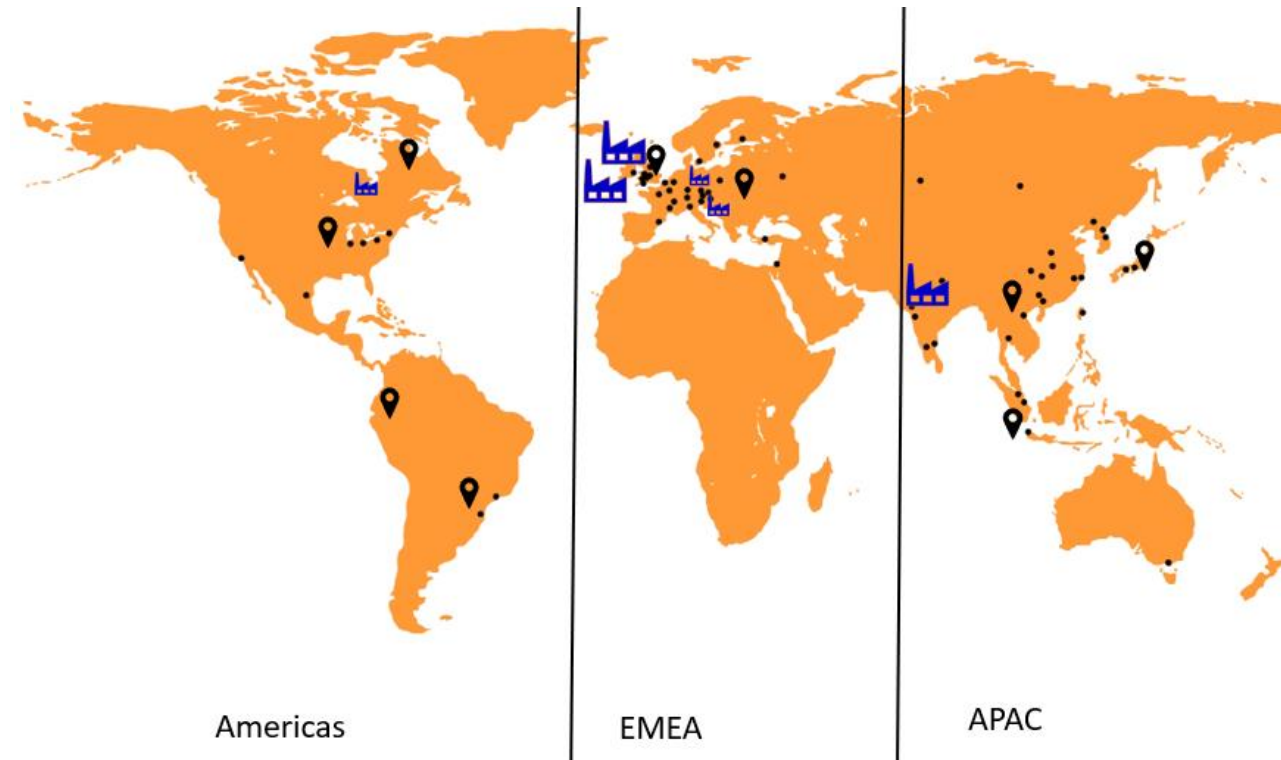


# Investor Day 2022

## Manufacturing overview

# Global manufacturing at Renishaw

- Manufacturing operations at multiple sites primarily in the UK, Ireland and India
- 1,800 staff - two-thirds are direct
- Strategic duplication of facilities at different sites to ensure business continuity
- Key drivers 5 year plan – Harmonisation, Agility, Productivity, Evolve.....



Miskin, South Wales



New Mills, Gloucestershire



Woodchester, Gloucestershire



Stonehouse, Gloucestershire



Swords, Dublin



Pune, India

# Highly vertically integrated

- Innovation, local customer support, **in-house manufacturing**
- Control of Quality, Cost & Delivery



- Circa 150,000 parts & assemblies ~ 31,000 saleable items
- 14 million mechanical components/yr
- 4.3 million PCBs ~ 135 million components/yr

# High variety challenges

- Volume - custom 1 off to '0,000s /month
- High levels of customisation
- Complexity - styli through to AM
- Size - micron precision alignment of < 1 mm parts through to large parts (200+ kg)
- Technologies - electronics, machining, precision assembly, safety risks (lasers/HV/explosion).



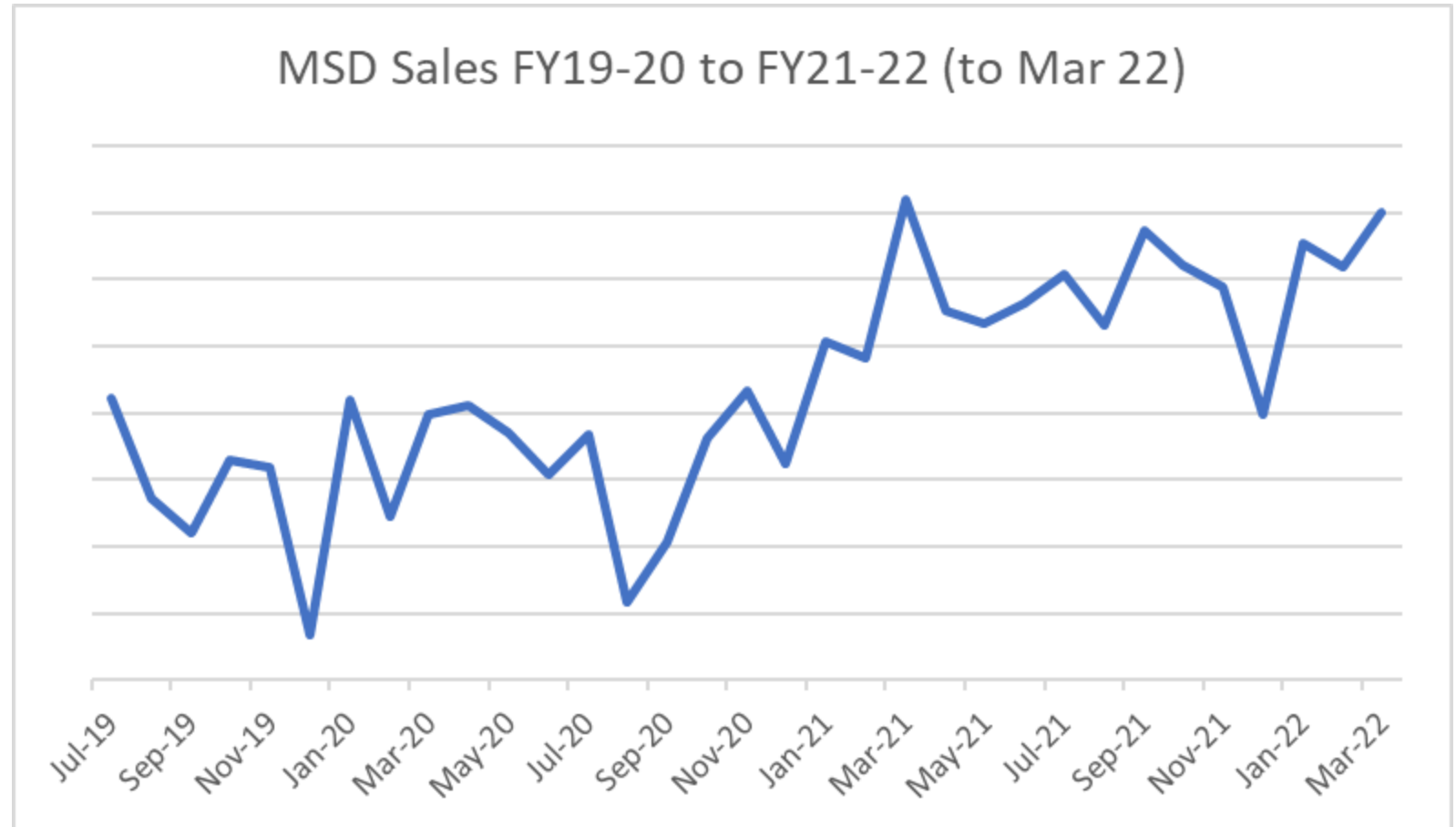
# Digitalisation – real-time data

- Dashboards and reports giving real-time data for KPIs (Quality, Cost, Delivery)
- One source of data / one “version of the truth” adopted across the group
  - Direct shopfloor supervisors (manage direct efficiency in real-time)
  - Production managers (trends, strategy)
  - Engineering teams (continuous improvement)
  - Board level performance reporting



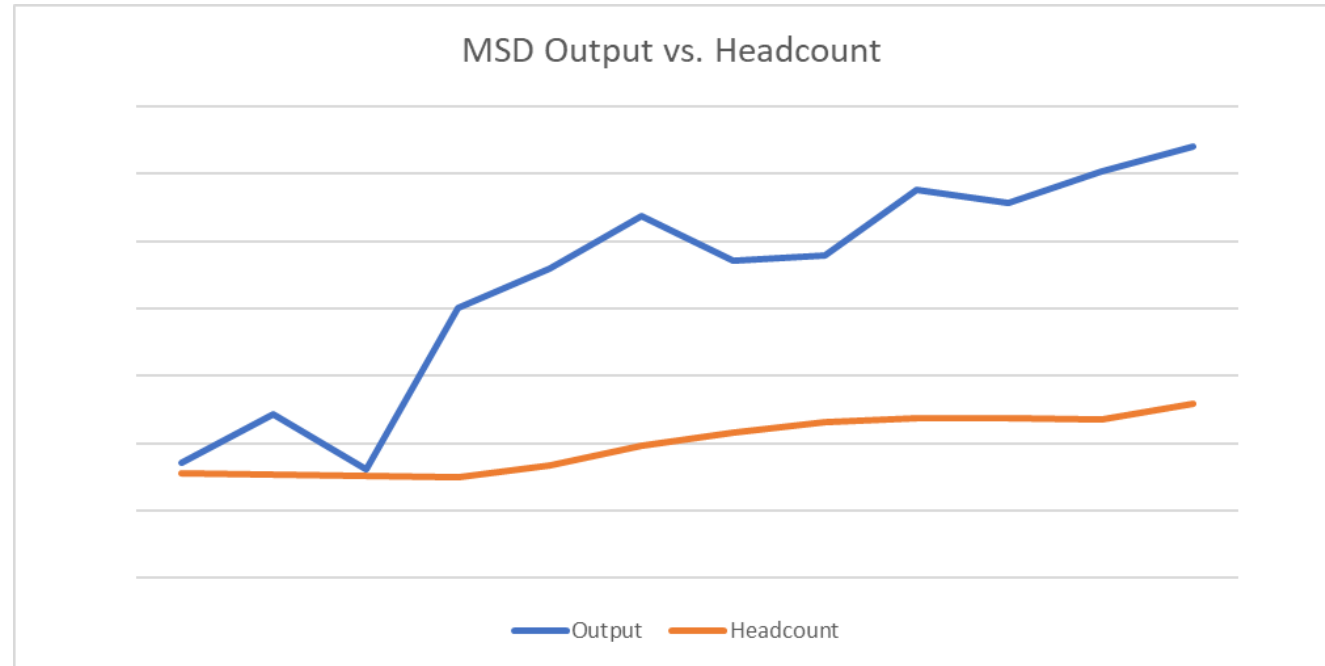
# COVID-19, demand, supply chain..... The last 2 years

- Big changes to working practices and hybrid working
- Very significant business growth in the last two years
- Enormous efforts to increase capacity and deliver output
- Supply chain challenges - requires teamwork of supply chain, operations, engineering and design personnel
- Issues - 200/month, small numbers very acute



# Productivity challenges and maintaining gross margin

- Facing similar challenges to our customers.....
- Headwinds – labour availability, training, costs and supply chain disruption
- Machining - further digitalisation
- Assembly - lifecycle management (labour/quality)



MSD headcount increased by 20% in the period while output (productive hours) rose by 70%

# Future manufacturing strategy



## Harmonise

Aim to align across  
Manufacturing wherever  
possible



## Improve productivity

Change the way we do  
things to better utilise  
resources



## Increase agility

Change the way we do  
things to be able to respond  
to fluctuations quicker



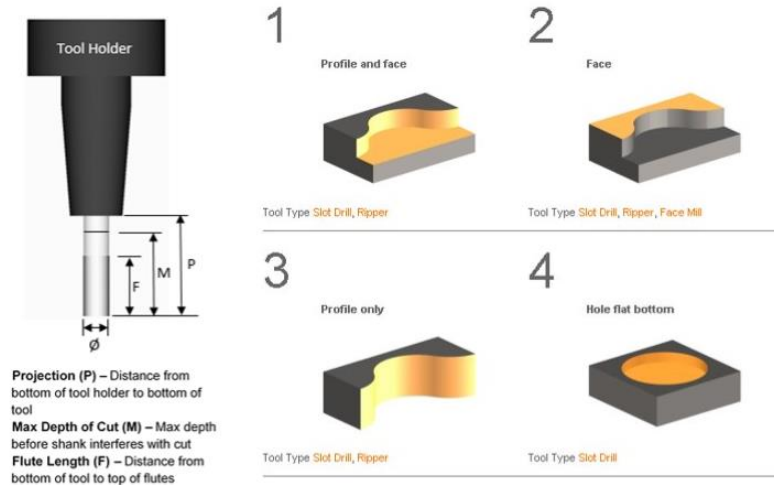
## Evolve

Continuously strive to be at  
the forefront of  
manufacturing



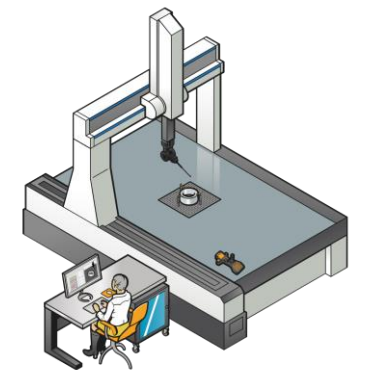
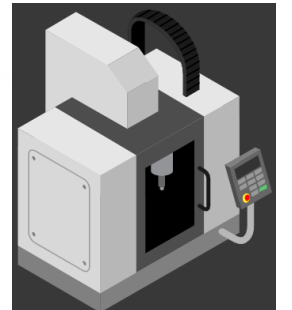
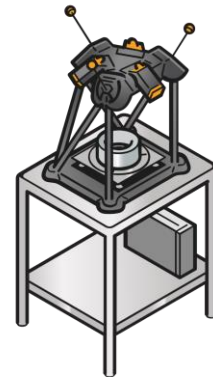
# Manufacturing strategy

- New Products - Continue strong Design For Manufacture (DFM) & Process Capability.....
- Automation - life cycle view ....Cost and Process Control.....
- Intelligence - no faults forward
- RAMTIC - remains an excellent example of these approaches.....



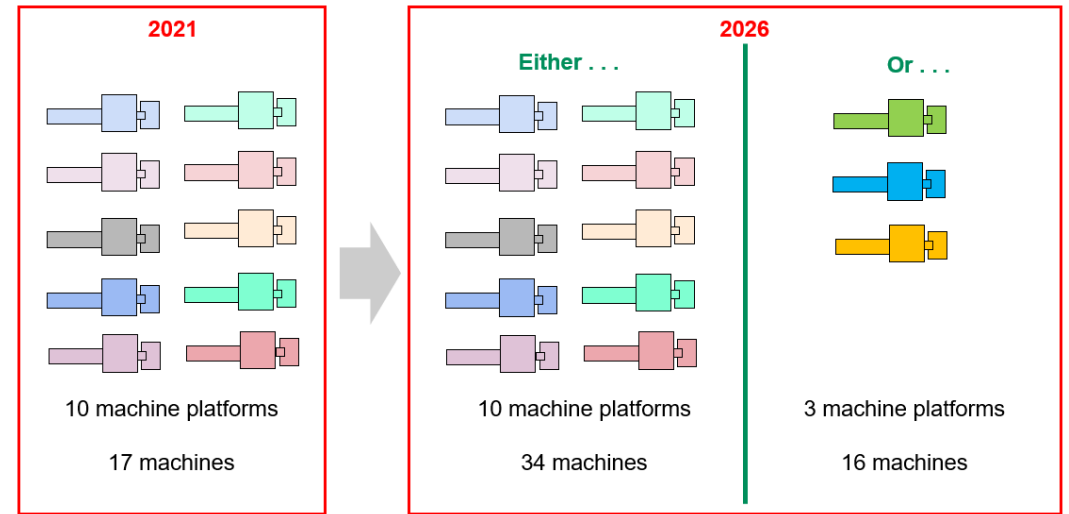
# Machine shop productivity – Renishaw Central

- New Product Development process in real world environment
- Process foundation: Machine condition data
- In-process control: process setting and adjustments during running, gauging data
- Post-manufacturing quality data: CMM measurement data, manual quality checks
- Decision making ..... Productivity improvement



# Evolution – Low Volume Machining Strategy

- Adoption of latest technologies, standardisation, Design for Manufacture
- Controlling gross margin by improving process capability, improving Value Added Output, reducing labour, optimising real estate

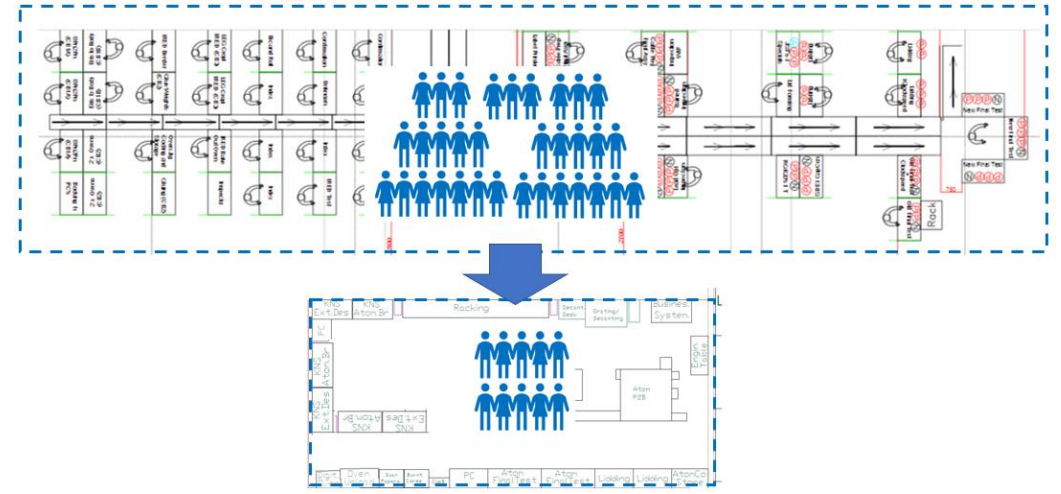


## Rationalisation of machine types:

- Fewer machines overall
- Shorter set times
- Less floorspace
- Fewer people
- Common tooling
- Agile when demand changes

# Evolution – Assembly

- Increasing levels of automation and process control
- Managed product obsolescence programmes
- Changing requirements (size, volume, quality) present different challenges



Automated assembly cells:

- Less floorspace
- Fewer people
- Error reduction
- Consistency
- Agile when demand changes

# Other strategic initiatives

- Current automation projects:
  - FORTiS encoder machining and part finishing
  - Precision assembly alignment operations, soldering, electrical test
  - Vision - part recognition intelligence
  - Process simplification
- Adoption of additive manufacturing in new products

