



BABCOCK

*The ingenuity of our people
creates endless possibilities*

We aspire to be the most
trusted and valued
support services company

From Innovation to Implementation

Bert Holt | 21/02/23

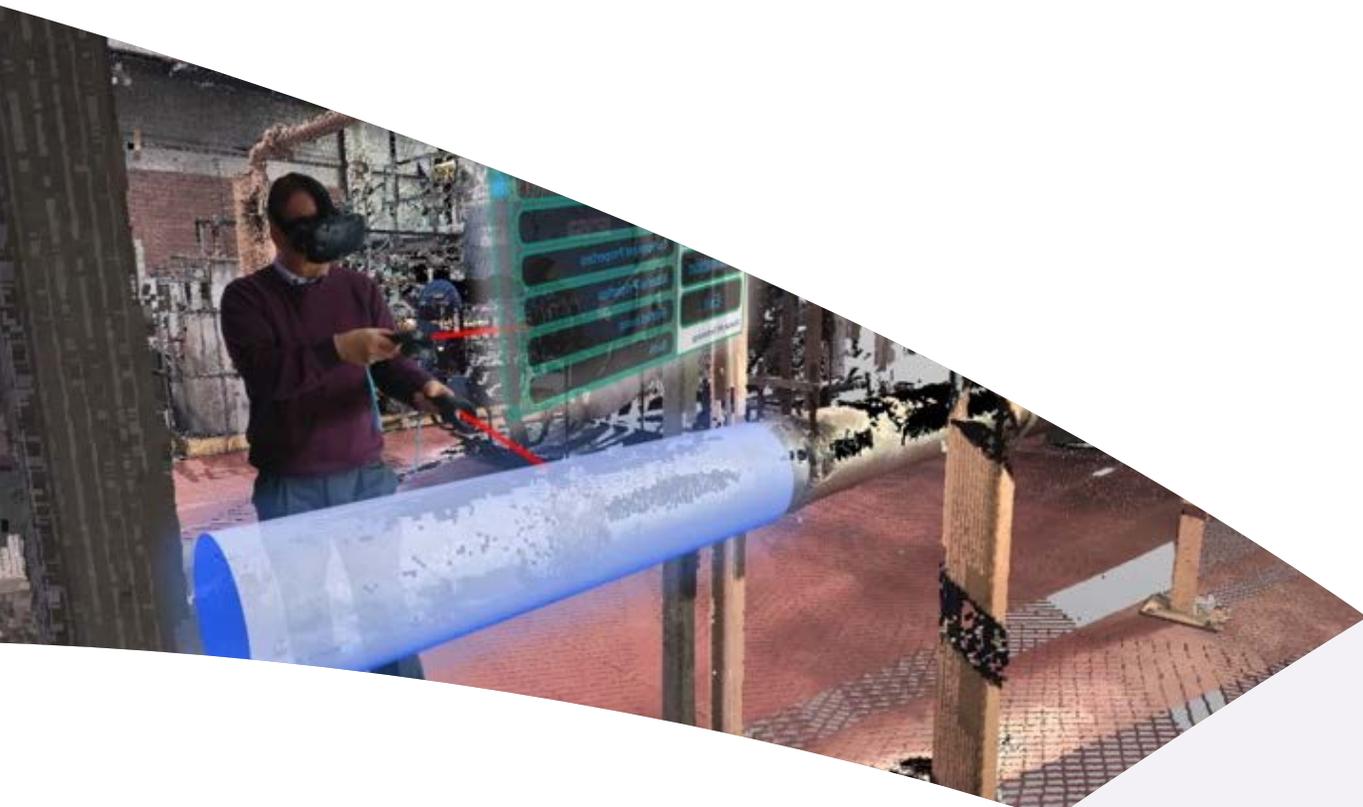
altradbabcock.com



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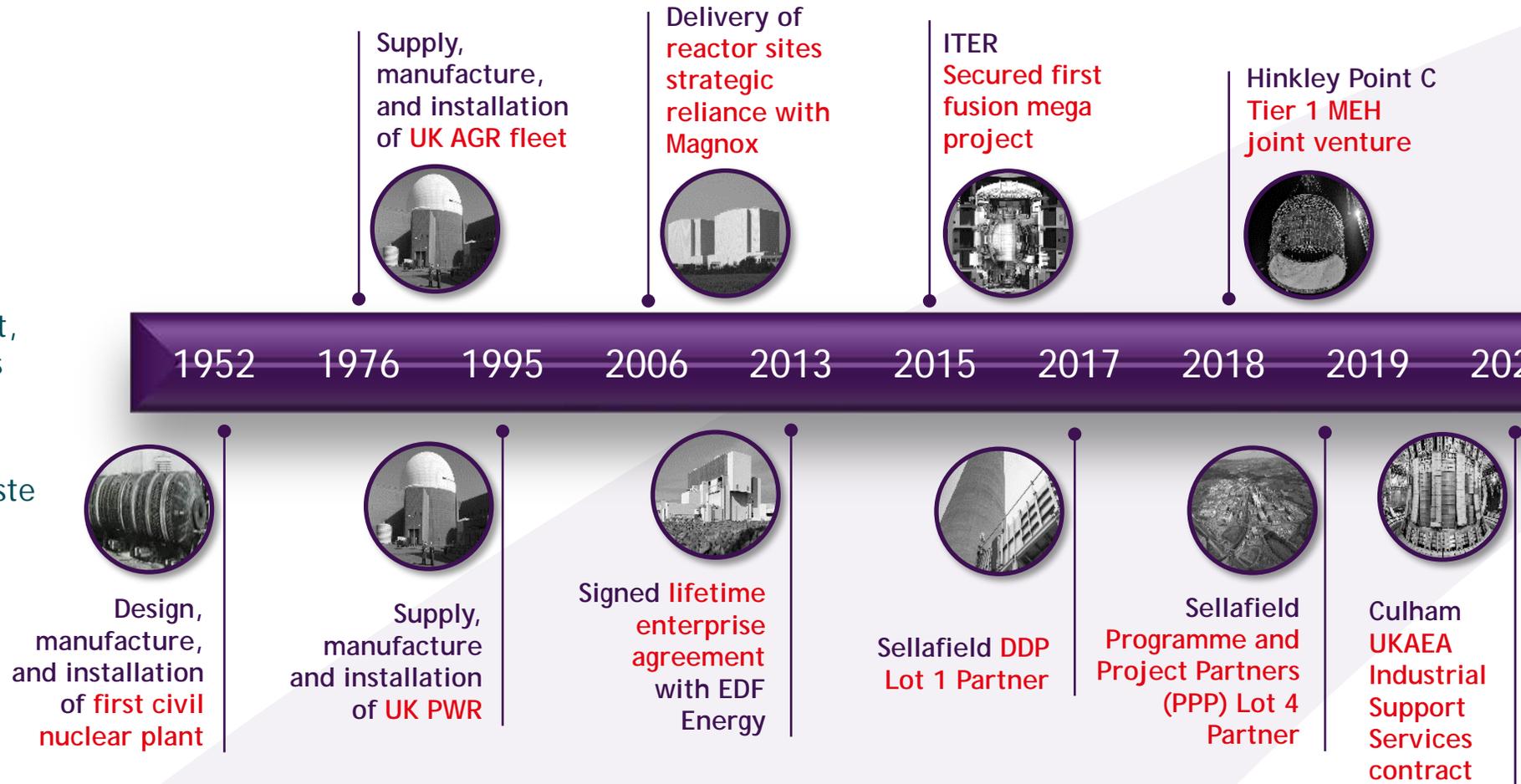
Agenda



- Altrad Babcock Nuclear Heritage
- Strategy Drives Innovation
- Challenges to Innovation
- Implementation
- Conclusion

Altrad Babcock Nuclear Heritage

- Nuclear New Build
- Operational Plant Support, Maintenance and Outages
- Plant Life Extension
- Decommissioning and Waste Management



Introduction to Altrad Babcock Asset Management

Safely supporting customers manage the entire lifecycle of their assets of innovative technology and engineering solutions.



Acting as trusted advisors and providers of innovative technology and engineering solutions.

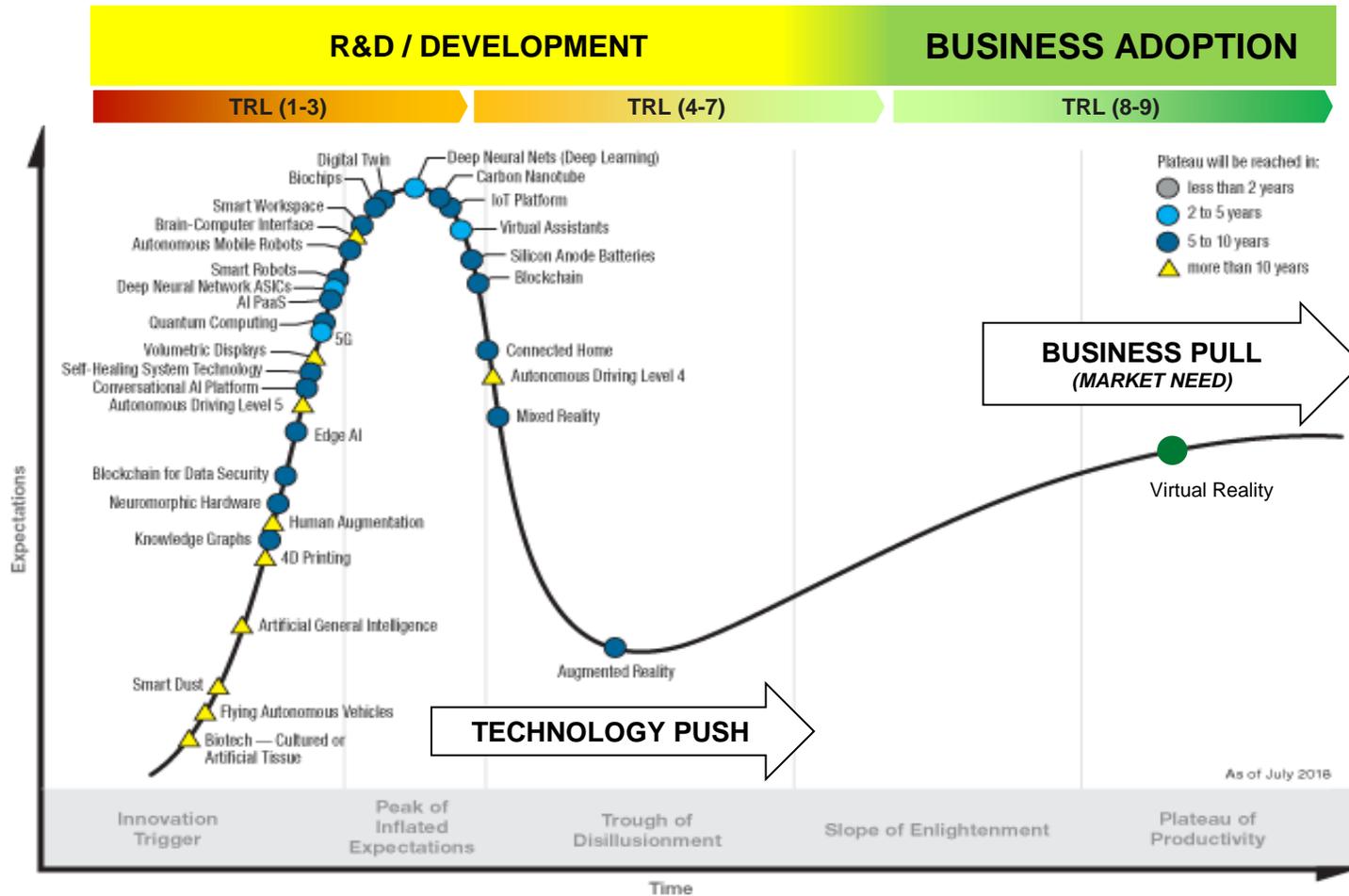
Working across the **Nuclear, Fusion, Offshore, Thermal and Future Energy Markets**, providing strategic recommendations and technical engineering support to optimise asset performance and mitigate commercial and operational risk.



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Strategy Drives Innovation



FOCUS



* TRL : Technology Readiness Level

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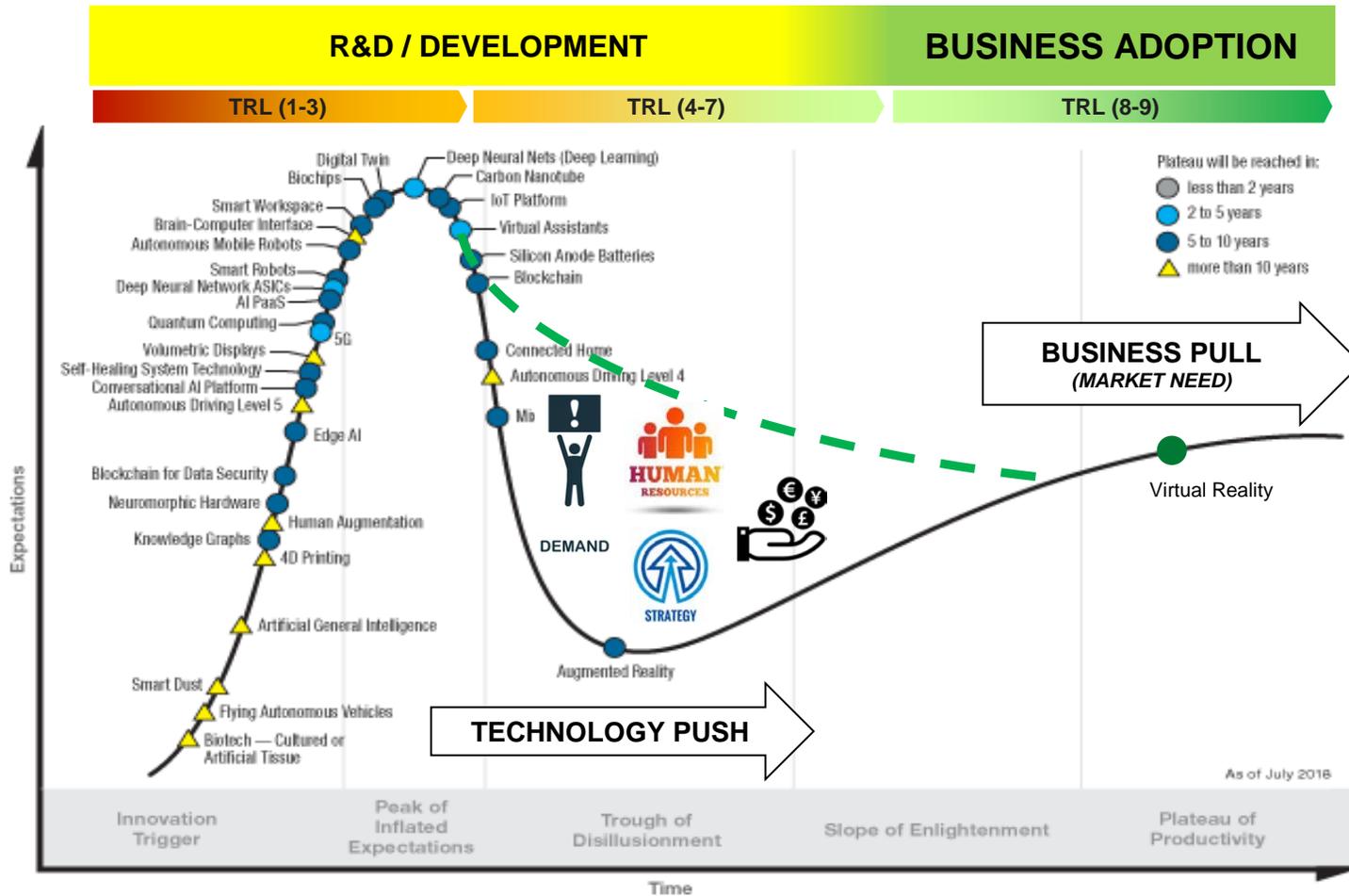




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Strategy Drives Innovation

The Triple Helix: Aligning policy, research needs and industry delivery



ADVANCED NUCLEAR RESEARCH CENTRE

<p>PROVIDE READY TO USE TOOLS</p> <p>REDUCE RELIANCE ON 1-2 INDIVIDUALS</p> <p>VALIDATED AI MODELS WITH DEPLOYMENT ROUTES</p> <p>IMPROVED TRANSLATION OF TECHNOLOGY, ENABLE ROI</p>	<p>DELIVER BASELINE CAPABILITIES Translate / implement / increase robustness</p>	<p>ACTIVITIES PROPOSED</p> <ul style="list-style-type: none"> Increased joint activity of translation eg workshops Growth of technical delivery team (in key areas) 	<p>IDENTIFIED BY: Bruce Doosan-Babcock Cavendish</p>
<p>ENABLE JOINT /ACTIVITY / SUPPORT TO CUSTOMER ACCESS TO NEW OPPORTUNITIES</p> <p>DATA PIPELINES, AI DEVELOPMENT TOOLS & COLLABORATION ALIGNED WITH INDUSTRY APPROACHES</p>	<p>ADVANCE CAPABILITY PWR, Defence, Decom focus Solutions for AMR / SMR and Fusion markets</p>	<p>ACTIVITIES PROPOSED</p> <ul style="list-style-type: none"> Support Development of remote operations technology Data pipelines, AI development tools and development/collaboration platforms aligned with industrial partners In house infrastructure for handling large data pipelines 	<p>IDENTIFIED BY: Bruce Doosan-Babcock Cavendish</p>
<p>R&D FOCUS ON THE EVOLVING INDUSTRIAL LANDSCAPE</p> <p>BROADER DIGITALLY ENABLED CAPABILITIES</p>	<p>EXTEND CAPABILITY BASE Refocus AGR expertise to AMR, SMR, Decom, EPR, Defence</p>	<p>ACTIVITIES PROPOSED</p> <ul style="list-style-type: none"> Extend planning focus beyond continuation of current themes Enhance / develop capabilities in areas (eg Advanced testing, Fusion Materials expertise, Novel Inspection Techniques, Remote Operations, Robotics Deployment, Digital Analytics Solutions, Decommissioning technologies) Broaden capability portfolio. Areas to consider include: Fusion materials, data visualisation VR /AR, Digital Engineering and Design, Data driven planning (eg of decommissioning), digitally enhanced characterisation, Adv Manufacturing (for one-offs), data architectures, codification of knowledge 	<p>IDENTIFIED BY: Cavendish Doosan-Babcock</p>
<p>UNDERPIN FUTURE POSITION OF NUCLEAR INDUSTRY</p>	<p>ESTABLISH NET ZERO CREDIBILITY Underpin nuclear industry role in net zero CO2 energy</p>	<p>ACTIVITIES PROPOSED</p> <ul style="list-style-type: none"> Role of nuclear in hydrogen and synthetic fuels economy Hydrogen storage Carbon-focused nuclear Carbon life-cycles in nuclear Carbon embodiment in nuclear (including developing methods to assess embedded carbon in nuclear construction and manufacture) Association with circular economy 	<p>IDENTIFIED BY: Bruce Doosan-Babcock Cavendish</p>

Digitalisation is Sector-Agnostic

Data enables digital solutions to streamline decision-making using mathematical algorithms to inform humans and machines on past, current and future states. The applications can be anywhere ...

Data Capture



Pressure, temperature, flow-rate, stress/strain, material properties, gas composition

Data Stored



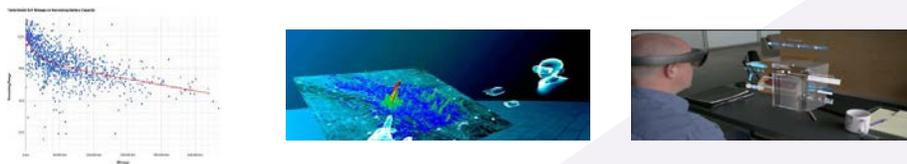
Data storage driven by quantity, security needs and urgency of access

Data Analysed



Modern learning methods improving but experience and application-specific data needed

Data Visualised



Visualisation technology common but applications are in context with sector

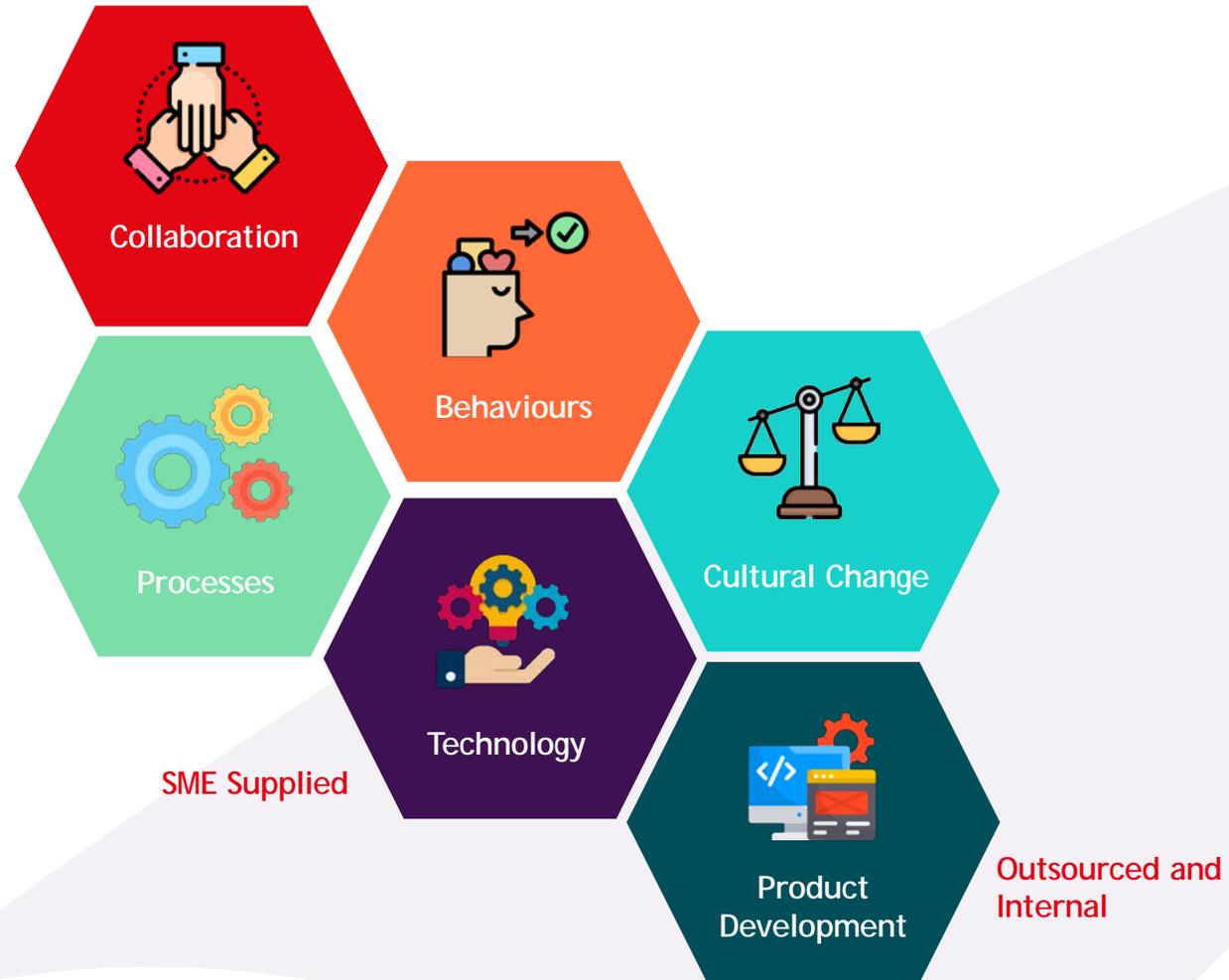
Data Outcomes



Dashboards and reports providing context, enabling human, semi/fully automated decisions

Challenges to Innovation

*It is not all about
shiny new tools!*



Digital Solutions Enable Transformation - but present Challenges!

DIGITAL



DIGITAL TRANSFORMATION

Delivering internal operational effectiveness through automation and optimisation of processes, extracting value from internally generated data

EFFICIENCY + BUSINESS INSIGHT
(increased EBIT)



DIGITAL SOLUTIONS

Development of customer-driven solutions offering decision support and enhanced insight, leveraging customer, vendor and public data

EFFICIENCY + PRODUCT INSIGHT
(increased margin) (increased order intake)

Implementation Examples

Close collaboration with ANRC allows Altrad Babcock to jointly develop and deploy novel solutions for industrial problems



ANRC support to Altrad Babcock Industrial Opportunities

- NDT Alignment Development for PWR Nuclear Application
- Header Inspection Tool for HRSG Headers and Tubes
- Robotically Deployed Cleaning, Eddy Current & Dye Penetrant Inspection System for Nuclear Plant
- Improved Detection of Defects in Remote Visual Inspections of Nuclear Power Plant

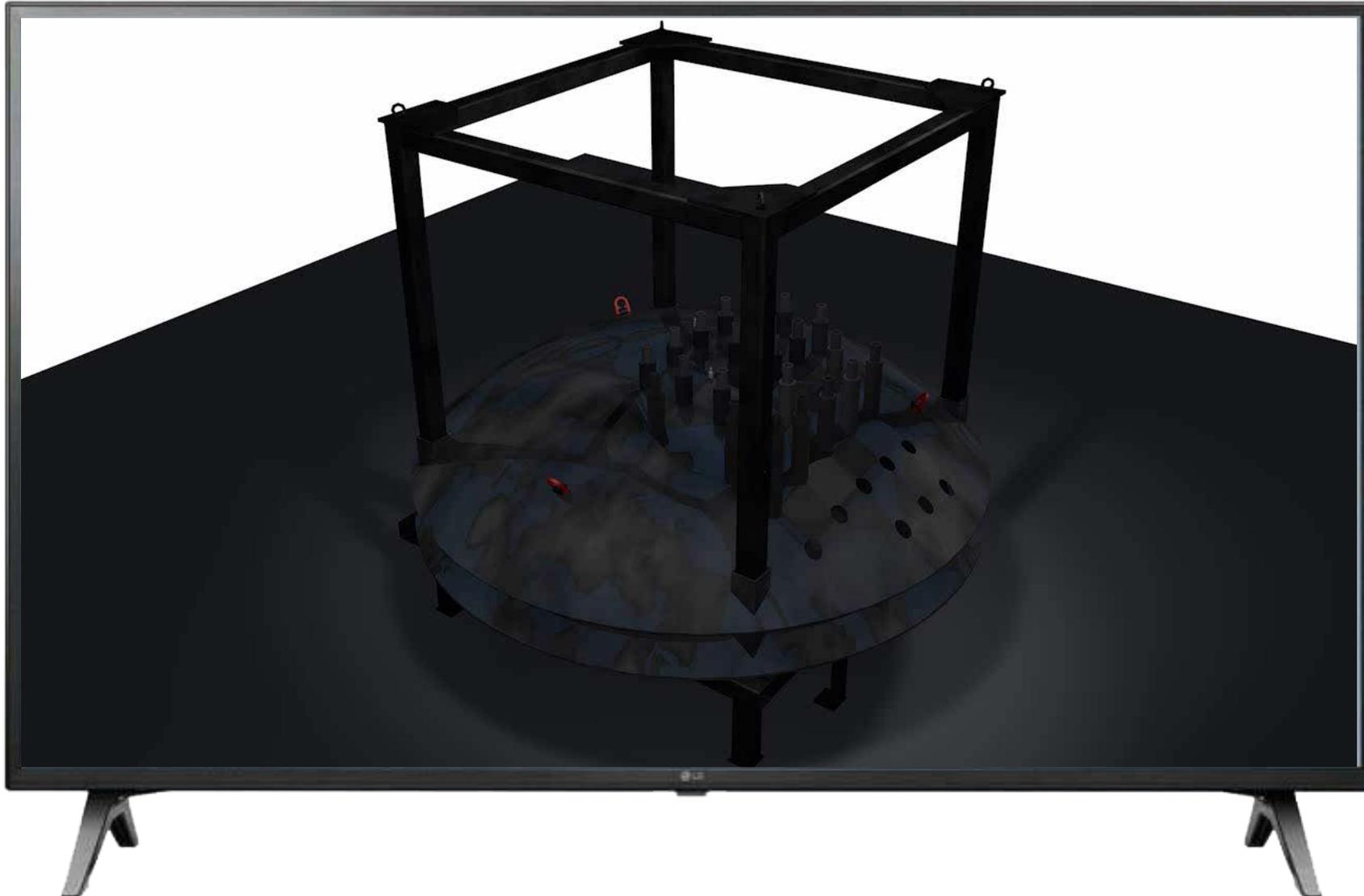




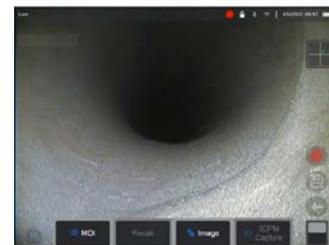
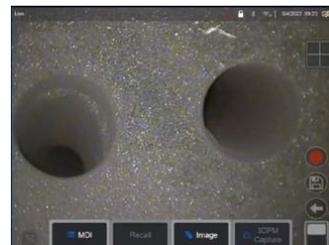
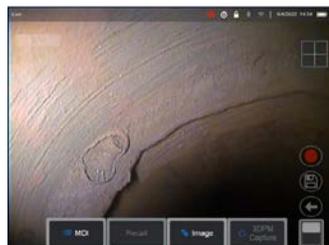
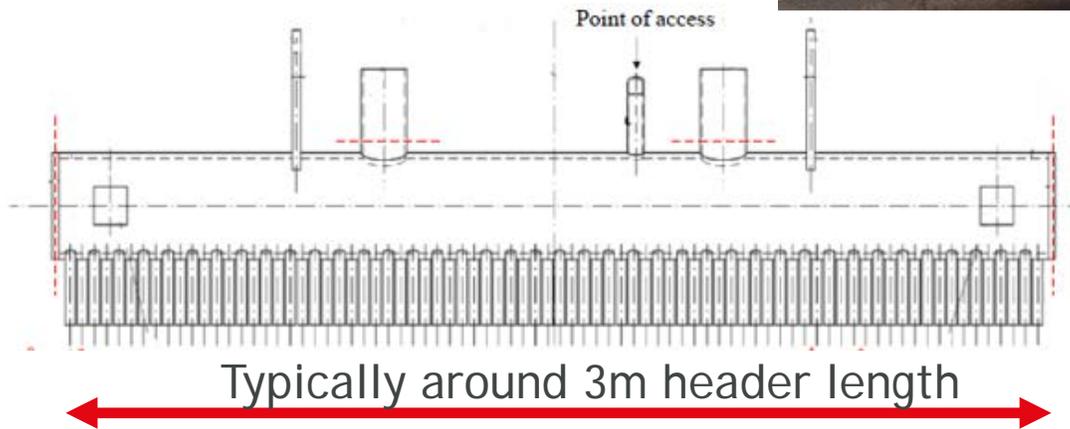
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NDT Alignment Development for PWR Nuclear Application



HRSG Header Inspection Tool



Ability to inspect up to 8m
down tubes

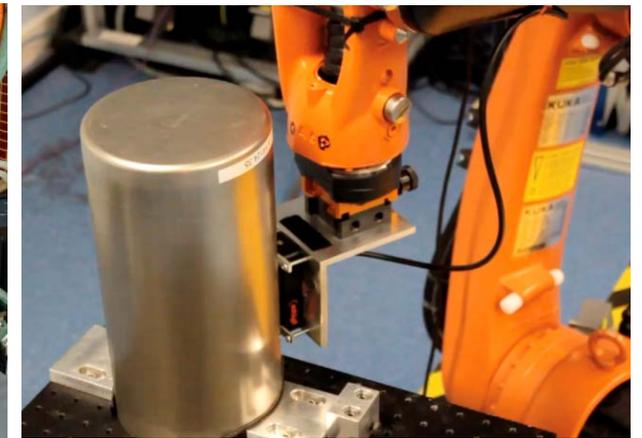
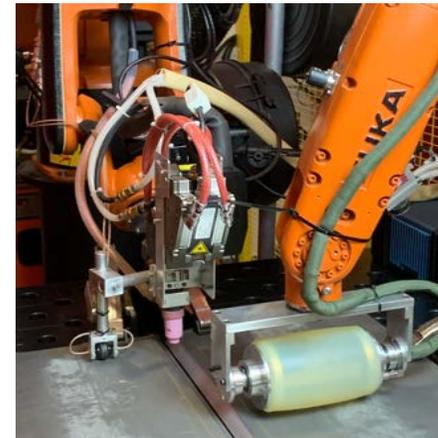
ANRC Inspection & Welding Technology Development

AWESIM Collaboration jointly develop disruptive manufacturing technology



Automated Welding Equipment and System for Inspection and Monitoring (AWESIM)

- Real-Time In-Process Ultrasonic NDE
 - Phased Array RollerProbe
 - Angled Weld Inspection
 - Dry-Coupled
 - High-Temperature Compliance (350 Deg C)
 - In-Process NDE Imaging
 - Thermal Distortion Compensation
 - Partial-Groove Region-of-Interest Masking
 - Automated Geometry Thickness Compensation
 - Innovative signal T/R approaches for EM filtering
- Automated Inspection Approaches
 - Multiple Modalities (PAUT, ECA & Visual)
 - Automated Path Planning & Defect Detection
 - Synchronised Sensor Data & Pose Capture



In Conclusion



- Innovation is a Critical Part of the Government's Industrial Strategy and the Drive to Net Zero.
- Change in Traditional Business Operation Drivers Needs to be Embraced to Capitalise on Digital Innovation
- Embracing Innovation to Improve Implementation
 - Enhances staff satisfaction
 - New products aligned to market needs
 - Enhances Brand





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Thank you
for your
time !