INSPHERE

IONA™

Unlocking the true potential of industrial robots

Product Brochure

ACCURATE POSITIONAL AWARENESS FOR ROBOTS

IONA is a scalable network of sensors providing metrology-grade data for industrial robots.

Automated Robot to Part alignment
20x Faster alignment process

Improved robot performance
10x Increase in process accuracy

Continual process monitoring
100% Confidence through 24/7 monitoring

"IONA is a great example of some really exciting new technology that is coming to market that will help revolutionise the UK Manufacturing."

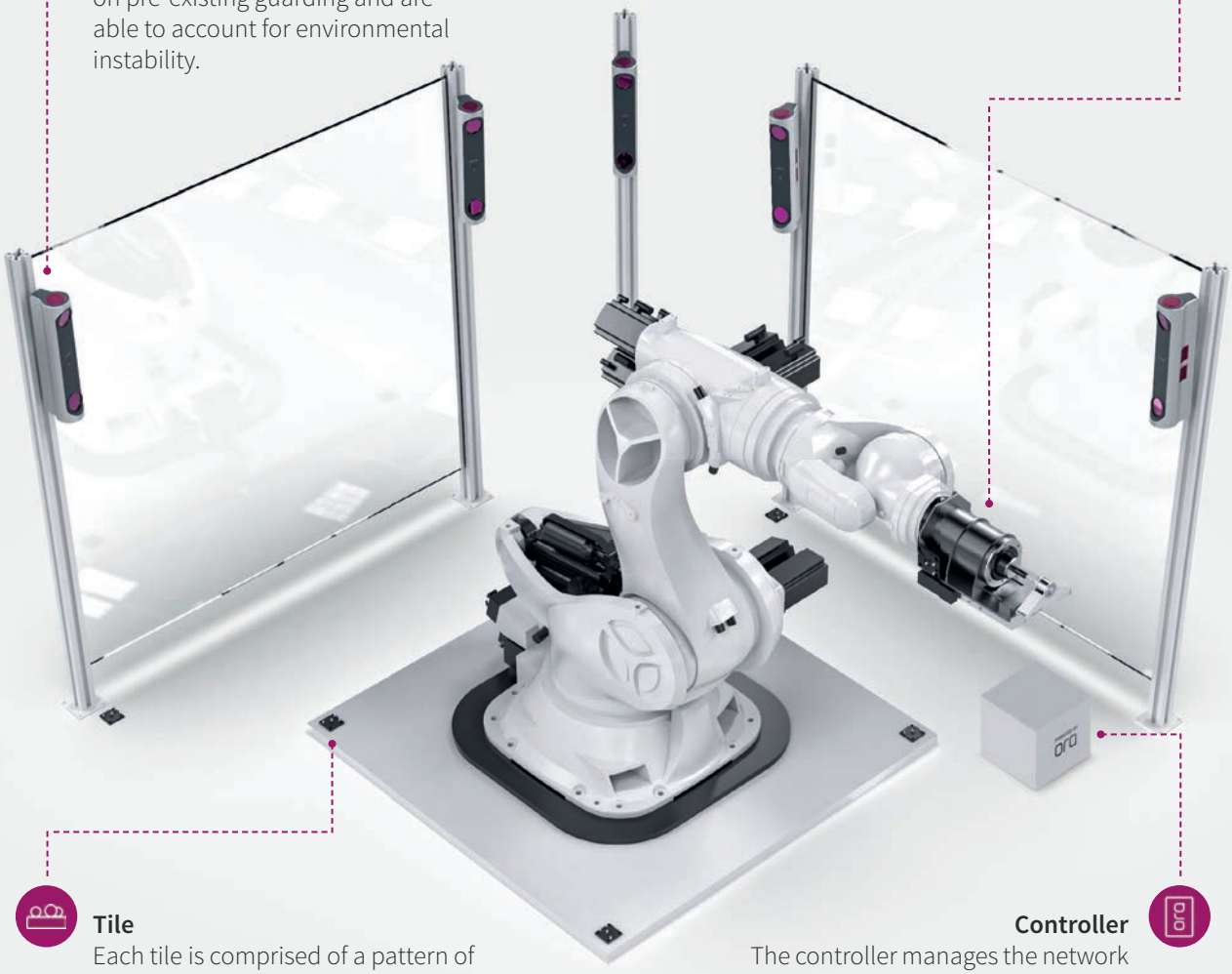
Andy Silcox – Research Director at AMRC CYMRU

A **NETWORK** OF **SENSORS**

IONA Nodes work as a permanently deployed network of sensors, simultaneously capturing live data from multiple points of interest - Robots, Fixtures, Datum features etc. By observing motion from multiple vantage points, accuracy is increased and line-of-sight issues are removed.

Node
Each node tracks the motion of targets in 3D within its field of view. It is robustly designed and is connected via a single data and power cable. Nodes can be mounted on pre-existing guarding and are able to account for environmental instability.

TCP Targeting
Discrete Targeting on the robot end-effector to monitor the position and the relationship to the work object.



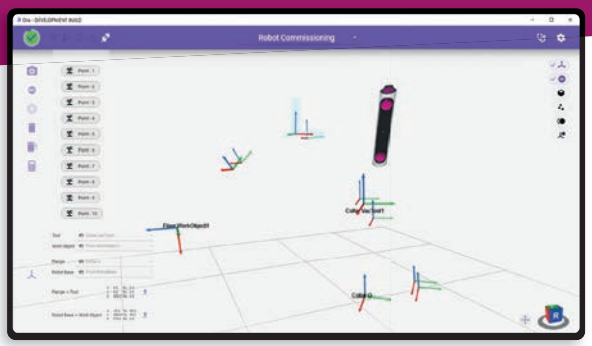
Tile
Each tile is comprised of a pattern of retro-reflective spheres. These tiles are located sparsely around the cell to provide a reference frame. They are also used to track additional points of interest such as: parts, fixtures and tooling. Each one is uniquely coded allowing the software to automatically identify the feature being tracked.

Controller
The controller manages the network of nodes, combining the data each node returns and calculating an accurate 6DOF position(s) using proprietary ORA algorithms. Data output is simplified so no specialist knowledge or bespoke programming is needed to utilise the data.

UNIQUE SOFTWARE: TURNING **DATA** INTO **ACTIONABLE INFORMATION**

POWERED BY ora

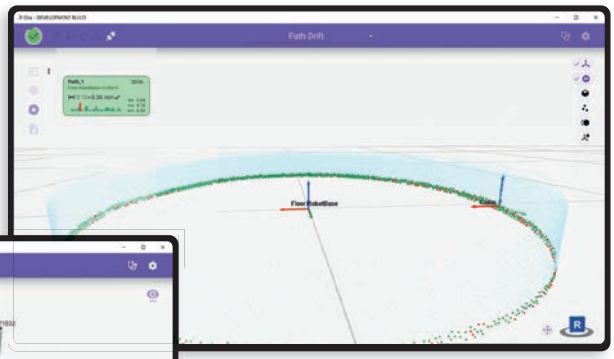
ORA is our software platform that powers our IONA Network.



ORA analyses the physical cell set-up, robot movements and fixture alignment, generating data that can then be compared to the program or simulation. Processes can then be updated, correcting for misalignment, inaccuracies and process variation errors.

Software features include:

- Verification of Robot Path
- Tool and Base Calibration
- Automated Fixture Alignment
- In Process Robot Correction



"We see IONA having an integral role in the future of advanced manufacturing."

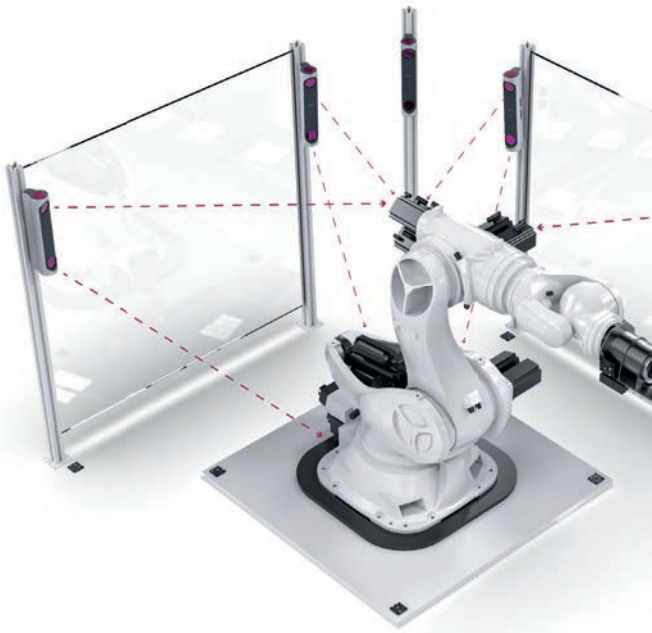
James Allum, Senior Manufacturing Research Engineer AMRC Cymru

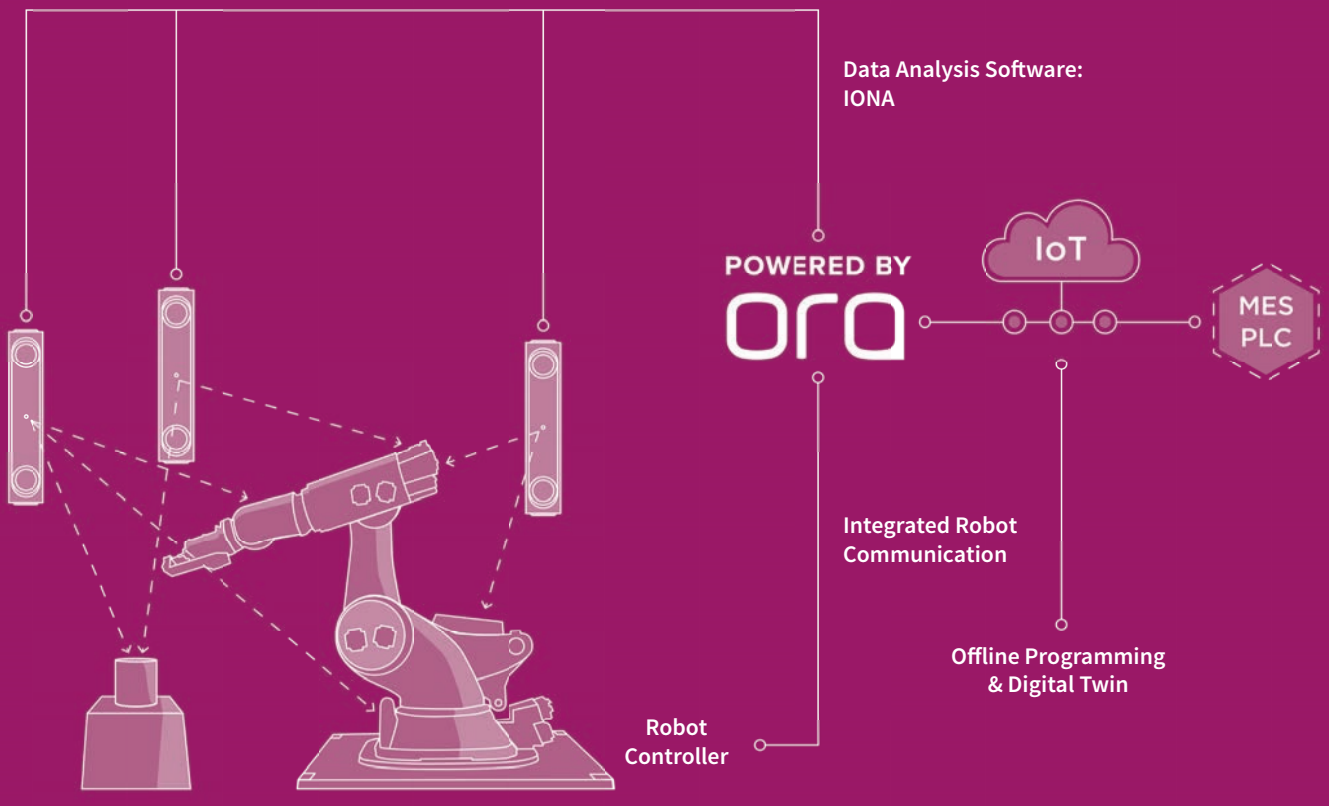
SEAMLESSLY **INTEGRATED** INTO THE **MANUFACTURING SYSTEM**

POWERED BY ora

Integration Features:

- Built-in integration with major robot OEMs, communicating in native programming languages such as KUKA KRL, ABB Rapid and Fanuc KAREL.
- Ability to operate as an autonomous 'black-box', fully integrated with the robot controller or cell PLC, providing data when requested by the robot program.
- Simple user interface with 3D environment and graphical display of the data generated.
- OPC-UA and MQTT communication protocols allowing data to be seamlessly input to MES platforms at a factory level.
- Ability to send data to advanced digital manufacturing applications such a digital twin or input to detailed SPC analysis.





MANUFACTURING **WORK-FLOW**

IONA can be used to enhance three key stages of manufacturing

Process Commissioning

Increased Speed of Set-up

- 15x Faster new program commissioning

Benefits

- Accurate robot alignment to cell datum and part fixture
- Increased consistency and traceability of program updates
- Reduced commissioning downtime
- Less scrap from commissioning activity

Process Performance

Increased Process Accuracy

- 10x Accuracy improvement
- 20x Faster alignment process

Benefits

- In-Process correction of robot errors
- Update fixture alignment each process cycle
- Enhanced process accuracy – consistent product quality
- Reduced cycle time – fully automated alignment

Process Control

24/7 Process Monitoring and Feedback

- 100% Process confidence

Benefits

- Enhanced process control - warning of process drift, eliminating scrap
- Data for predictive maintenance – reduced cost and downtime
- Process Feedback – live input to MES and digital twin

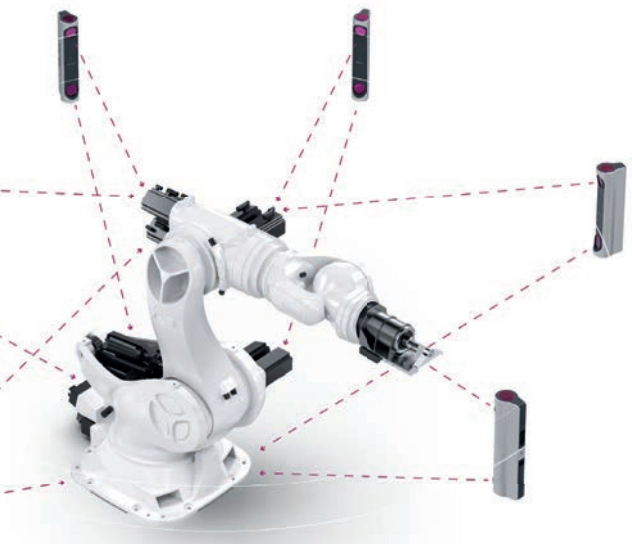
AN **INDUSTRY 4.0** ECOSYSTEM

Digital Twin
Validate the digital version of your manufacturing system and monitor performance 24/7, enabling the identification of trends and reacting with agility. Greater confidence can be placed in the digital simulations knowing that the digital model accurately matches the real environment and that any changes can be accurately implemented. Making these changes without manually intervening increases the system uptime and productivity, creating a truly flexible manufacturing system.

Predictive Maintenance
By continually monitoring the position of the robot end-effector in relation to the fixture or work-piece, IONA allows engineering to gain forward-looking insights to predict when maintenance is required.

Rapid, Automated Commissioning
Rapidly perform a physical dry run of the program, capturing data effortlessly with IONA and then using the ORA software to highlight the differences between the intended program and what happens in reality and in-process. The changes to correct the program can then be made at the click of a button.

IoT Connectivity:
Standardised communications protocols allow easy data exchanges with other devices in the ecosystem to create truly autonomous networks capable of carrying out complex tasks in the physical world.




SERVICE ACCESS ONLY

PRODUCT
SPECIFICATION

Node Level:

Dimensions:	118mm x 176mm x 605mm
Weight	6.5kg
Power Input:	24V, 2.5A (DC or POE)
Power Consumption:	60W
Effective Field of View:	58.7 ° x 58.1°
Operational Temperature:	-10° to +40°

Network Level:

Robot Support:	KUKA, ABB, FANUC*
Comms. support:	OPC-UA & MQTT
Accuracy:	210µm**
Working Volume:	Unlimited; Increased with additional nodes

*NB: Others can be added as required.

**NB: 1⊠ determined from a modified VDI/ VDE 2634-3 test carried out in working volume with a body diagonal of 2.6m with 6 nodes.

"As we develop scalable and robust automation solutions in the composites industry, the IONA system shows promise for increasing process confidence and flexibility."

Dr Stuart Morris, Engineering Director, Pentaxia

OUR STORY

The smart factory is built on data, continually monitoring manufacturing process variables. This data allows manufacturing processes to react and adapt autonomously creating a flexible system, which outputs products that are right first time.

INSPHERE creates the technology to capture, analyse and utilise data for advanced automated production.

Ben Adeline
Chief Executive

"We're at an inflection point in the development of advanced manufacturing. The eco-system of technology is now available to autonomously monitor and control manufacturing processes yielding new levels of productivity and flexibility."

Ollie Martin
Chief Technology Officer

"For the past 10 years our focus has been on developing unique solutions to generate and analyse data to drive manufacturing. IONA is a game changing technology that allows this philosophy to be applied to industrial automation creating a manufacturing system fit for the future."

Craig Davey
Chief Operations Officer

"I am immensely proud of what the team at Insphere has delivered. IONA has already shown its potential to "unlock" robotics in challenging areas, including welding, high-accuracy drilling, and composites manufacturing. These advances have massive potential to cut waste and increase productivity, which is fundamental to delivering the sustainable, low-carbon future that we all want to see."

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