Pragmatically Stepping into the Twinned Digital World of 4IR
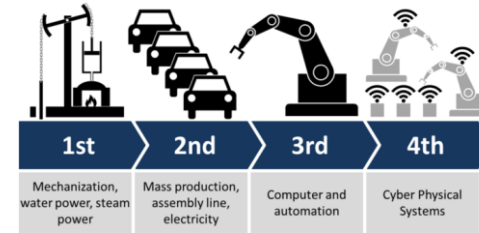
Gash Bhullar

Director
Sematronix Limited   www.smecluster.com
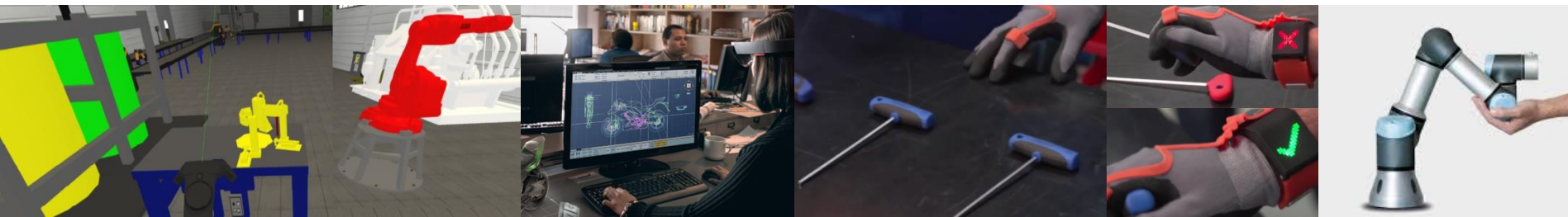
Managing Director
Control 2K Limited   www.control2k.co.uk

Director and Chairman
Technology App Network Limited   www.tanet.eu

"Tomorrows Manufacturing Vision Today"

Cloud Computing & Factory Automation:
Taking Business into the Next Generation

Thursday 17th November 2011

SMECluster - The Connected Business Community

Reducing paper-based processes and creating audit trails

Capturing process data to increase equipment effectiveness

Improving business processes with data and document sharing in the cloud

SMECluster Platform

Tendering for contracts in new areas with trusted partners

Linking efficiently with Customers and Supplies

Dynamic management of materials available worldwide

Future Internet Services are changing working practices and shaping the way we all do business.
Keep up to date with the latest trends and use the local community to strengthen your business.

(For more information - www.smecluster.com /Events/SMECluster.aspx)
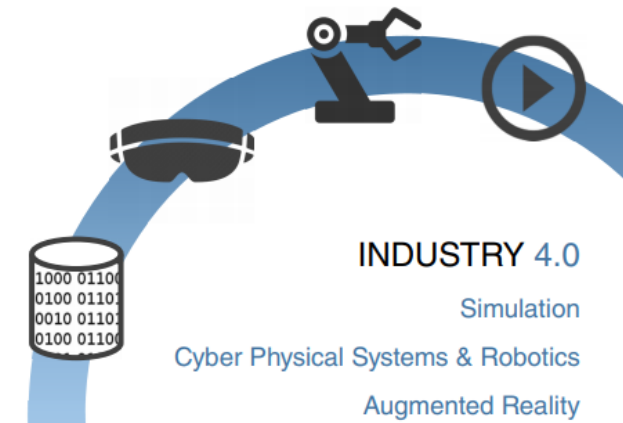
www.smecluster.net

2013 - SMECLUSTER EVENT - Take advantage of the Connected Business Community

The Connected Business Community 4.0
Service Based Software Economy
www.smecluster.com

INDUSTRY 4.0

Simulation

Cyber Physical Systems & Robotics

Augmented Reality

2015 - SMECLUSTER EVENT - The Connected Business Community 4.0 - Service Based Software Economy

Welcome to the 4ᵗʰ SMECluster Event 2017

Pragmatically Stepping into the Twinned Digital World of 4IR

SMECLUSTER Hosts Events Every 2 Years

SMECLUSTER is a community portal for SME's to find useful Resources, Tools and Services to improve and expand their business.

SMECluster
Connected Business Community

www.smecluster.com

Official Welcome

Opening Session

Geraint Green – Welsh European Funding Office

Arian Zwegers – European Commission

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BREXIT

- EU funds 'open for business', with successful applications made whilst the UK is part of the EU protected by the UK Government's lifetime expenditure guarantee.

- Firm assurances from the European Commission that Welsh organisations will not be discriminated against.

- Going forward, protecting access to European research funding is a key priority.

- In or out of the EU, Wales must continue to co-operate and do R&I with organisations across Europe.

Courtesy of Banksy/BBC News - Gyda diolch i Banksy/BBC News
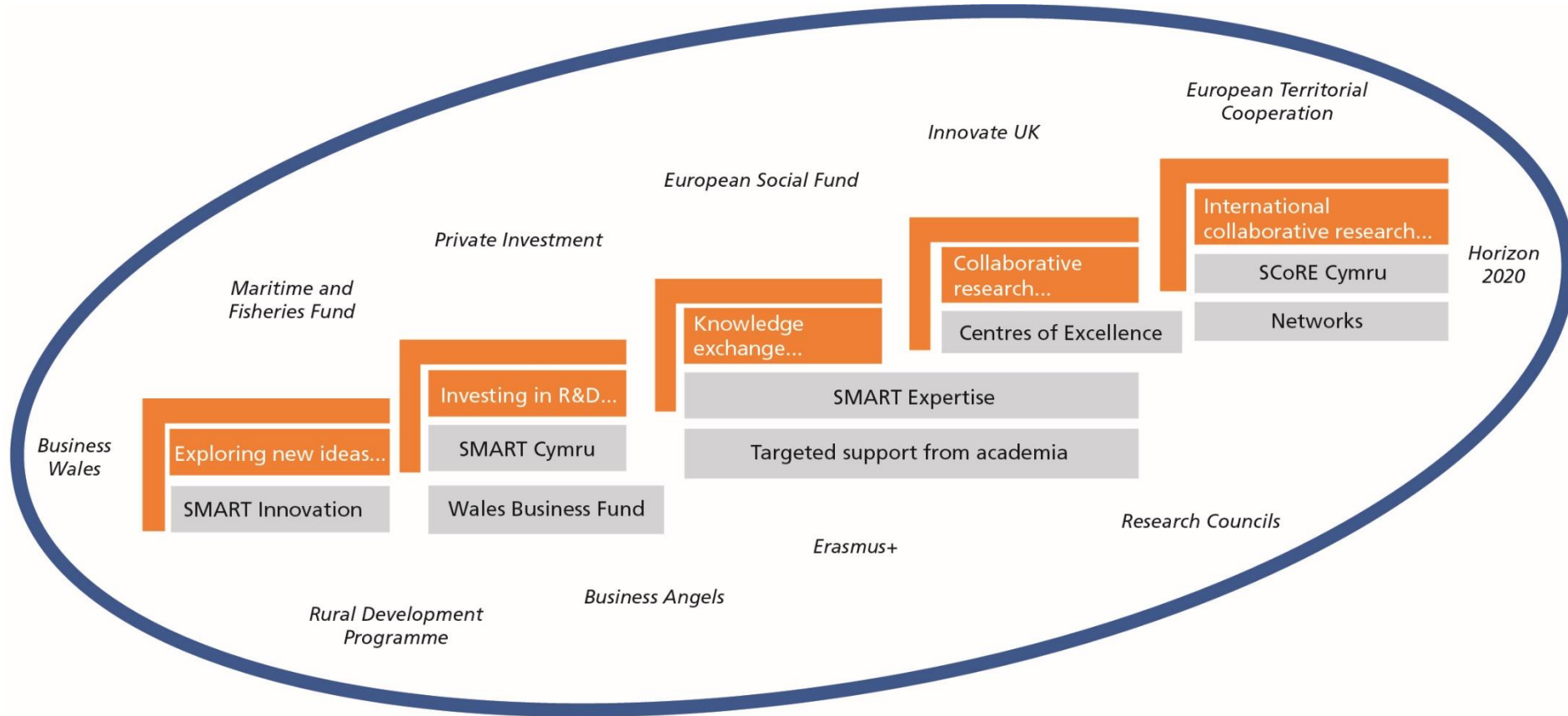
HORIZON 2020 UNIT

A central contact point for all Welsh organisations.

KEY OBJECTIVES

- Build a 'stairway to excellence'

- Increase the engagement and success of businesses

- Develop a Horizon 2020 culture and community in Wales

- Maximise the impact of existing and emerging support

- Support and develop our experts & evaluators

BUILD A STAIRWAY TO EXCELLENCE

Industry 4.0

Welsh Government's SMARTInnovation – consultancy support for Industry 4.0

Recognising Industry 4.0 and it's importance to manufacturing in Wales, health checks available via SMARTInnovation will in future offer consultancy support for companies to embark on the I4.0 journey.

This support is expected to be available next year.

SCoRE CYMRU

Grants to support Welsh-based organisations with:

Travel:

Support for the costs of meeting potential or existing partners and attending key events. **The amount of funding will vary:**

- Maximum of £1,000 per trip;

  - For SMEs up to 100% of costs, Higher Education up to 50% (or 75% if travelling with a Welsh SME), other organisations (e.g. public sector, large enterprises) up to 50% in certain circumstances.

SCoRE Cymru Support for travel: The Industrial Technologies 2016 – Creating a smart Europe event in Amsterdam.

Proposal development:

support for the costs of relevant sub-contracted expertise, e.g. bid writing, specific legal/technical advice or impact/market research. **The amount of funding will vary:**
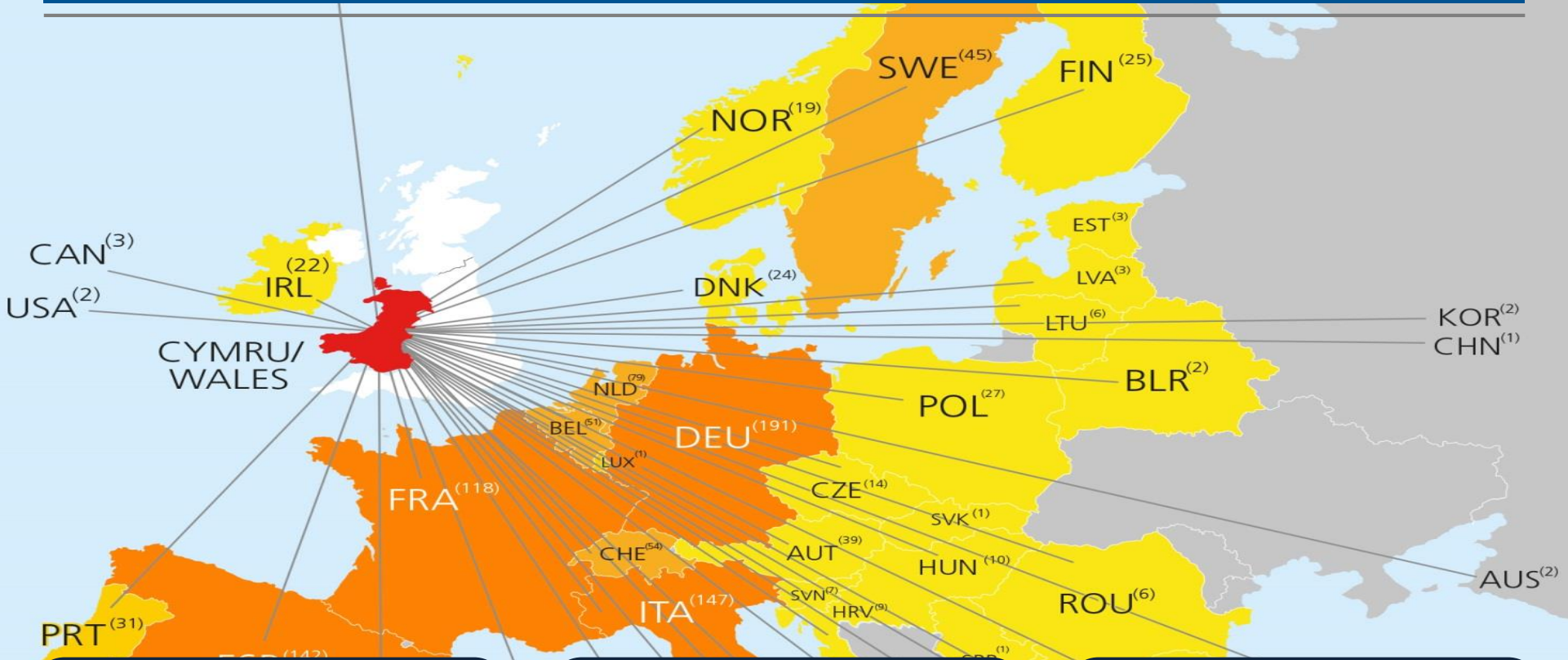
- Generally up to £5,000 and 50% of the costs;

- Up to £10,000 and 75% of costs available in some cases, e.g. first application, bid co-ordinators.

SCoRE Cymru backed IMSPEX's application for Horizon 2020 funds which went on to secure €1.5m to lead a European project to revolutionise the way respiratory illnesses are diagnosed.

Worth doing?

CAN (3)
USA (2)
IRL (22)
CYMRU/ WALES
NOR (19)
SWE (45)
FIN (25)
DNK (24)
EST (3)
LVA (3)
LTU (6)
KOR (2)
CHN (1)
NLD (79)
BEL (51)
LUX (1)
DEU (191)
POL (27)
BLR (2)
FRA (118)
CHE (54)
CZE (14)
SVK (1)
AUT (39)
HUN (10)
SVN (7)
HRV (9)
ROU (6)
ITA (147)
PRT (31)
ESP (142)
AUS (2)
TZA (2)
ETH (2)
ISR

over **€83m** secured

191 Participations

over **2000** International collabs.

Manylion
Details correct @ 30.09.16
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And the future?

LAB – FAB – APP

Investing in the European future we want

Report of the independent High Level Group on maximising the impact of EU Research & Innovation Programmes

Research and Innovation

> **"** *Doubling the overall budget of the post-2020 EU research and innovation programme is the best investment the EU can make.*

> **"** *Whatever Brexit modalities are agreed between the UK and the EU by 2019,* **full and continued engagement with the UK within the post-2020 EU R&I programme remains an obvious win-win for the UK and the EU**...

Pascal Lamy

Chair of the High Level Group on maximising impact of EU Research and Innovation Programmes

HM Government

Collaboration on science and innovation

A FUTURE PARTNERSHIP PAPER

> **"** *... the UK would also like to explore forging a more ambitious and close partnership with the EU than any yet agreed between the EU and a non-EU country*

**Collaboration on science and innovation: a future partnership paper
6 September 2017**

Thank you

Find out more:

Email: horizon2020@gov.wales

Call: 0845 010 3355

Visit:
http://gov.wales/funding/eu-funds/horizon2020

Cronfeydd yr UE:
Buddsoddi yng
Nghymru

EU Funds:
Investing in Wales

UNDEB EWROPEAIDD
EUROPEAN UNION

Llywodraeth Cymru
Welsh Government

Session 1

The Twinned Industrial Landscape

Gash Bhullar – Representing the industrial viewpoint and links to EU projects

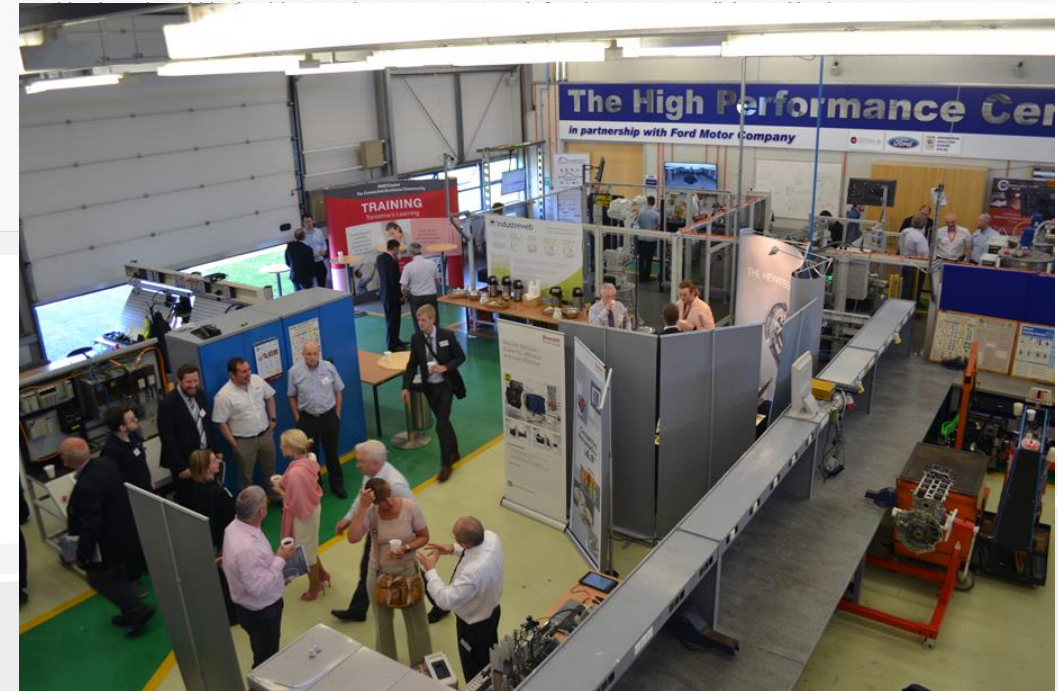# Recent Event – Tata Steel / IET – 25ᵗʰ May 2017

The Institution of Engineering and Technology
www.theiet.org/manufacturing

Contents of the Day – Industrial Focus (Morning)

- Industry 4.0 a quick catch-up and key points

- Industrial Viewpoint Providers and Consumers including security considerations

- CREMAnufacture – Featuring Industreweb 4.0, one of the tools offered for the spinout of the CREMA project

- Practical Demonstrations of the presented Technologies

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Contents of the Day – Technical Focus (Afternoon)

- Use case descriptions coming from a variety of EU Projects showing the implementation possibilities of I4.0 Technologies

- Featured Projects include C2NET, CREMA, vf-OS and DIGICOR

- Innovation Hubs – Where to go for further interaction

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Key Speakers 16th November 2017

Service Providers

- Andy Hodgson – Siemens – MindSphere Applications for production improvement

- Andy Parker Bates – Festo

- Russel Smith – Balluff – Strategy for UK with 4IR

- Damon Rands – Wolfberry – Enabling Secure Connectivity

Key Speakers 16th November 2017

Industry Consumers

- Digitising European Industry – Presentations Intro Tim Williams

- Arnd Schirrmann – Airbus Hamburg – Supplier strategy 4.0

- Mark Thomas – Ford Motor Company Bridgend – Deployment challenges for OEMs

- Roberto Camp – Fluidhouse Oy Finland – Evolution meets Revolution

- Jessica Gil Zapico – Tenneco Belgium – Process Optimisation and Analytics

Industry 4 / 4IR

Is it finally here?

Definitions

Industrie 4.0

Vertical and Horizontal online integration of all IP-connected **data and services** for **situated optimal** adaptation and execution of **manufacturing processes at runtime, in mixed reality**.
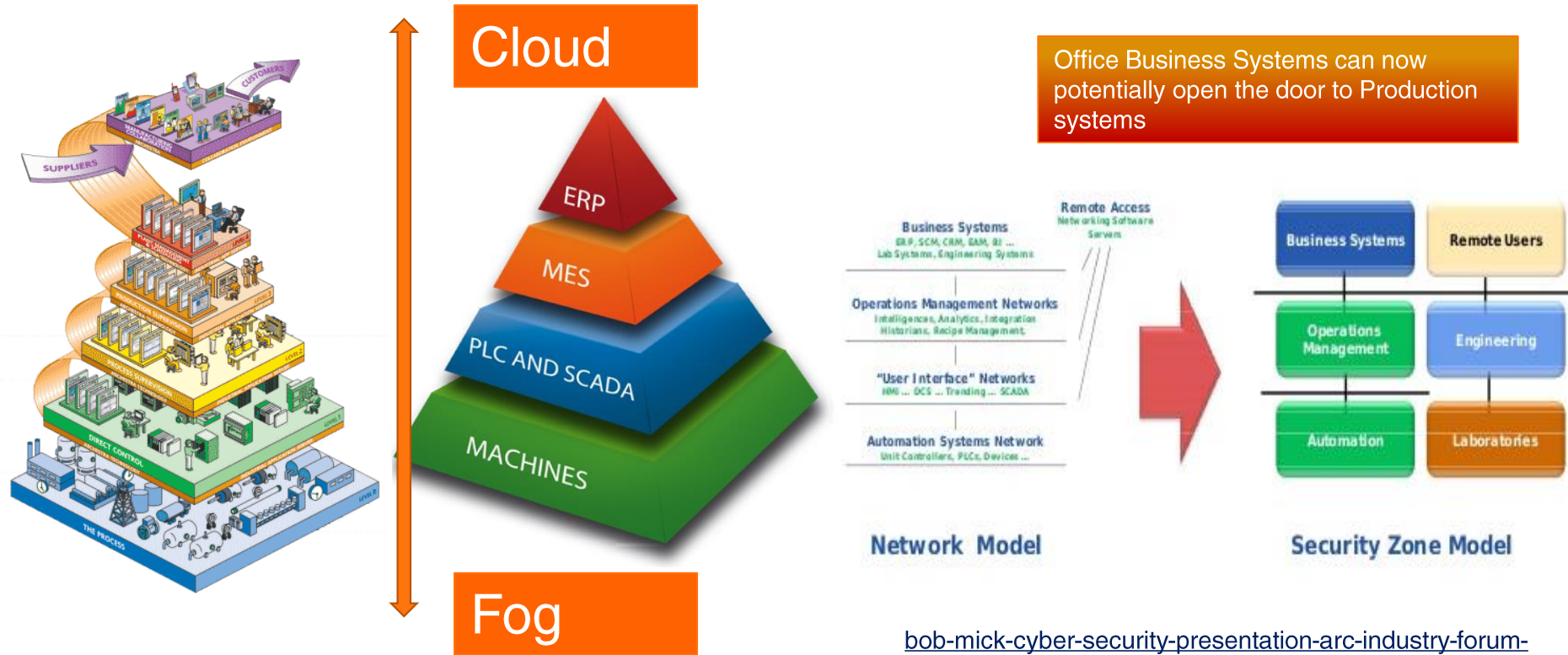
Matthias Klusch, DFKI, 2015

Industry 4.0 in the coming Years

The term Industry 4.0 will become a **generic term** for deploying **digitally connected optimised intelligent systems** that cross the barrier of specialised services in the same way as Lean and Agile Manufacturing became day to day terms.

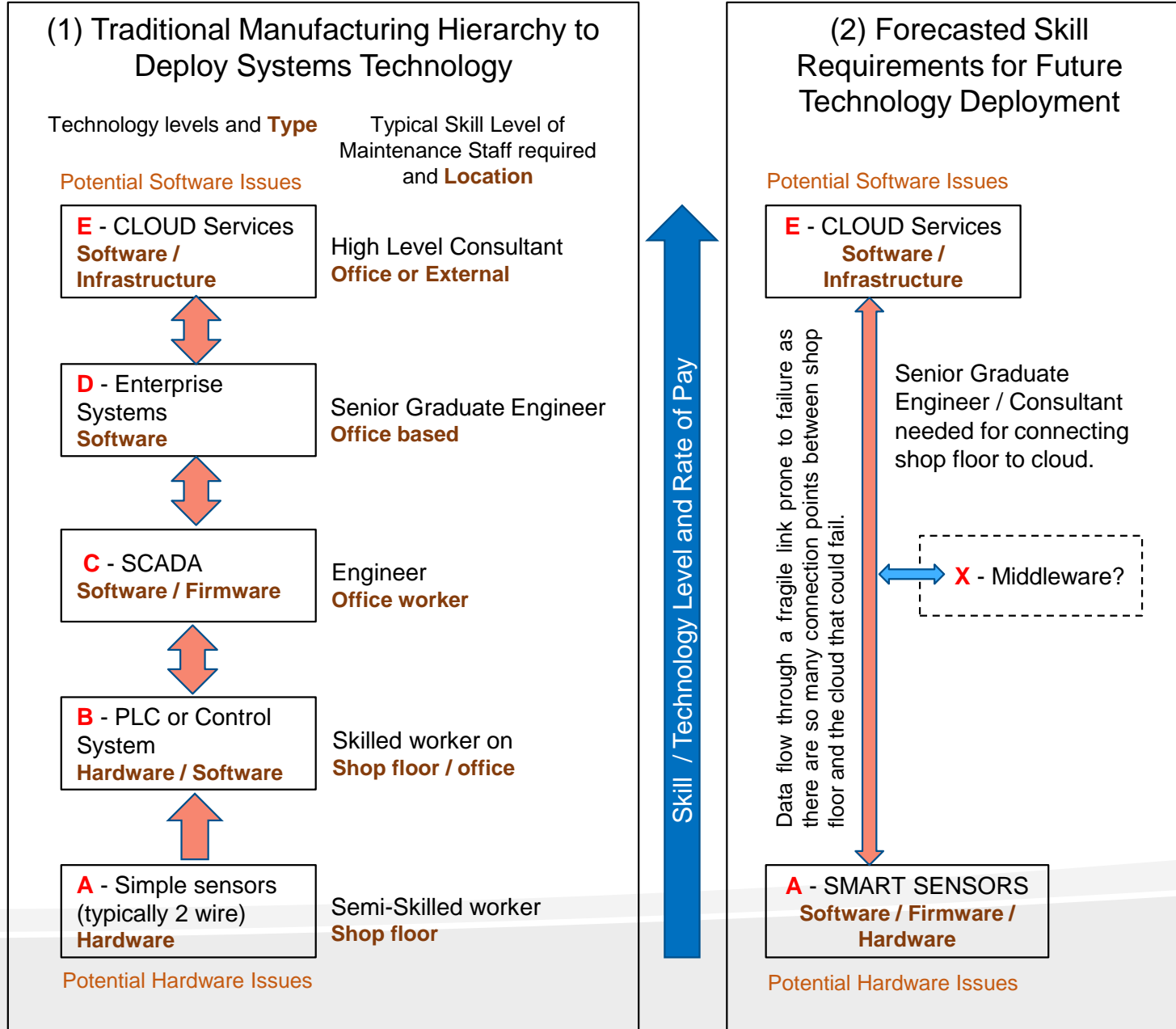Gash Bhullar, Control 2K Limited, 2016

Cyber Security across the Organisation

Cloud

Fog

ERP

MES

PLC AND SCADA

MACHINES

Office Business Systems can now potentially open the door to Production systems

Network Model

Security Zone Model

Business Systems
ERP, SCM, CRM, EAM, QI ...
Lab Systems, Engineering Systems

Remote Access
Networking Software
Servers

Operations Management Networks
Intelligences, Analytics, Integration
Historians, Recipe Management.

"User Interface" Networks
HMI ... DCS ... Trending ... SCADA

Automation Systems Network
Unit Controllers, PLCs, Devices ...

Business Systems — Remote Users

Operations Management — Engineering

Automation — Laboratories

bob-mick-cyber-security-presentation-arc-industry-forum-2010

- Organisations need a clear policy to connect "to and from" the outside world
- We still struggle with internet connectivity at the best of times but competition will drive the market as always and you will have no choice other than to adopt or lose your market.

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ICT in Manufacturing Driving Change

(1) Traditional Manufacturing Hierarchy to Deploy Systems Technology

Technology levels and **Type**   Typical Skill Level of Maintenance Staff required and **Location**

Potential Software Issues

E - CLOUD Services
Software / Infrastructure
High Level Consultant
Office or External

D - Enterprise Systems
Software
Senior Graduate Engineer
Office based

C - SCADA
Software / Firmware
Engineer
Office worker

B - PLC or Control System
Hardware / Software
Skilled worker on
Shop floor / office

A - Simple sensors (typically 2 wire)
Hardware
Semi-Skilled worker
Shop floor

Potential Hardware Issues

Skill / Technology Level and Rate of Pay

(2) Forecasted Skill Requirements for Future Technology Deployment

Potential Software Issues

E - CLOUD Services
Software / Infrastructure

Senior Graduate Engineer / Consultant needed for connecting shop floor to cloud.

Data flow through a fragile link prone to failure as there are so many connection points between shop floor and the cloud that could fail.

X - Middleware?

A - SMART SENSORS
Software / Firmware / Hardware

Potential Hardware Issues

"Wear" Is the Manufacturing Future: The Latest Fashion Hitting the Workplace

Gurbaksh Bhullar_OTM_2015

https://link.springer.com/chapter/10.1007/978-3-319-26138-6_7

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Industry 4.0 / 4IR Hype verses reality

- The drive for Industry 4 primarily comes from the automotive industry in a search to reduce costs, increase efficiency and indeed Germany is leading the way

- I4.0 builds on the steps of TPM, Lean Manufacturing and Six Sigma. It's the natural progression to now use the data generated in the business across all divisions of the business

- The approach is nothing new. If you talk to older engineers they will tell you they were doing similar things up to 40 years ago. The technologies platforms change and often skills and knowledge is lost if its not successfully transferred

- Researchers and marketers are always pushing the next thing so you will already here Industry 5 been talked about (Synergy between people and machines)

- Bitcoin Technologies is the new hype in Security – How soon it comes to market is anyone's guess but the stronger the hype – the more people that adopt the idea, the higher the probability of the product coming to market

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Industry 4.0 / 4IR Things to consider

- **Nothing beats good engineering practice**. Technology is only a tool for engineers. If you ask the right questions you can find the right solutions – Technology will never replace good engineering practice.

- **Don't use technology for the sake of technology**. Be clear what the benefits are and educate yourself and the team about best practice

- **We need to plan for the future**. The next generation are Technology savvy but we need a clear transition from coding machines like the BBC micro:bit to Industrial Control Systems

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Industrial Focus Session 1

Leading companies giving an insight into the benefits offered by Industry 4.0

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Industry 4.0 / 4IR Providers

Industrial Focus Session 2

An industrial viewpoint of companies deploying or looking to deploy Industry 4.0

Moderator – Tim Williams – Welsh Automotive Forum

Aim: Enable the UK based automotive supply chain to adopt digital technologies to improve competitiveness, productivity and risk management capabilities of UK based OEMs and their suppliers.

Scope:

- Initially OEMs and tier 1 JIT suppliers with subsequent engagement of other tier one and tier two suppliers
- Sensing and gathering of real time data in the supply chain
- Data management, aggregation, analytics, decision making, AI, block chain for SCM decision making
- Core SCM processes: Demand management, forecasting, orders management, capacity planning & asset utilisation, master scheduling, production planning, inventory optimisation, traceability
- Software, hardware, sensing, data storage, data management
- Supply chain open platform collaboration
- National, international and OEM standards/legal/regulatory requirements regarding data formats, protocols, data sharing, file formats, data protection and ownership etc.
- Addressing already identified barriers to adoption – Cybersecurity, skills, ROI, Infrastructure, Interoperability

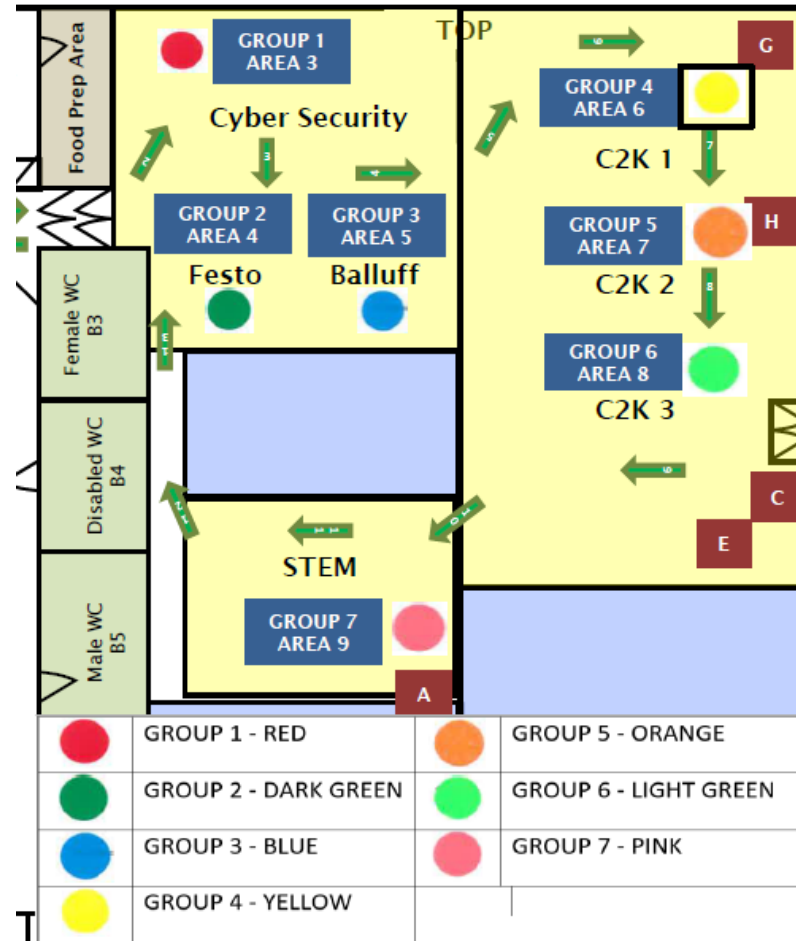# Industry 4.0 / 4IR Consumers

Industrial Example Session 3

Industreweb 4.0 has been developed through participation of EU projects and is a great example of affordable software aimed at the Tier 1 supply chain

Simon Osborne – Control 2K Limited

Session 4

Demonstrations

Panel Discussion Session 5

Mark Thomas – Ford Motor Company
Arnd Schirrmann – Airbus
Andy Hodgson – Siemens
Andy Parker Bates – Festo
Robert Camp – Fluidhouse
Russell Smith – Balluff
Damon Rands - Wolfberry

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Technical Keynote Session 6

Incorporating EU project results into business

Roberto Camp – Fluidhouse Oy Finland

Technical Focus Session 7

CREMA Detailed demonstration

Tim Dellas – Moderator – Project Manager

Use Case 1 – Jon Rodriguez

Use Case 2 – Jessica Gil

Cloud-based Rapid Elastic MAnufacturing
http://www.crema-project.eu/

Technical Focus – Session 8

VF-OS

An Open Operating System for
Virtual Factories
http://www.vf-os.eu/

C2NET

Cloud Collaborative
Manufacturing Networks
http://c2net-project.eu

DIGICOR

Decentralised Agile Coordination
Across Supply Chains
www.digicor-project.eu

DMIW

Digital Manufacturing Innovation
Hub Wales (DMIW)
http://dmiw.co.uk

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