



AI for Industrial Control UK delegation to Nuremberg during SPS 2024 supported by Bayern Innovativ

10-15 November 2024

AI focussed on industrial control technologies take advantage of phenomena at the atomic scale to find new ways to manipulate information. These technologies will one day make it possible to solve complex problems that are currently impossible to solve with even the most powerful high-performance classical computer and will allow us to reach entirely new frontiers in sensing, timing, imaging and communications. This sector already offers possible solutions to some of our greatest societal challenges and, perhaps most excitingly, offer future capabilities that are yet to be explored. They will improve lives, drive economic growth and create jobs, and make us more secure. Those countries that are amongst the first to develop AI focussed on industrial control technologies, and who use them widely across the economy, will have vast advantages in terms of productivity, economic growth, health, sustainability, and national security and resilience, not least because of the anticipated ability of computers to undermine cryptography used to secure the internet. The UK and Germany were early movers in the AI focussed on industrial control sector.

The delegation of 11 ambitious UK companies will use this visit to Nuremberg during SPS 2024 as an opportunity to engage with research organisations, hear cutting-edge ideas and network with German companies who share a similar interest for collaboration with the support of Bayern Innovativ as part of the Enterprise Europe Network. The combination of commercial expertise, creative excellence, and technological innovation across the two countries can generate a significant value add for companies operating in both markets and develop strong collaborations.

If you have any questions concerning the mission or you would like to get in touch with the UK-companies, please contact:

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Overview of Companies

Digital Transit Limited



We specialise in advanced sensor technology and AI-driven solutions for industrial automation. Our core innovation lies in On-Rotor Sensing (ORS) systems, which are designed for real-time monitoring of rotating machinery. The ORS solution enhances the efficiency, reliability, and longevity of industrial equipment by providing precise data for condition monitoring, fault detection, and predictive maintenance. Our expertise extends across a range of industries, particularly in the manufacturing sector, where we focus on optimising the performance of CNC machines.

Our offerings include:

- **On-Rotor Sensing (ORS) Technology:** A cutting-edge system that integrates sensors directly onto rotating components, enabling high-precision data capture and real-time condition monitoring.
- **AI and Machine Learning:** We leverage advanced AI algorithms and machine learning models to analyse data, predict equipment failures, and optimise maintenance schedules.
- **Integrated Software Solutions:** Our data analytics platforms provide actionable insights for improving operational efficiency and reducing downtime.

Collaboration and Partnership Interests:

During our visit to Germany, we are seeking partnerships in:

Collaborative R&D: Working with AI and automation technology specialists, research institutions, and manufacturers to co-develop innovative solutions in industrial control.

Strategic Alliances: Forming partnerships with companies in the automation and manufacturing sectors for joint ventures, technology integration, and market expansion.

Industry Networks: Engaging with stakeholders at events like the SPS Smart Production Solutions Conference to explore synergies and collaborative opportunities in smart manufacturing and Industry 4.0.

Our goal is to establish relationships that drive forward innovations in industrial automation, leveraging AI and sensor technology to build more resilient and efficient manufacturing ecosystems.

Emerging Data Technologies Limited



At Emerging Data Technologies Ltd (EDT), we don't just analyse data - we embrace your most pressing challenges as our own. We are more than data scientists; we are your dedicated partners in your journey towards breakthrough solutions.

EDT products and services include:

- 1) PerceptiQ – a family of machine learning models that predict quality failures ahead of time, allowing machine operators to step in and take mitigative action. Aimed at the precision manufacturing sector.
- 2) Exploratory and proof of concept projects via our AI research lab, centred around AI and machine learning.
- 3) Bespoke AI & machine learning system builds, solving your most pressing problems.
- 4) Wrap-around support, guidance and upskilling of your in-house capabilities on a data science, AI and machine learning front.

We are seeking partnerships with organisations who align with any of the following:

- 1) Are working within the precision manufacturing sector to connect, collect and visualise machine data.***
- 2) Have collected (or have access to) a dataset and want to unlock its full potential value.***
- 3) Have an interesting problem they think data science, AI or machine learning could solve.***
- 4) Want to explore the art of the possible regarding data science, AI or machine learning.***

Engtech Analytics Limited



Digital twin specialists for asset integrity. Focussing on data visualisation and automated simulations for pipeline integrity management. Connecting data sets and distilling them through engineering simulations we reduce asset risk and maintenance expenditure allowing clients to focus on the highest risks at a more granular level than manual processes.

Our solution includes a scalable web-based data repository for pipeline data and automated pipeline engineering simulations based on 'as built data' and industry standards. We are not just storing data and making it accessible to users, we distil it into actionable items based on engineering knowledge.

We are seeking partnerships with companies in the value chain including pipeline operators, pipe mills, EPCs, and pipeline engineering consultancies, to take advantage of the scalability of our solution.

Additionally, we are seeking collaboration with universities researching pipeline failure mechanisms for hydrogen and CO2 transportation to enhance our engineering simulations with the latest research.

Enverse Limited



Enverse offers a fully customizable, no-code industrial SaaS platform that revolutionizes the integration and application of AI in industrial environments. Our technology simplifies deployment of industrial AI applications, making AI accessible and actionable for a wide range of industrial applications. Our software processes 5 million data points daily by companies in manufacturing, aviation, energy, and facility management.

Our Products: Enverse Edge, Enverse Sky Bridge, Enverse Insight

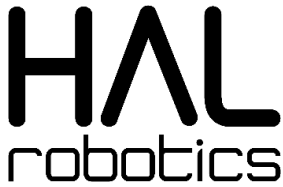
We provide complete engineering industrial digitalisation services, including PLC programming, communication system architecture design, edge and cloud data processing, data analytics, construction of digital twin models, development of AI/ML models, and project management.

We are seeking long term delivery and innovation partners (factory owner, system integrator, or consultant) to localise and deliver full suite of Industrial 4.0 solutions in Germany, including:

- ***Energy and Carbon Management***
Integrate multiple low carbon energy sources, forecast energy costs/risks, and automate energy dispatch (with battery) to trade with national grid.
- ***Asset Predictive Maintenance***
Low-cost manufacturing asset digitalisations, rapid implementation of digital twin and predictive maintenance technologies in production environment.
- ***Manufacturing Optimisation***
Using forecasted manufacturing workload to reverse calculate and optimise manufacturing capacity, thereby reducing inventory risks and capital costs.

We have 6 R&D innovation projects across Europe, Africa and Asia. We are collaborating with more than 40 organisations across multiple consortiums.

HAL Robotics Limited



HAL Robotics is an innovative London-based, Industry 5.0-ready, robotics software company specialised in human-robot collaboration, and the automation of variable and challenging tasks.

With its human-centric approach, HAL Robotics' software gives operators the ability to combine their expertise, process knowledge and decision-making with the speed, repeatability and tirelessness of robots, pushing the boundaries of industrial automation by transforming any robot into a truly collaborative and adaptive machine.

Our no-code software, decode, focuses on giving operators the agency to adapt a robot's task without programming. They are presented with combined work instructions which ask the operator for their input where and when it's required, and automatically regenerates the robot's program, allowing exceptional flexibility with minimal training. decode can be adapted for just about any process, from finishing to additive, to inspection, to welding. It leverages generative robot toolpaths, derived from data sources like 3D scans, CAD models or text in a database. This means that when incoming data changes the robot program does too, which gets validated almost instantly by the cell's digital twin to ensure any potential errors are caught before runtime.

We are seeking partnerships with a range of companies to identify, through collaborative projects and installations, where there is a potential for additional, value-adding functionality in our software that can make best use of advances in AI:

- Manufacturers with processes in their production that have frequent variations (either because they are made to order, or the process is reliant on another imperfect process e.g. polishing paint defects or finishing castings).

- Manufacturers with processes which require regular operator input and therefore have been difficult to automate.

- System Integrators with experience of either of the above, or who may have had to turn down projects due to either of the above.

- System Integrators, Machine Builders or OEMs who are keen to explore standardised robotic systems which need to be flexible and offer operators guided workflows (potentially supported by AI for adaptability, natural interactions and enhanced quality).

Heronic Technologies Limited



Heronic Technologies delivers innovative, accelerated, AI solutions for high-throughput or low-latency industrial applications. Our secure edge computing technology fits many use-cases, including industrial vision applications such as automated inspection, asset tracking and hazard detection, as well as predictive maintenance and robotics control.

Our solution is designed to accelerate various AI tasks including, but not limited to, object detection, semantic/instance segmentation, anomaly detection, pose estimation, and human action recognition. Our technology leverages the latest in FPGA, GPU and Microcontroller devices.

We are currently seeking the following partnerships to grow our business:

- ***Application Collaborators: We are looking for companies with real industrial-based AI applications that are struggling to deploy their application in a real-time environment. We are interested in finding projects in industrial vision.***
- ***Sensor Manufacturers: We are looking for sensor manufacturers who want to improve on their AI offering by creating integrated solutions for AI compute.***
- ***Device Distributors: We are interested in finding distributors of edge computing hardware and sensors to partner with to help them provide better solutions for their customers.***

Luffy AI Limited



Our mission is to unleash industrial performance and enable tomorrow's sustainable manufacturing and robotics by developing revolutionary adaptive AI control systems.

To us, AI means Adaptive Intelligence. Just as nature adapts and builds resilience, we believe control systems should be always learning and adapting to what's happening around them. We train optimal, high speed AI control systems that can be safely deployed into industrial equipment at the edge.

We have created a revolutionary AI framework which is based on neuroplasticity. We use this framework technology to train optimal closed loop AI control and optimisation systems. The neuroplasticity allows the AI to continuously achieve optimal performance by continuously adapting to real-time variations in the equipment, process and environment.

Adaptive Intelligence "adapts at the edge" by using real-time feedback to continuously retrain models in the runtime environment based on new data and user adjusted goals. It responds quickly to environmental changes and dynamically builds up its own training data. It also responds to challenges that were not foreseen when the model was originally built.

We are seeking to collaborate with partners in two key areas:

Intelligent VFD Motor Control: We assist Variable Frequency Drive (VFD)/ Inverter manufacturers to create smarter products by including a few powerful AI algorithms in their firmware. Our AI controllers are efficient, adapting quickly to load variations and system dynamics, eliminating the need for manual tuning. We hope to meet with R&D leaders at companies like SEW-Eurodrive, Yaskawa, Kollmorgen, Beckhoff and Bosch Rexroth in order to discuss technology trials.

Furnace Optimization (Steel and Aluminium): Our nearly complete suite of AI products helps improve furnace operations. Our solutions include tools like the Operator co-pilot, Schedule Optimiser, Furnace Optimiser and Furnace expert, which all help increase production, improve energy efficiency and reduce waste. We aim to collaborate with companies like Speira, Constellium, Hydro Aluminium, Andritz metals and SMS-group to showcase our AI capability and begin trial projects

NoMAD Limited



NoMAD (Novel Materials Architecture + Design) are a Northern Irish-based startup specialising in the parametric design, novel material formulation and digital fabrication of modular precast and 3D printed low carbon and net-zero concrete landscaping components. NoMAD's rapid setting, Ultra High Performance Concrete (UHPC) is made with byproduct and waste reducing virgin resource consumption and CO2 emissions by up to 90% to deliver beautiful, durable and resilient modular construction components.

Our vision is to support a global distributed network of precast and 3DCP fabrication partners from our Northern Irish base with the designs and formulae they need to manufacture high-performance, high quality, net zero concrete components using their local byproduct and waste.

We are seeking:

- 1) AI and ML experts with experience of real time local server-based automation and optimisation***
- 2) Specialist suppliers of heavy-duty photonic and electronic sensors including multispectral imaging, MWIR presence detectors and distance sensors, moisture and pH sensors and strain gauges.***
- 3) Control integration system to receive and action feedback/signals from the sensors and AI to an ABB Robotic arm with an IRC 5 controller.***

Universal Atmosphere Processing UK Ltd



Universal Atmosphere Processing (UAP) is a leading atmospheric engineering innovation focusing on capturing and converting greenhouse gases into valuable resources.

Our flagship technologies – the Electromagnetic Plasma Separator (EMPS) and Atmospheric Processing Plant (APP) – work together to extract and separate atmospheric gases efficiently. We provide sustainable solutions for high-emission industries such as energy, manufacturing, aerospace, and maritime, transforming harmful emissions into usable products like synthetic fuels, industrial chemicals, and purified air.

Products and Services:

- **Electromagnetic Plasma Separator (EMPS):** This device uses advanced technology to capture and separate greenhouse gases efficiently.
- **Atmospheric Processing Plant (APP):** A scalable, modular system that houses the EMPS, capturing and converting atmospheric gases for Earth and space applications.

Capabilities:

- **Advanced Atmospheric Engineering:** Large-scale atmospheric management in extreme environments, including space.
- **Carbon Capture and Utilisation (CCU):** Converting greenhouse gases into valuable resources contributes to a circular economy.
- **Space Technology Integration:** Supporting life support and resource utilisation in space habitats.

During our visit to Germany, UAP seeks collaborations in the following areas:

- ***AI Integration: Understand how we can control the efficiency of EMPS and APP through AI-driven process optimisation.***
- ***Industrial Process Optimisation: Collaborations with companies specialising in automation to integrate our technology into existing industrial systems.***
- ***Full Plant Automation: We aim to automate our plants with AI and robotics for autonomous, efficient operations.***
- ***Research & Development: Partnering with institutions and firms to co-develop next-generation atmospheric processing solutions focusing on space applications.***
- ***Sustainability Impact: Seeking partnerships to advance our mission of reducing global greenhouse gas emissions.***

Virtual Learning Factory



Virtual Learning Factory (VLF) is at the forefront of Industry 4.0, specializing in creating immersive training environments that bridge the gap between education and industrial applications. We focus on integrating advanced technologies such as Augmented Reality (AR), Virtual Reality (VR), Digital Twin applications, IoT, and Artificial Intelligence (AI) to transform the manufacturing and engineering sectors.

Our mission is to connect industrial processes with innovative training solutions that prepare the workforce for the challenges of Industry 4.0, optimizing productivity and minimizing risks across manufacturing sectors.

Core solutions:

- Immersive Training Platforms: VLF offers a unique platform that combines AR, VR, and Digital Twin technology to create adaptive and interactive industrial training modules. These modules simulate real-world scenarios to enhance operational efficiency and decision-making.
- Industrial Metaverse Integration: By integrating data from ERP systems, manufacturing execution systems, and shop floor data, our platform enables the creation of a comprehensive industrial metaverse. This environment supports real-time decision-making and operational insights.

Partnership and Collaboration Opportunities:

We are actively seeking collaborations in the following areas:

- ***AI and Industrial Control: Collaborative projects with companies who are providing AI-driven industrial control solutions and able to integrate with our industrial metaverse solutions to offer significant benefits.***
- ***IoT Integration: Partnerships with companies specializing in IoT to enhance the connectivity and data integration of our platform.***
- ***Digital Twin Innovation: Collaborations with technology providers to develop more accurate and detailed digital twin simulations that improve industrial training and process control.***

VLF envisions a future where industrial training and control systems are seamlessly integrated into an industrial metaverse, driving productivity, reducing errors, and fostering innovation across global manufacturing sectors.

Weeteq Limited



Weeteq is a deep tech startup based in Glasgow, Scotland, developing power and control system optimisation innovation, in a totally unique way. Our technology makes motors more productive and energy efficient, all without the need to deploy additional sensors/infrastructure. We do this by accessing and optimising existing operational data, directly within motor control and power circuits, at the microcontroller level, enabled by lean AI models and weeteq's patented innovation.

Our innovation virtually eliminates inefficiencies during torque and power transients, reducing energy and increasing performance whilst reducing motor stress and extending the life of all inverter drives and motors.

This technology is applicable to a broad range of industries and use cases. We have focussed our early commercialisation efforts on industrial automation and automotive markets and applications. Our initial efforts are focussed on electric motors and drives.

We are seeking partnerships with device and component manufacturers in the following categories:

- ***Electric motor drive manufacturers: Ideally VFD / VSD type drive manufacturers who are developing next generation drive technology. Co-development / co-creation opportunities welcome.***
- ***Power inverter manufacturers: Manufacturers involved in the data centre power distribution market. Validation of the worlds' first AI data centre power dispatching solution.***
- ***Automotive manufacturers & supply chain: Automotive manufacturers and their supply chain, interested in partnership opportunities to support the sustainable manufacture, use and service of all motor vehicles.***

Our interest in meeting those listed above would be to develop relationships and secure pilot project opportunities, developing into longer-term licencing opportunities.