Welcome to the AMAP Manufacturing Forum

Thursday 18th October 2018

Roger O'Brien

Head of AMAP

AMAP Manufacturing Forum

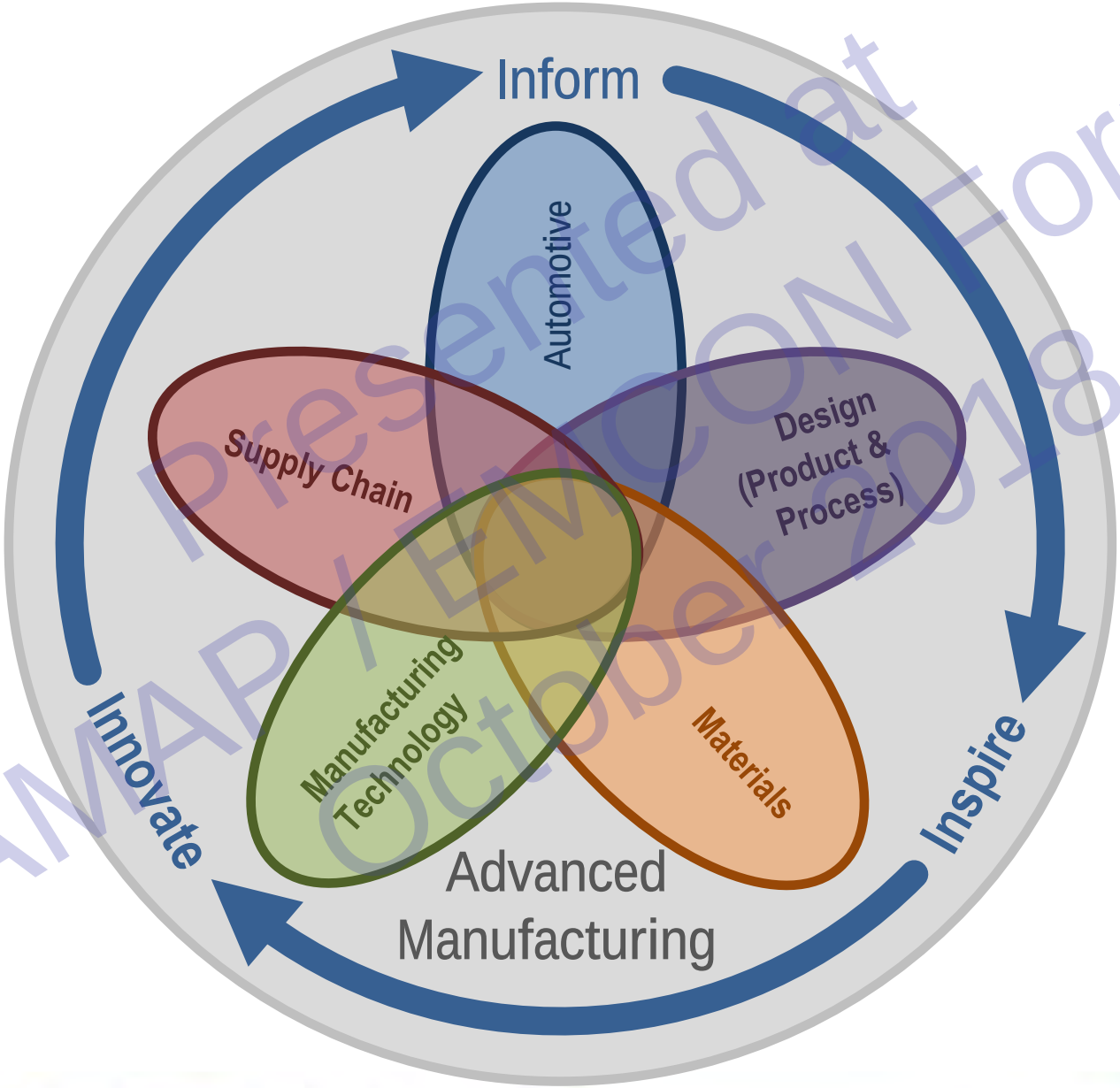
Agenda

9-05	*Introductions – Roger O'Brien: AMAP*
9-10	*SME support via SAM project – Roger O'Brien: AMAP*
9-20	*Benefits of Additive Manufacturing – Carl Gregg: SAM*
9-35	*Scanning for inspection & Reverse Engineering – Danny Melville: Hexagon*
9-50	*Maintenance: Back to Basics – Peter Usher: SAM*
10-05	*Ultrasonic Inspection – Chris Hallum: UE Systems*
10-20	*AR/VR from a users perspective – Helen Scott: AMAP*
10-35	*Energy monitoring for improvements – Adrian Morris: AMAP*
10-50	*Advanced Maintenance & NEMF – David Baglee: Univ of Sunderland*
11-00	*SAM recap and Case Study support examples – Roger O'Brien: AMAP*
11-10	*Close*

amap – *Vision*

Informing, Inspiring & Innovating in Advanced Manufacturing

We aim to be **the** University of choice in the North East for Advanced Manufacturing



What do we mean by Advanced Manufacturing?

Advanced Manufacturing, for AMAP and UoS, can be defined by:

The application of innovation or novel approaches to:

Product Design (including Materials)

Process Design

Manufacturing Process

Services

It is underpinned by and the key drivers are:

- Knowledge
- Intellect
- Skills
- Culture

All these elements need to be in place with appropriate support to deliver sustainability

SUSTAINABLE ADVANCED MANUFACTURING

European Union
European Regional Development Fund

University of Sunderland

ERDF Sustainable Advanced Manufacturing SME Support Programme

Sustainable Advanced Manufacturing (SAM) Project:
£5.1M ERDF project to support the implementation of product and process development and the introduction of technology within the SME manufacturing base within the NELEP area.

The project is receiving ERDF Funding of almost £2.6M, and the University of Sunderland has committed significant academic resources and recruited industrial specialists to support the delivery of both practical and research support.

The project has in excess of £800K in grants to support capital / product validation / tooling and other financial inhibitors to driving strategic development of both product and process.

Engagement Streams

Design Practical Engineering Support & Knowledge Transfer

Minimum 2 days engagement to support either a product / process development / an innovation step change or to support knowledge transfer with access to Design Software at The Industry Centre

- **Product Design**
- **Process Design**
- **Design for Manufacture**
- **CAD**
- **Access to Software**

Process Practical Engineering Support & Knowledge Transfer

Minimum 2 days engagement to support either a product / process development / supply chain development or to support knowledge transfer with access to Simulation Software at The Industry Centre

- **Quality Systems / Controls or Product Capability**
- **Supply Chain (Capability Improvement)**
- **Process Improvement**
- **VR / AR**
- **Lean Tools & Techniques**

Maintenance Practical Engineering Support / Knowledge Transfer

Minimum 2 days engagement to support either asset purchase / controls / performance or to support knowledge transfer with access to a number of maintenance support equipment at The Industry Centre

- **Advanced Maintenance**
- **Robotics / Collaborative Robots**
- **Sensors**
- **Process Simulation**
- **Energy Monitoring**

Challenge us with your Research

Why not issue us the challenge to support the development of your new product or process to help you get in to new markets / improve capacity and capability

- **Alternative Forming and Joining Technologies**
- **Customised Manufacturing**
- **Materials Development / Additive Manufacturing**
- **Data Analytics and Big Data**
- **Light-weighting**
- **Automation & Technology Development**

£800K+ in Financial Grant Support

Financial support for investment in:

- New Technology
- New Product Validation (Tests / Consultancy)
- Process Improvement Capital Investment
- Structure to support R&D Implementation
- Other Development costs (currently an inhibitor to new product or process development and technology introduction)

Consortia bids are welcomed (SME's working together in development of their R&D capabilities)

£800K+ in Financial Grant Support

Grant application Process

- Call issued via SAM website/ Press / Social Media/North East Growth Hub
  open until March 2020, or until all available funding has been allocated
- Electronic Expression Of Interest (EOI) completed and submitted on the SAM website
- Assessment of EOIs by SAM Project Team
- Project Development
  EOIs in scope of Call provided with expert help from SAM project, which may include external consultancy assistance, to develop a full Project Business Case (PBC).
- Submission of Project Business Case (PBC)
- SAM Project Selection Group consideration of applications (PBCs)
- AMSG consideration of applications recommended for approval
- Issue of Grant Offer Letter by University of Sunderland
- Return of signed acceptance of grant offer by grant recipient
- SAM Team support provided to applicant on meeting the ERDF procurement and grant claim requirements
- Payment of Grant Award on quarterly basis on receipt of eligible quarterly financial claims, accompanied by supporting evidence and satisfactory project delivery progress reports, by grant recipient.

Note The purchase of any equipment with a value of £5k or greater is regarded as an asset and their approved use must be maintained for a minimum period of 5 years. Any disposal of the asset within that period would require the University of Sunderland and the ERDF Managing Authority's approval

Capital Investment of £1M

Equipment to support SME's use / experience and knowledge transfer of the technology available in the market for product and process development

There are 6 distinctive areas established to support SME's on site at The Industry Centre:

Innovation and Prototype Factory
Digital Factory
Improvement Factory
Production Factory
Metrology Factory
Knowledge Transfer Factory

Innovation and Prototype Factory

To support your ability to develop innovation and produce prototypes for product validation

- 3d Rapid Prototyping
- Additive Manufacturing
- Vision and Machine Learning
- Product design and simulation
- Prototype development

Digital Factory

To support your ability to interact with new technology relevant to the training and development of process operators and technical maintenance safely without interruption of process

- Virtual reality
- Augmented reality
- Human factors
- Cobot applications
- Process simulation
- Factory simulation
- Offline programming

Improvement Factory

To support your ability to interact with new technology relevant to the development of your process performance

- Advanced Maintenance & CMMS
- Condition / Proactive based monitoring
- Industry 4.0 applications
- Pneumatic & Hydraulic Applications
- Productivity Techniques
- PLC Training

Production and Automation Factory

To support your ability to interact with new technology relevant to the development of your process performance

- CNC Machines
- Industry 4.0 applications
- Robotics / Cobotics
- Automation and AI vehicles
- Manufacturing Technology
- Materials Processing

Metrology Factory

To support your ability to interact with new technology relevant to the development of your process performance

- CMM Inspection
- Scanning: laser & structured light
- Reverse Engineering
- Portable Metrology
- Laser Scale Metrology

Note: The equipment in this area has been provided to AMAP by their technology partner ***Hexagon Manufacturing Intelligence***

Knowledge Exchange Factory

The ability to deliver interaction in larger groups in use of the software, tools and techniques

- CAD / CAE / CAM
- Product and Process Simulation
- Quality Tools & Techniques
- ANPQP
- Best Practice and CI

Sample KE programs:

Manufacturing Best Practice & Continuous Improvements

- Concept to design
- Design for Manufacture
- Quality processes
- Supply chain development
- Process improvement
- Performance management
- Maintenance all aspects
- New model introduction
- Operations planning
- Understanding industry 4.0
- Lean Logistics
- Etc….

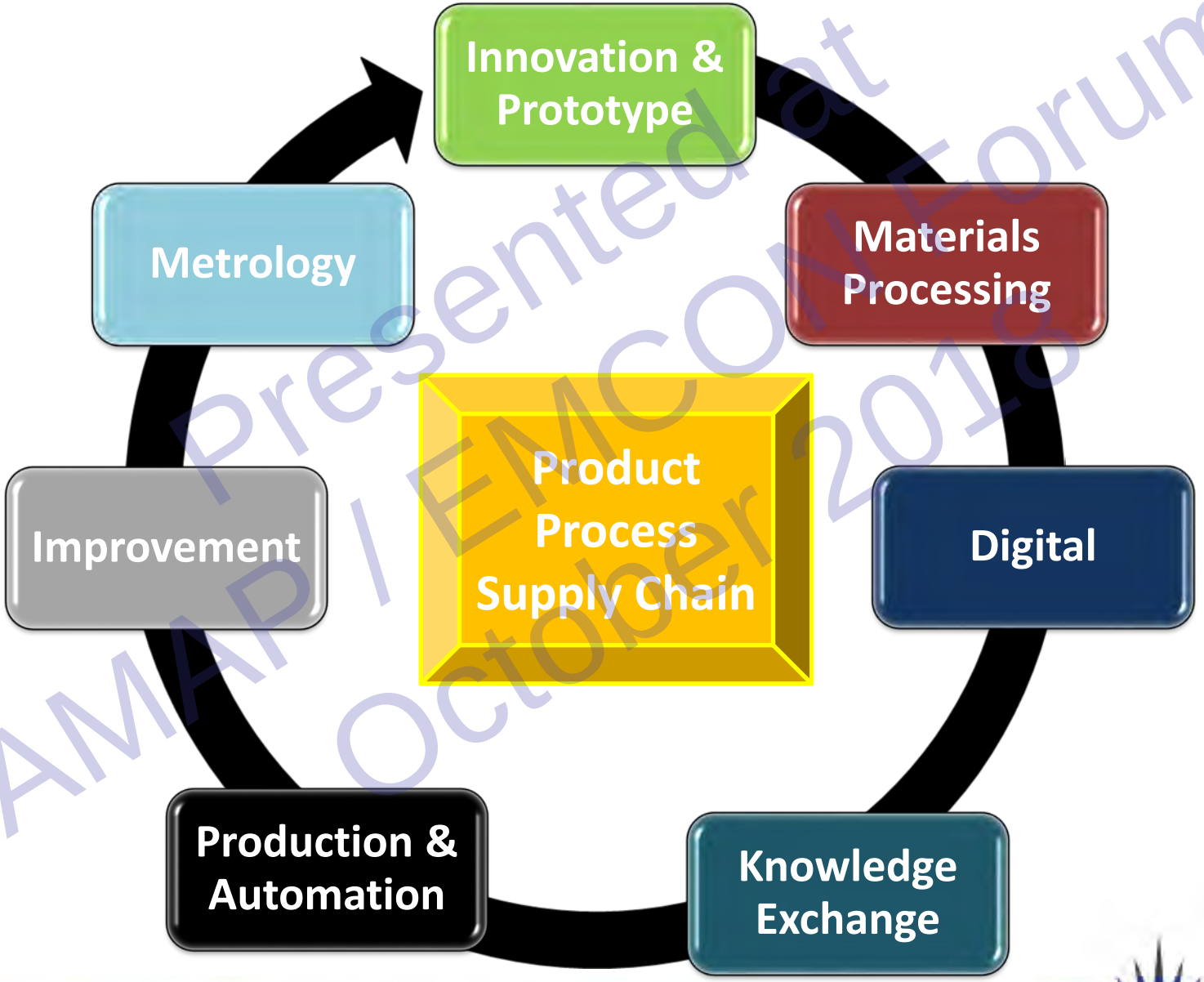
Challenge us with your Supply Chain

Why not issue us the challenge to develop your supply chain locally

New Products to Market
Additional Processes
Localisation of Supplier
Collaborative Product Development
Capability Improvement
Cost Reduction

ERDF Qualification:

- ✓ SME Manufacturer within NE LEP Area
- ✓ < 250 Employees
- ✓ <£50M annual turnover / <£45M balance sheet value
- ✓ <200K Euro in previous state funding within a rolling 3 year period under the State Aid Measure being used.



Contact SAM at:

Claire Defty
Project Manager
Claire.Defty@sunderland.ac.uk
Sam.Project@sunderland.ac.uk
Mob: 07976833380
Tel: 01915153111

Social Media:
Web: www.samprojectuos.co.uk
LinkedIn: https://www.linkedin.com/in/sam-project-9233b3166/
Twitter: @SAMProjectUoS
Instagram: sam.project@sunderland.ac.uk

Benefits of Additive Manufacturing

Carl Gregg
SAM Project -
Product & Process Design Specialist

Scanning for Inspection & Reverse Engineering

Danny Melville
Hexagon Metrology

Maintenance: Back to Basics

Peter Usher

SAM Project
Advanced Maintenance
& Industry 4.0 Specialist

Ultrasonic Inspection

Chris Hallum

UE Systems

AR/VR from a Users Perspective

Helen Scott

AMAP – University of Sunderland

Energy Monitoring for Improvements

Adrian Morris

AMAP – University of Sunderland

NEMF Updates & News

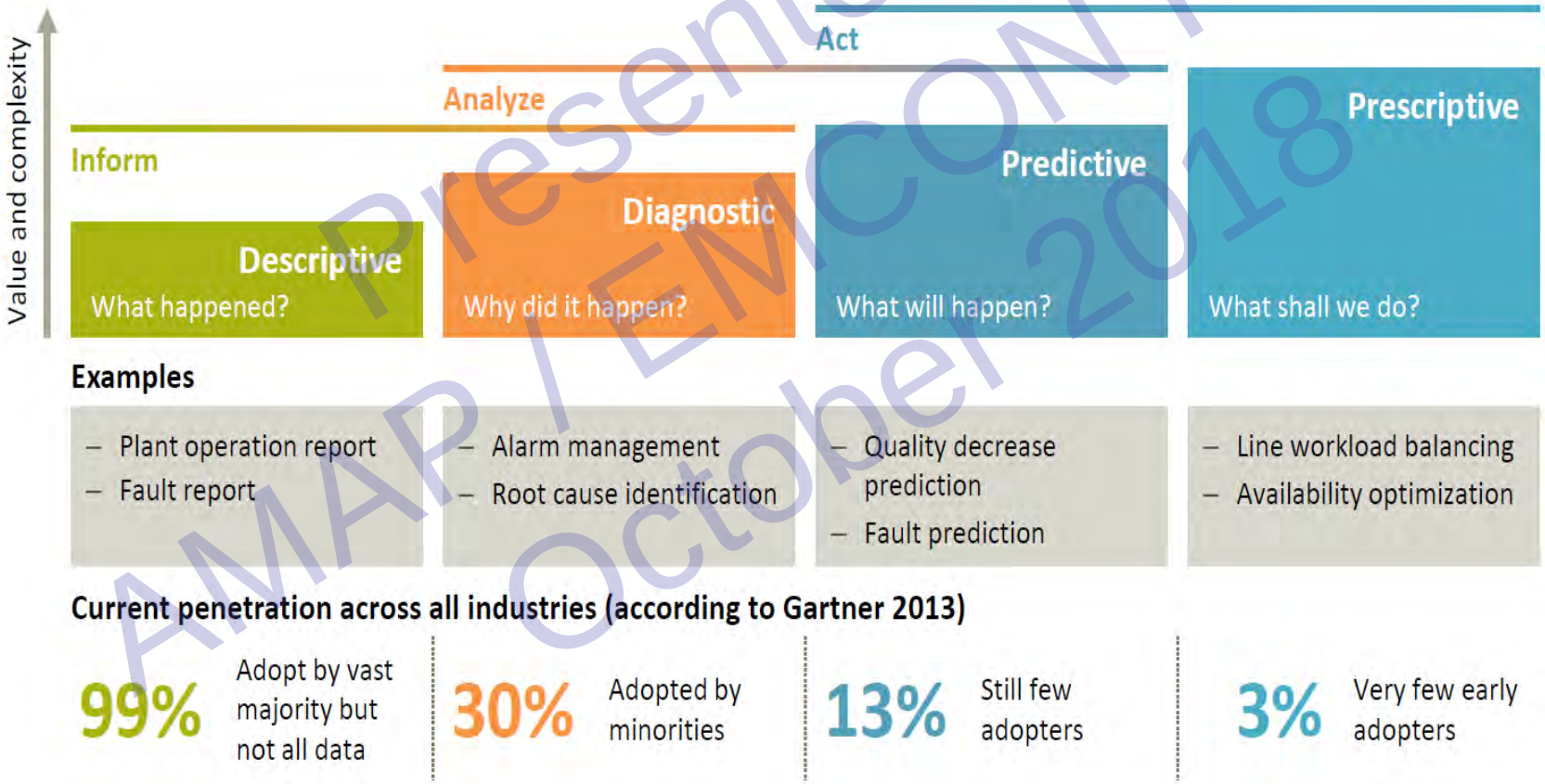
- International Society for Engineering Asset Management
  - 6 sub-groups worldwide (food and drink, auto, aviation, health care etc.)
  - UK - Sunderland (general engineering)

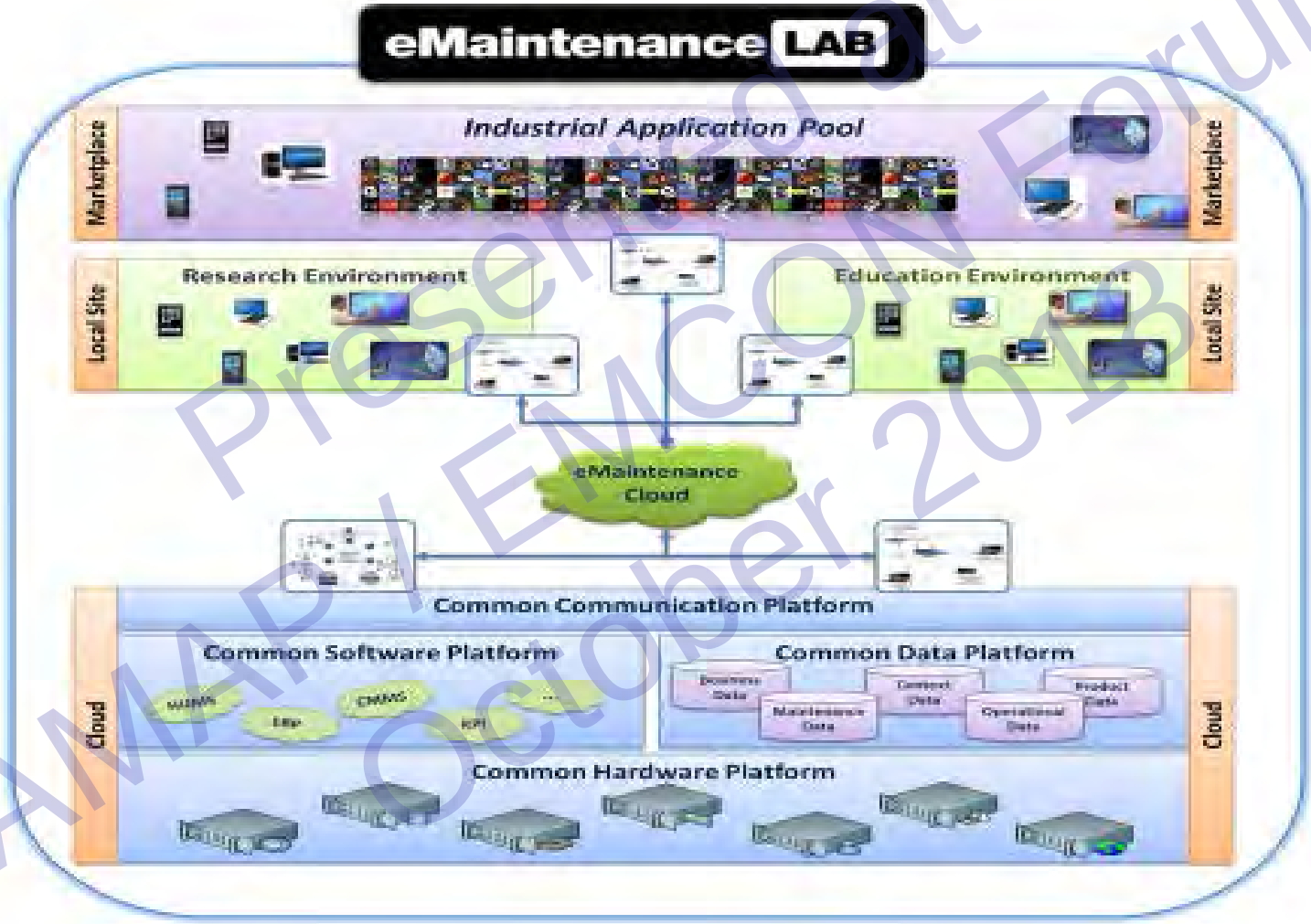
- BSI and ISO 55000 +
  - New standard on electrical equipment (moving from place to place)
    - Need help!
- Manufacturing the Future
    - Digital Manufacturing (maintenance)

Research themes (not limited) are:

- Condition Monitoring
- Remaining Useful Life Estimation
- Maintenance Decision Modelling
- Diagnostic & Prognostic
- eMaintenance
- Maintenance Performance Measurement
- Human Factors in Maintenance
- Design for Maintenance
- ISO55000
- VR/AR for Maintenance Training
- Energy Efficiency
- Industry 4

UK survey 2017. 3000 Manufacturing / Engineering Companies





MSc Advanced Maintenance Engineering

This programme integrates theory and practice to develop the management and technical skills required for anyone working in Maintenance or Asset Management.

We provide:

- Face to face delivery designed to fit alongside work commitments and to network with other students
- Extensive online materials to support independent learning
- Personal support in all modules through a dedicated tutor

This Masters programme is designed to fulfil both industrial and academic demands so that students can pursue a career in a technical and competitive industry

Bringing Innovation to your Business

Case Study support examples:
Bringing Innovation into your processes as an SME

Industry4.0 Implementation

Washington based SME – 15 employees, subcontract machining

Lots of aging/old equipment

Need better information on asset availability for planning and maintenance – interest in how I4.0 can benefit them

- *Project to take old NC machine, implement low cost I4.0 solution to measure asset health and utilisation, simple interface for visual management back to production and maintenance planning*
- *Sensors include oil analysis, vibration, energy, and heat*
- *Dashboard display via Internet/wi-fi/Intranet*
- *System currently being deployed and data gathering to commence soon to demonstrate benefit*

Process Improvement support

Sunderland based Large SME – supply auto industry

Problem with variation through process runs resulting in large rework

- *Project to investigate product to identify source of variation*
- *Ischicawa diagrams developed*
- *Detail process investigation undertaken*
- *Scanning of products thorough production batch run to measure variation*
- *SPC undertaken on data*
- *Problem identified that product improved through press run*
- *Revisit data and Ischicawa identified die clearance issues – minor die modification solved problem*
- *Company now investing in scanning technology having seen and demonstrated benefit*

Maintenance Best Practice Support

Regional based large SME – consumer products

Large modern factory but struggling with maintenance

Need to benchmark and target improvements and implement best practice, struggling to justify investment

- *AMAP Maintenance Assessment tool utilised, 2 day in depth maintenance audit*
- *Data analysed and report prepared*
- *Feedback to company, provided evidence for investment in both training and equipment*
- *Support for best practice implementation with at should support via AMAP maintenance practitioner*

Product and Process Design Support

Small SME with novel idea for new product in new sector

Traditional SME, no history of R&D,

Long development process resulted in product that performed sub-optimal and not fit for scale up

Approached AMAP to assist in DfM and redevelop product, process and materials

- *SME had spent 4 years struggling to develop idea and invested many thousand in tooling and parts*
- *Prototype parts tested, performance not to spec. Parts away from design, and poor CAD data.*
- *Detailed design review identified fundamental flaw in design, which lead to yield/buckling*
- *Redesign undertaken to improve feature, FEA performed to optimise design for application. Insert and holder re-specified for suitable materials and DfM incorporated to reduce part price.*
- *Prototype parts 3D printed for new trials at end customer*
- *Assisting sourcing other parts for the assembly for further proto trials*
- *New Prototypes being produced for verification trials with major UK and International furniture manufacturers*
- *Potential for sale of millions of units as product saves time, money, labour and has other possible applications too.*

Upcoming events: Special NE Maintenance Forum Event

Is your maintenance smart and future proof?
Are you looking for ways to improve?

Come and join us at our Technology Showcase and experience connected engineering with interactive exhibits, demos, seminars, Q&A sessions with industry experts, networking and more.

The day will include seminars on the following topics:

- Hydraulic training systems
- Mechatronics
- Artificial intelligence/predictive maintenance
- I.4.0: How to get started
- Showcase manufacturing 1.4.0: Software

Demonstration highlights:

- Lean Factory line
- IoT Gateway starter pack
- Augmented reality
- Artificial intelligence/predictive maintenance
- Connected hydraulics I.4.0
- Training systems

Venue

AMAP (Institute for Automotive and Manufacturing Advance Practice)
Sunderland University, The Industry Centre, Colima Avenue
Sunderland Enterprise Park West, Hylton Riverside, Sunderland, SR5 3XB

boschrexroth.co.uk
#WeMoveYouWin

amap University of Sunderland

rexroth
A Bosch Company

Smarter Maintenance

Bosch Rexroth with AMAP

31st October 2018
Or
1st November 2018

At:
AMAP
The Industry Centre
Sunderland

Repeats both day

Register Via Eventbrite

Thanks for your attention

Any Questions?

Contact Details:

Roger O'Brien – Head of AMAP

roger.obrien@sunderland.ac.uk

0191 515 3888

AMAP, University of Sunderland, The Industry Centre,
Enterprise Park West, Sunderland SR5 3XB