



mtc

Manufacturing
Technology Centre

INSPIRING

Great British Manufacturing



mtc

Manufacturing
Technology Centre

IMPROVING PERFORMANCE AND PRODUCTIVITY FOR **DEFENCE** THROUGH ADVANCED MANUFACTURING **TECHNOLOGIES**

BACKGROUND

- Opened in 2011
- Independent RTO
- Secure facilities
- Prove innovative manufacturing ideas
- Manufacturing system solutions
- Training



MTC & HVM CATAPULT

The High Value Manufacturing (HVM) Catapult is the catalyst for the future growth and success of manufacturing in the UK.

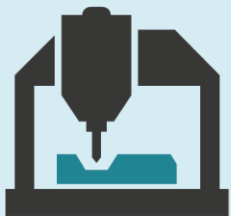
We are developing extensive capability in manufacturing technologies and process expertise to grow the contribution of the manufacturing sector to the UK economy.

The MTC will:

- Identify and implement new technologies
- Undertake research and development
- Complete client or collaborative projects
- Increase operational efficiency
- Support the supply chain
- Provide technical training and employee upskilling



INDUSTRY CHALLENGES



You want to make something

at a lower cost
better quality
quicker
in higher volume
you've never made before



You want to assemble something to

minimise reject rate
improve reliability
improve consistency
reduce waste
reduce errors



You want to use data more effectively for

improved design
better quality
efficient logistics
new business models

MANUFACTURING INNOVATION

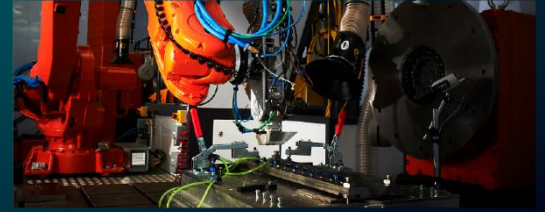
Component Manufacturing



Additive Manufacturing



Non-Conventional Machining



High Integrity Fabrication

Assembly Systems



Advanced Tooling and Fixturing



Electronics Manufacturing



Intelligent Automation

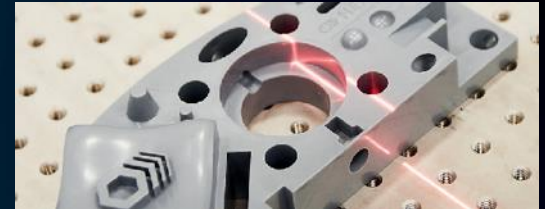
Data Systems



Design and Simulation



Manufacturing Informatics



Metrology and NDT

DEPLOYMENT OF DIGITAL MANUFACTURING STRATEGY



Dr. Lina Huertas, CEng FIMechE

- Chief Technologist for Digital Manufacturing at The Manufacturing Technology Centre
- Former chair of the High Value Manufacturing Catapult strategy team
- Focused on driving the creation of value through the digitalisation of UK industry



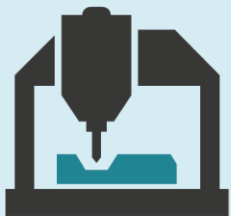
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Lina Huertas
Chief Technologist, Digital Manufacturing
2019

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MTC DIGITAL MANUFACTURING

HISTORY AND COMPETENCIES



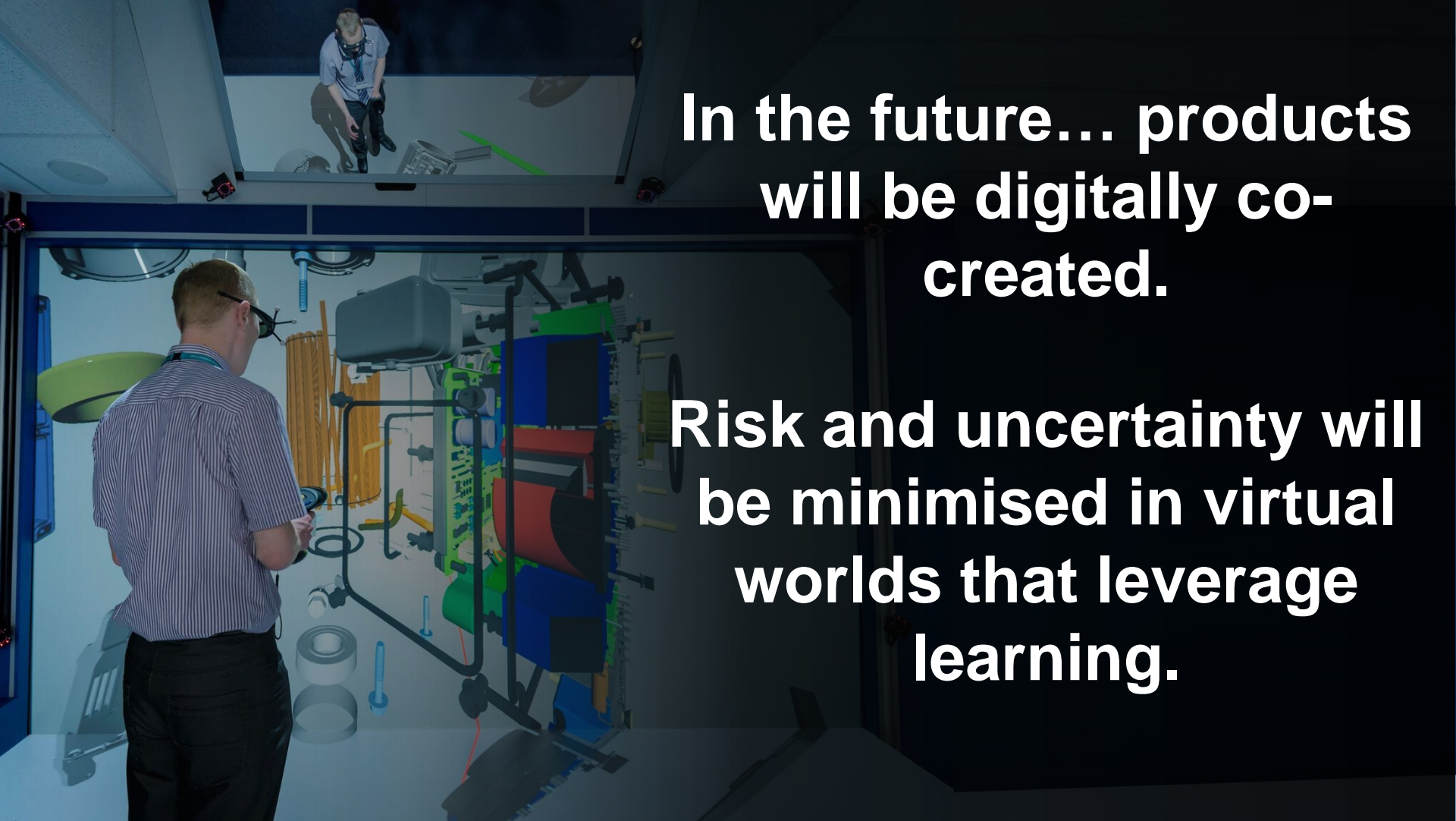
- Over 5 years building a dedicated digital team
- First end-user informed Digital Manufacturing strategy in the UK
- Multimillion investment in digital capability and infrastructure
- Holistic approach to Digital Manufacturing including Transformation and Skills
- Over 150 dedicated Digital Manufacturing engineers
- Several demonstration and test-bed platforms.

**Digital Manufacturing is about
extracting value out of data in
a manufacturing environment**



The background features a dynamic, abstract design. On the left, there are vibrant red wavy lines that transition into a black area on the right. This black area is filled with a pattern of small, glowing purple dots arranged in a grid-like fashion, creating a sense of depth and digital connectivity.

The Future of Manufacturing is Digital

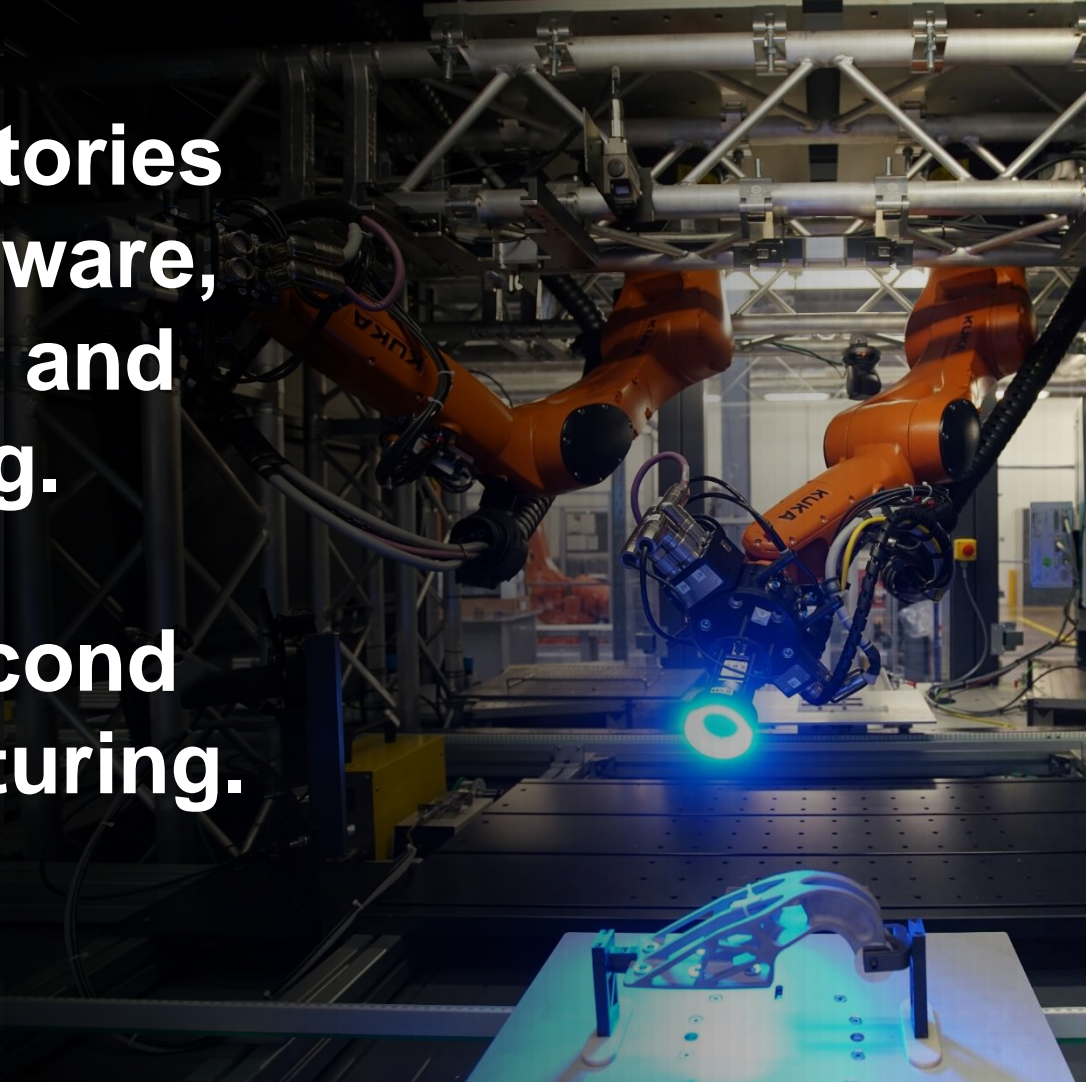
A man in a striped shirt and glasses is seen from behind, wearing a VR headset and holding a controller. He is standing in a virtual environment, looking at a large, complex 3D model of a mechanical assembly. The model is composed of various colored parts (blue, green, red, yellow) and is mounted on a black frame. In the background, another person is visible, also wearing a VR headset and interacting with the environment. The scene is dimly lit, with the primary light source being the virtual environment itself.

**In the future... products
will be digitally co-
created.**

**Risk and uncertainty will
be minimised in virtual
worlds that leverage
learning.**

**In the future... factories
will become self-aware,
hyper-connected and
self-optimising.**

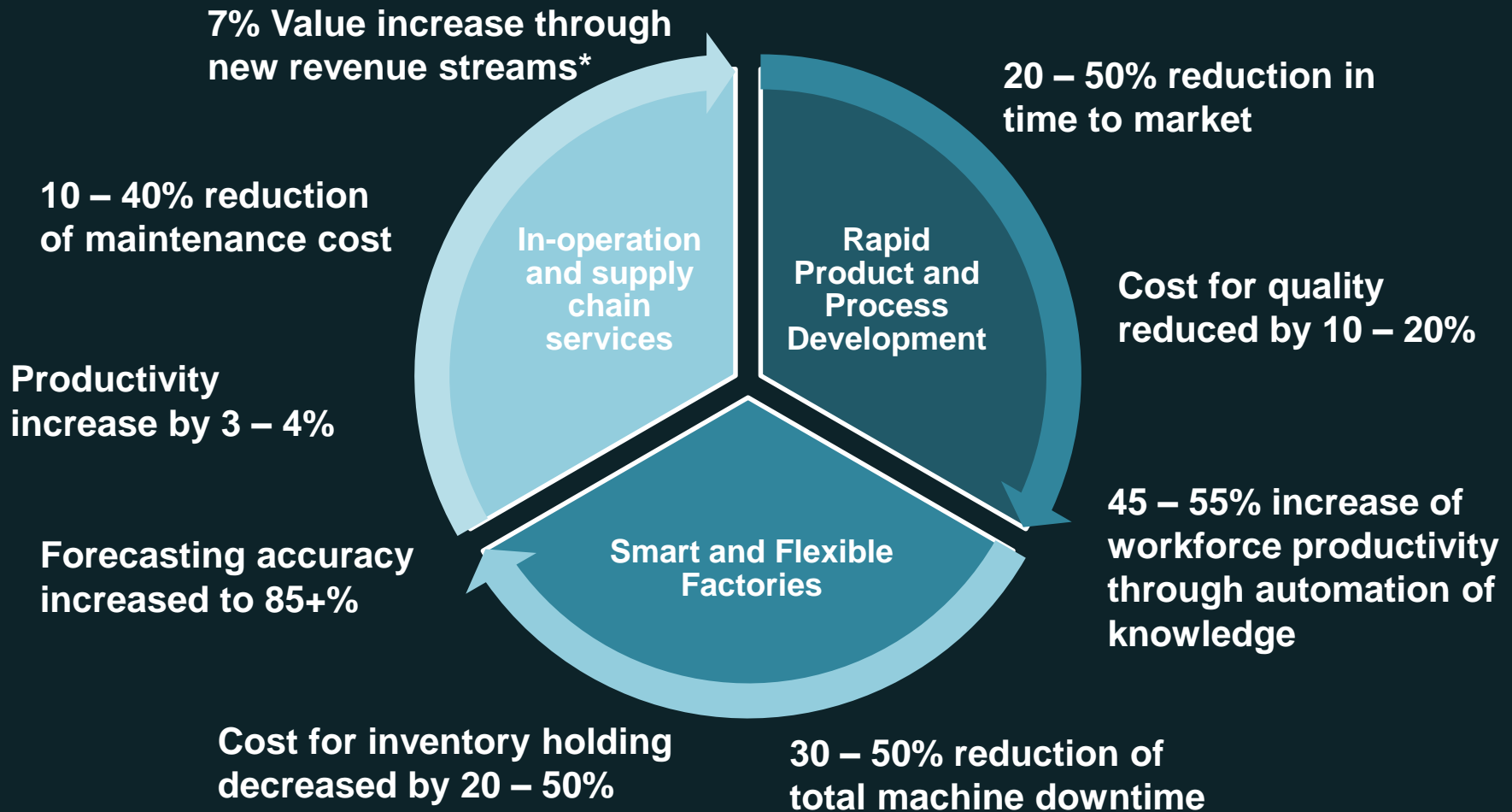
**Agility will be second
nature in manufacturing.**





**In the future... the world
will learn to do
manufacturing in a
different way.**

**Value will shift to less
tangible assets and will
be redefined.**



~50 Bn
machines vs
~1 Bn people

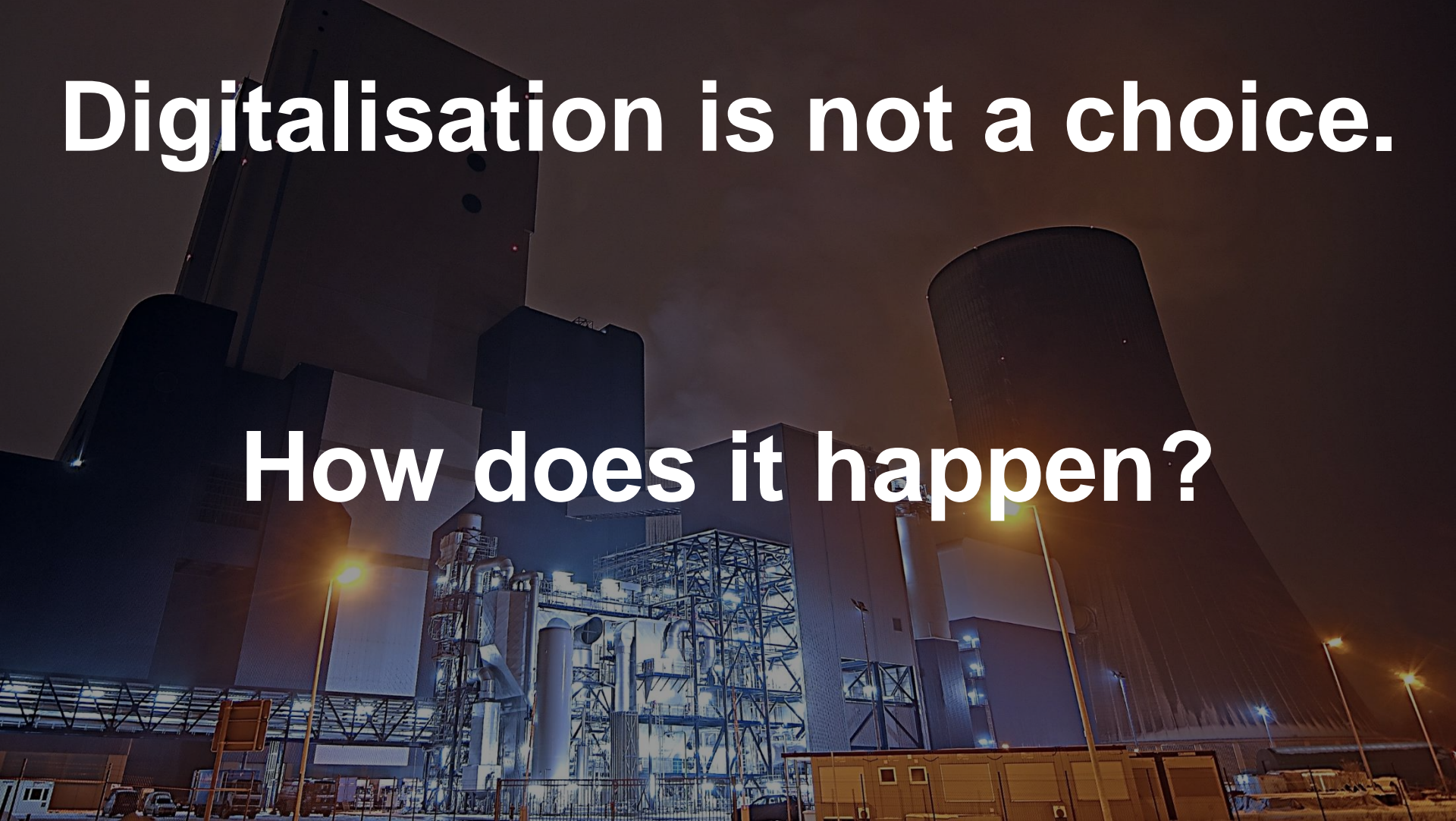
machines connected-
compared to ~1Bn
people today

\$1.2 to \$3.7 Tn
value from IoT in
factories

process optimization and
predictive maintenance

~8-9X increase
in GDP

for established
economies if impact
matches 1st industrial
revolution, as anticipated

A photograph of a nuclear power plant at night. The image shows several large, dark, cylindrical cooling towers and a complex network of pipes and structural steel illuminated by bright blue and white lights. In the foreground, there are yellow storage containers and a fence. The sky is dark, and the overall scene is industrial and dramatic.

Digitalisation is not a choice.

How does it happen?

01 - DOWNLOAD ADD-IN OR
UPLOAD FILE

02 - MANUFACTURABILITY
FEEDBACK DURING DESIGN

Analyze what you're working on in real-time and we'll let you know about tooling limitations, our capabilities, and how to fix any issues we find.

03 - INSTANT PRICING

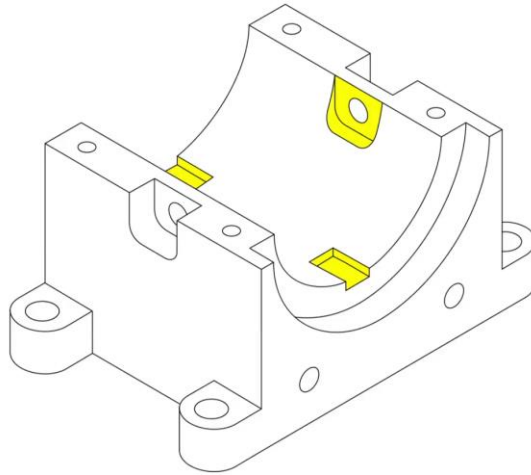
04 - CHOOSE A SHIP DATE

05 - PRODUCTION

06 - TRACK PROGRESS

07 - DELIVERY

Submit Your Part →



3 ISSUES FOUND

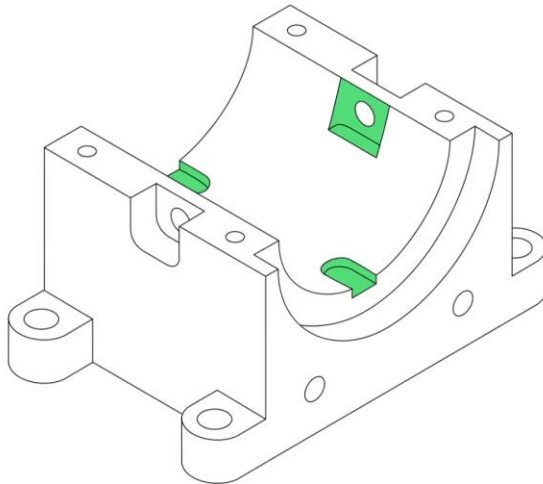
INTERNAL CORNER



INTERNAL CORNER



ACCESSIBILITY



SUCCESS!

INTERNAL CORNER



INTERNAL CORNER



ACCESSIBILITY



ORDER NOW

PLETHORA

Taken from: www.plethora.com



Upload parts to your
library



Add the parts you
need to your cart



We match your parts to the
best suited supplier in our
network



We calculate the cost including
logistics and materials



Track your production from
start to finish in real time



Relax and receive your
parts on time and at quality

The possibilities are endless...



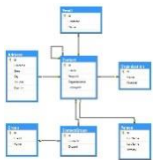
Value extracted from data



Innovation



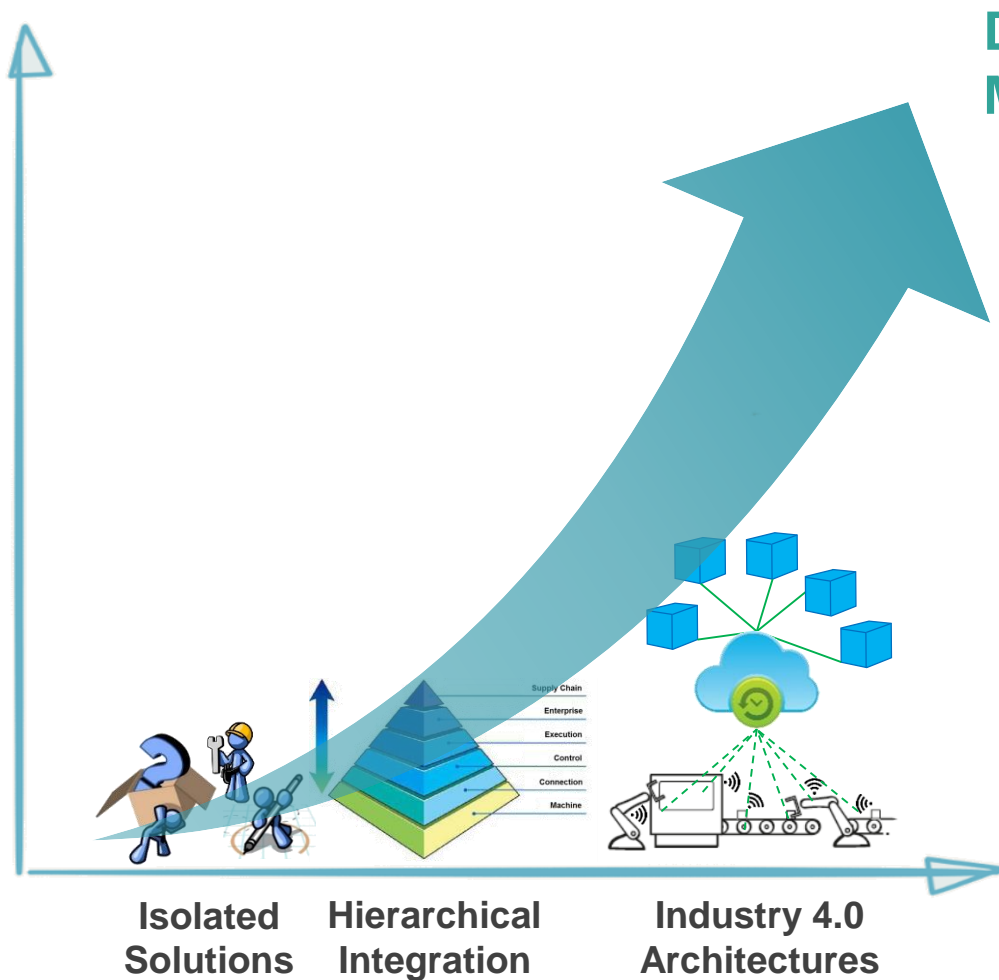
Intelligence



Structure

A	B	B
Name	Number	Number
John	10023	10023
John	10024	10024
John	10025	10025
John	10026	10026
John	10027	10027
John	10028	10028
John	10029	10029
John	10030	10030
Nike	10031	10031

Data



Digitalising
Manufacturing

Isolated
Solutions

Hierarchical
Integration

Industry 4.0
Architectures

ICT Technology
Strategy

WHERE DO YOU START?

1



Understand how digitalisation can support your business strategy – build a vision

2



Identify where you currently are and where you want to be

3



Create a plan of action to close the gap – your roadmap

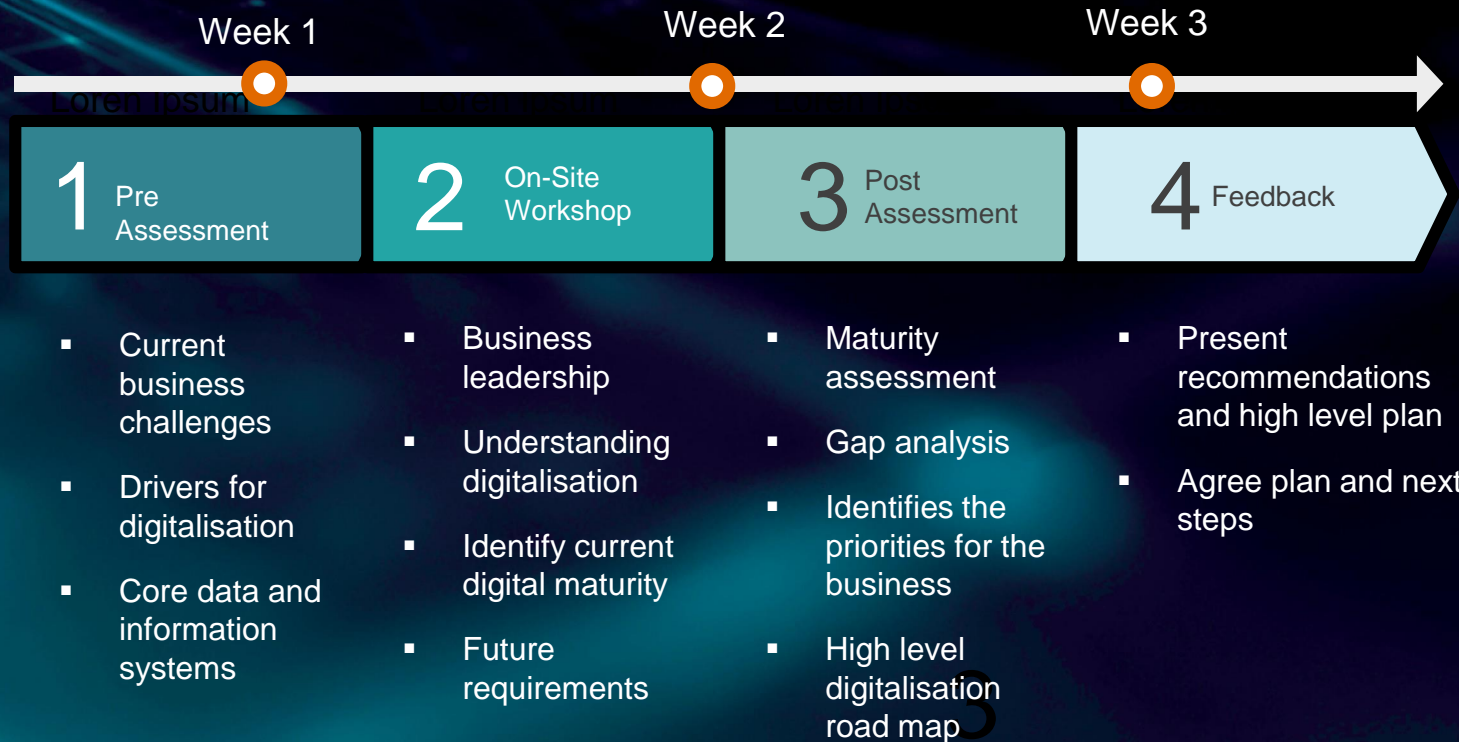
4



Start your journey

**Engage
your
team**

MTC DIGITAL DISCOVERY



HARRIS RCS – DIGITALISATION PROJECT

- Identification of key metrics and value drivers
- Identification of existing data in the organisation
- Co-development of dashboard for decision making
- Development of related processes



V25

OUTSTANDING	XXXX	NEW PART / FAIR REQUIRED	
IN PROGRESS	XXXX	HAZARD PART	
COMPLETE	XXXX	MIS PART	
LATE	XXXX		

MONDAY

11/12/2017

Total Processing Time (Days/Min) 08:25

Work Order	Part Number	Qty. No.	Start	Finish
29558	AHO88465	60	07:45	17:00

TUESDAY

12/12/2017

Total Processing Time (Days/Min) 08:25

Work Order	Part Number	Qty. No.	Start	Finish
29558	AHO88465	60	07:45	12:45
29628	568-2-26815-000	35	12:45	15:15
29628	568-2-26815-000	40	15:15	17:00

WEDNESDAY

13/12/2017

Total Processing Time (Days/Min) 05:45

Work Order	Part Number	Qty. No.	Start	Finish
29628	568-2-26815-000	40	07:45	13:30

THURSDAY

14/12/2017

Total Processing Time (Days/Min) 05:20

Work Order	Part Number	Qty. No.	Start	Finish
29607	1007-0006	210	11:36	13:06
29607	1007-0006	220	13:06	15:09
29426	DAC11100-01	55	15:09	17:00

HARRIS RCS – DIGITALISATION BENEFITS

- 30% increase in productivity
- Increase in On-Time In-Full from 80% to 99.3%
- Performance award from customer Pattonair
- Increased sales
- Growth in turnover and profit



V25

OUTSTANDING	XXXX	NEW PART / FAIR REQUIRED	
IN PROGRESS	XXXX	HAZARD PART	
COMPLETE	XXXX	MIS PART	
LATE	XXXX		

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GE AVIATION – DIGITALISATION PROJECT



- WP1: Digital Thread
- WP2: Composite Blade
- WP3: Controls and Pitch Change
- **WP4: Brilliant Factory**
- WP5: Aero-acoustics
- WP6: Project Management



Advanced Manufacturing Research Centre



GE Aviation



GE AVIATION – DIGITALISATION PROJECT

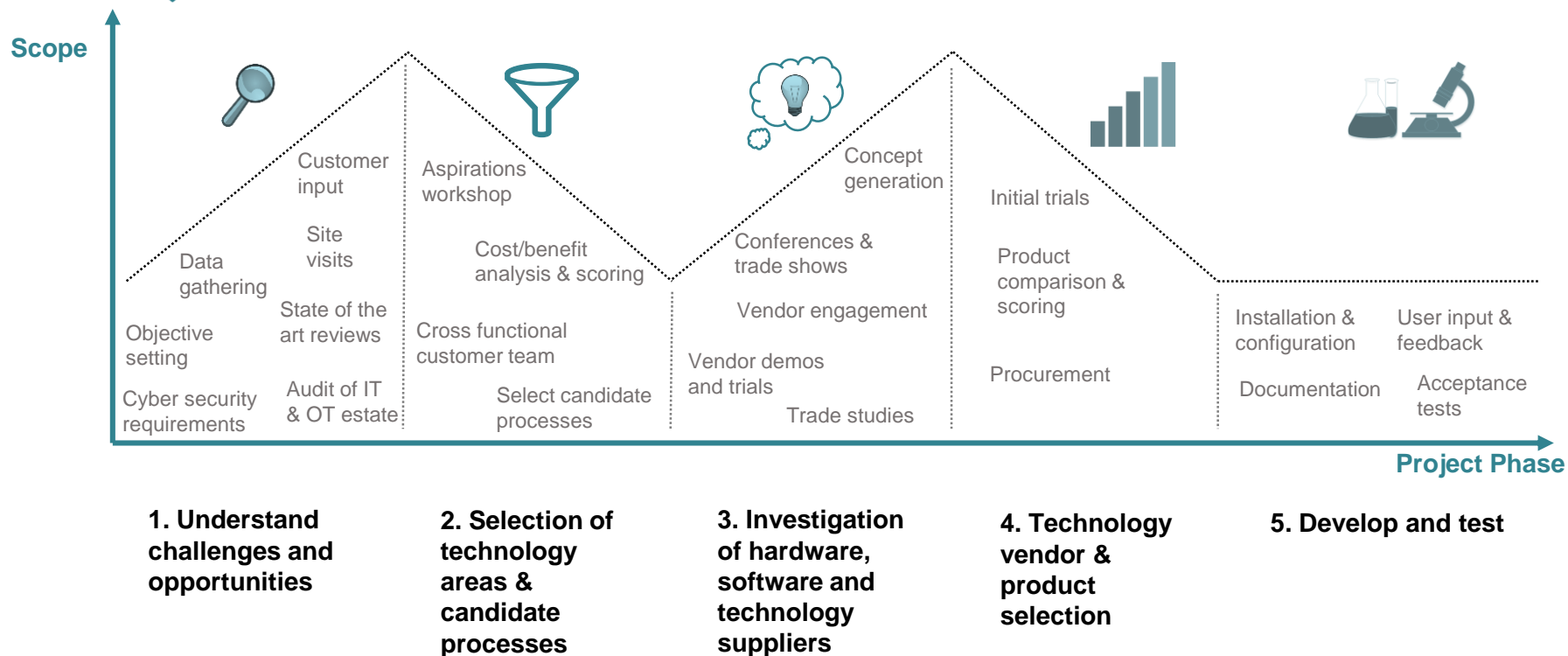


WP4: Brilliant Factory

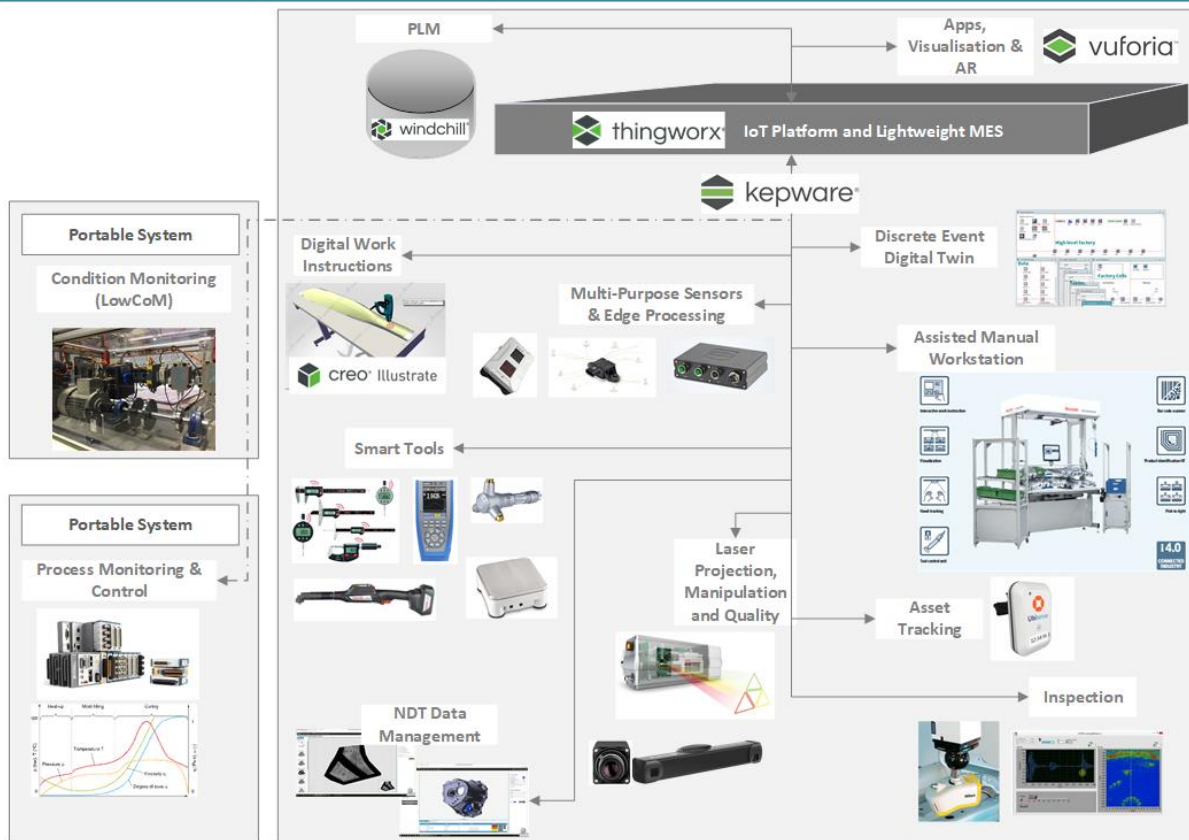
Focus: New facilities that demonstrate leading digitalisation capabilities



DIGIPROP WP4 DEVELOPMENT PROCESS



DEMONSTRATION CELL TECHNOLOGIES



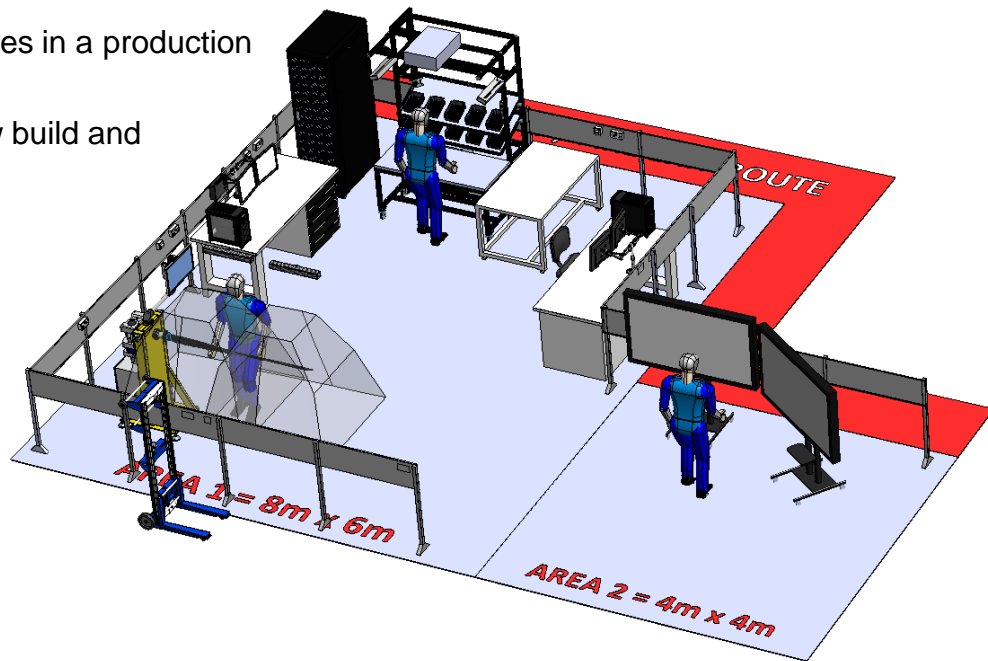
DEMONSTRATION CELL VALUE

Industrial Customer:

- Test competing options for hardware/software/architectures in a production relevant environment
- Uncover integration difficulties off the critical path for new build and without affecting production
- ROI estimates before purchasing full scale HW/SW
- Operators and managers feedback
- Training of operators in new processes

Vendors:

- As an applied demonstration of HW/SW capabilities







**What does your
revolution look like?**

DIGITAL MANUFACTURING

SCALE AND COMPETENCIES

Over 150 digital manufacturing engineers

Diverse Skills Range

Industrial Experience



Computer Scientists
Systems Engineers
Physicists

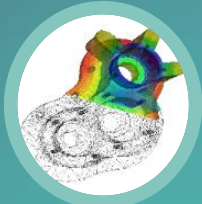
Mechanical Engineers
Controls Engineers
Mathematicians

Consumer Electronics
Aerospace
Automotive
Construction

Industrial Automation
System Integration
Oil & Gas



DATA &
INFORMATION
SYSTEMS



PHYSICS
MODELLING



BUSINESS &
FACTORY
OPTIMISATION



ADVANCED
VISUALISATION
SYSTEMS



METROLOGY
& NDT



ROBOTICS &
AUTONOMOUS
SYSTEMS



CONTROLS &
CONNECTIVITY

Several demonstration platforms and testbeds

In partnership with

**MADE
SMARTER**

mtc
Manufacturing
Technology Centre

DIGITALISING MANUFACTURING CONFERENCE 2019

Making Digital A Reality

4 - 5th NOVEMBER

MTC, COVENTRY

REGISTER NOW

WWW.THE-MTC.ORG/DIGITAL2019

#MakingDigitalAReality

#MTCdigital19



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Thank you
Lina.Huertas@the-mtc.org

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High Value Manufacturing