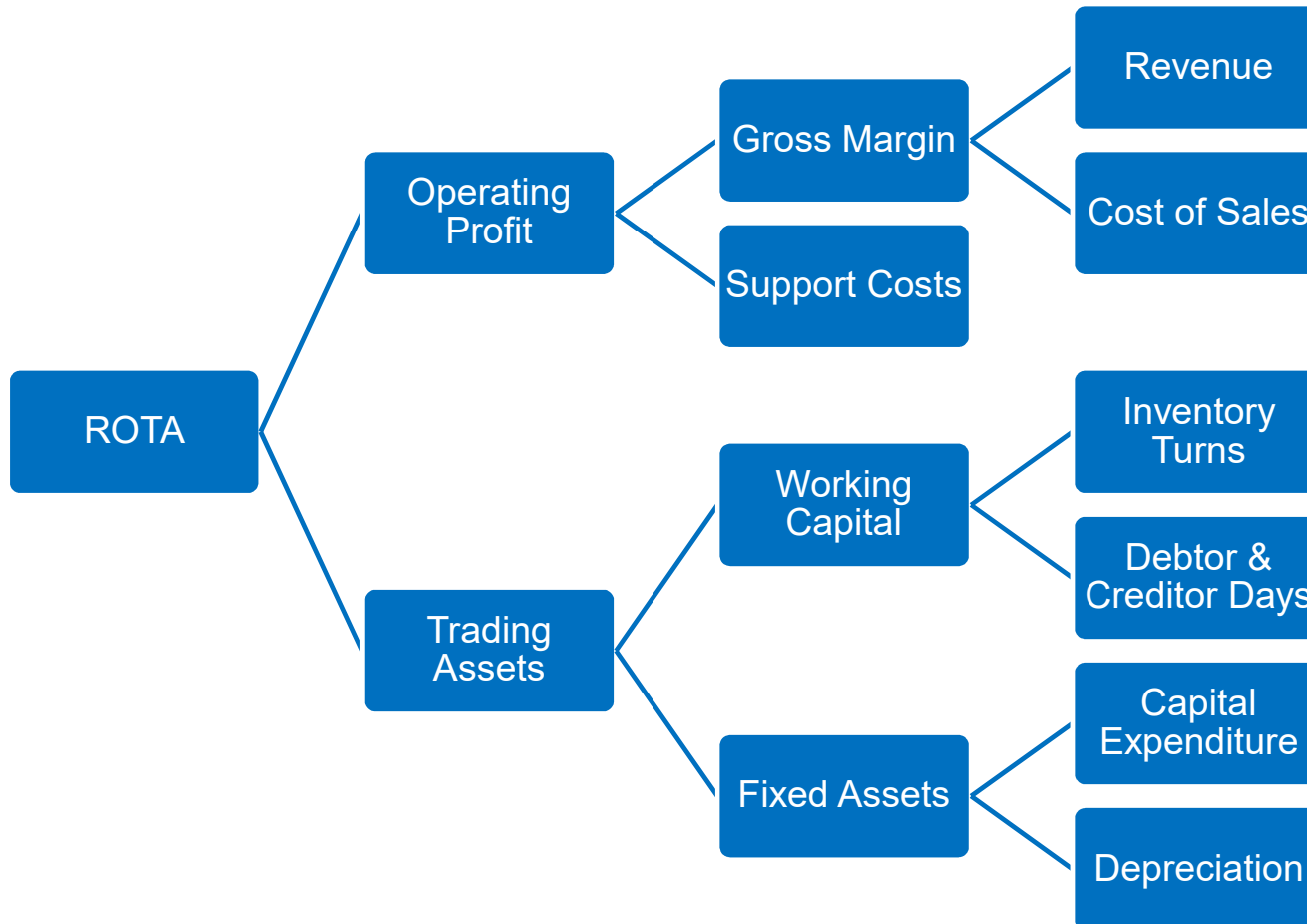


Return on Capital Employed (ROCE)

To maintain an overall return on capital employed (ROCE)⁽¹⁾ in excess of the Group's cost of capital⁽²⁾ and to target a pre-tax return in excess of 13.5% (on post IFRS 16 basis)⁽³⁾

- (1) ROCE is the Group's adjusted operating profit divided by the average of the capital employed at the start and end of the period, capital employed being total equity plus net debt.
- (2) Group pre-tax weighted average cost of capital (WACC) is 9%.
- (3) Pre-IFRS 16 ROCE target was 15%.

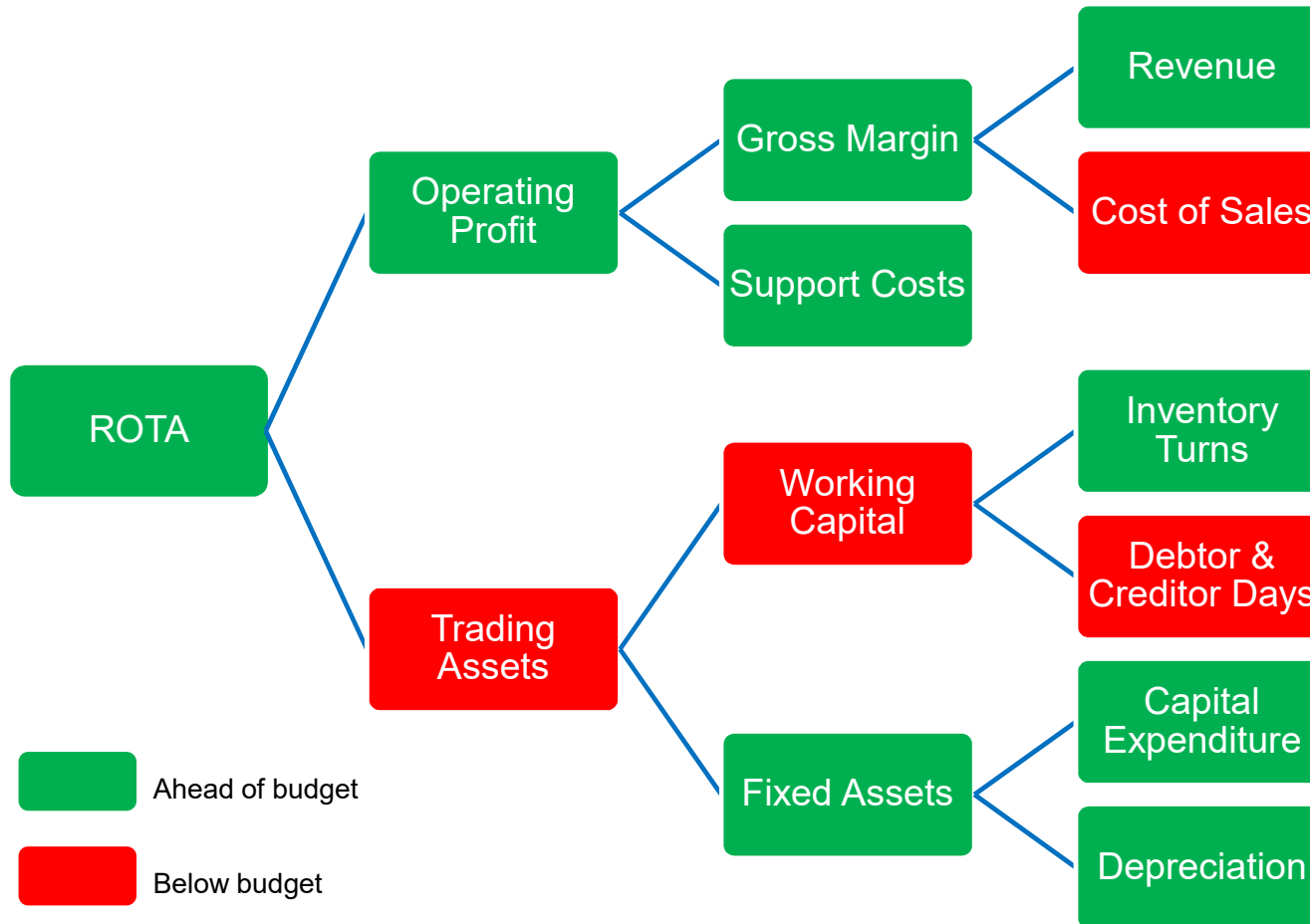
VALUE TREE



⇒ The Group's ROCE is translated to a Return on Asset (ROTA) measure for each operating business

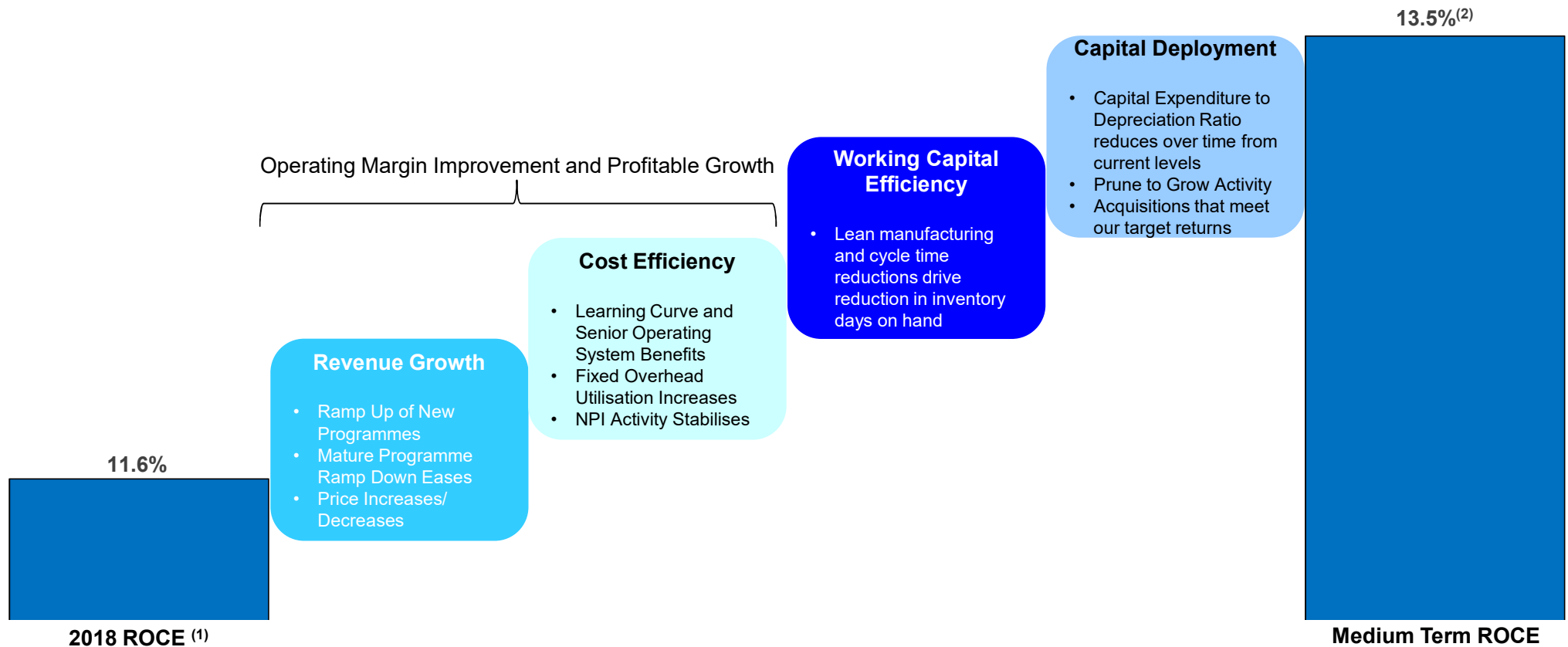
- ⇒ All investment decisions are assessed in terms of:
- Strategic value to the Group
 - ROTA %
 - Return on Revenue Margin
 - Cash Payback timeline
 - Internal Rate of Return
 - Net Present Value

EXAMPLE OF AN OPERATING BUSINESS VALUE TREE



- ⇒ Illustrates year-to-date performance compared to budget
- ⇒ Cost of sales higher due to higher revenue, but maintaining gross margin
- ⇒ Focus is on improving working capital, particularly addressing the balance between debtor and creditor days
- ⇒ ROTA ahead of budget

STEPS TO ACHIEVE TARGET ROCE OF 13.5% (post IFRS 16)



(1) 2018 reported ROCE of 13.0% has been re-stated to a post IFRS 16 basis

(2) Pre-IFRS 16 ROCE target was 15%

CAPITAL DEPLOYMENT FRAMEWORK

⇒ Prioritising organic investment

⇒ To support growing revenue faster than end-market growth

⇒ To improve cost efficiency with investments in automation and best in class equipment

⇒ Supporting investment in Research & Development

⇒ Well placed for evolving technology trends in our end markets

⇒ To continue to pay a progressive dividend

⇒ Reflecting earnings per share, free cash flow generation and dividend cover over the medium term

⇒ The Group has a long and stable track record of dividend growth

⇒ We will continue to “prune to grow” where it makes sense to do so

⇒ Maintain a disciplined approach to additions to our portfolio

⇒ Maintain strong balance sheet



CLOSING REMARKS

TODAY'S KEY MESSAGES

Senior operates in attractive end markets

There is a rich heritage of market leading technology that underpins the whole business

Ongoing investment is future proofing the business in line with market trends and customer requirements

Collaboration across the Group ensures the whole is greater than the sum of the parts

Senior is very focussed on delivering excellent shareholder returns – with clear and achievable minimum ROCE targets

senior



THANK YOU

senior
Aerospace

Capital Markets Day 2019

senior
Flexonics