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Future opportunity

Industrial Internet of Things (IIoT) within the Resource Efficient Supply and Manufacturing Environment (RESUME) testbed

University of Strathclyde

F01: Prior information notice
Prior information only
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Section I: Contracting authority

I.1) Name and addresses

University of Strathclyde

40 George Street, Procurement Department

Glasgow

G1 1QE

Contact

Kirstie Peffers

Email

kirstie.peffers@strath.ac.uk

Country

United Kingdom

NUTS code

UKM82 - Glasgow City

Internet address(es)

Main address

http://www.strath.ac.uk/

Buyer's address

https://www.publiccontractsscotland.gov.uk/search/Search_AuthProfile.aspx?ID=AA00113

I.3) Communication

Additional information can be obtained from the above-mentioned address

I.4) Type of the contracting authority

Body governed by public law

I.5) Main activity

Education

Section II: Object

II.1) Scope of the procurement

II.1.1) Title

Industrial Internet of Things (IIoT) within the Resource Efficient Supply and Manufacturing Environment (RESUME) testbed

Reference number

UOS-21328-2021

II.1.2) Main CPV code

- 72300000 - Data services

II.1.3) Type of contract

Services

II.1.4) Short description

The University of Strathclyde (UOS) seeks notes of interest from suppliers able to achieve seamless ISA-95 compliant digital connectivity for seventy-three (73) machines located in the Advanced Forming Research Centre (AFRC). This digital connectivity includes real-time data acquisition from different manufacturing equipment and machinery as well as enabling seamless data integration and communication with Data Analytics and Storage infrastructure via the Network.

This potential tender is the key part of RESuME testbed which will comprise of various tenders targeted at supporting the National Manufacturing Institute Scotland (NMIS) Digital Factory, currently under construction.

UOS is conducting this market sounding exercise to help evaluate future sourcing options for IIoT work package within RESuME testbed. The project is working to a tight deadline and as such, we are requesting expressions of interest, at latest, by 30th August 2021. Suppliers expressing interest in this call will be asked to respond to a detailed set of requirements by 10th September 2021.

This potential tender is focused on enabling digital connectivity for 73 machines located in the AFRC. Digital connectivity within the RESuME testbed will need to comprise of seamless, synchronised and centralised real-time data acquisition from existing machinery and equipment enabling further data processing, dashboarding, analysis and storage.

Due to the nature of NMIS operation, machinery and equipment selected for digital connectivity within this tender, have different digital capabilities and can be divided into two groups, as follows:

1. Machinery and equipment without communication means, such as various band saws, cranes, welders, legacy equipment etc. These machines might have legacy controllers or may only have a power supply cable (25 machines)

2. Machinery and equipment with communication means. These are controlled by a PLC or CNC, have HMI and can potentially communicate with external devices via various communication protocols, including but not limited to Modbus TCP/IP, Profibus, Ethernet,

MTConnect, OPC UA etc. (48 machines)

For most of the machines, additional external data acquisition systems such as various gateways, IPCs, edge devices etc. will be required in order to achieve live data acquisition.

For machinery and equipment without any communication means, it is expected to use external systems (e.g., current clamps) to collect data on energy consumption a well as machines` on/off/idle status.

In order to sustain data collection and synchronisation from multiple machines and equipment as well as to provide access to this data for different (3rd party) applications, an open Message Bus system (unified namespace provider) needs to be in the centre of the digital transformation.

Thus, this tender covers real-time data acquisition from machines and equipment (directly, via gateways and/or external sensors), data integration and synchronisation using a Message Bus system as well as data visualisation on live dashboards. Therefore, this potential tender will consist of three (3) lots as described below.

II.1.5) Estimated total value

Value excluding VAT: £600,000

II.1.6) Information about lots

This contract is divided into lots: Yes

The contracting authority reserves the right to award contracts combining the following lots or groups of lots:

Individual suppliers may submit expressions of interest for one, two or all aspects of the service or may choose to work in partnership to share responsibility for different elements. In the case of partnership proposals, one named supplier should be identified as the lead contact. However, winner of each lot will need to collaborate and work closely with winners of other lots (if different) to ensure smooth data acquisition and integration.

II.2) Description

II.2.1) Title

Data integration and synchronisation using a Message Bus system as well as building live dashboards

Lot No

3

II.2.2) Additional CPV code(s)

- 72318000 - Data transmission services
- 72300000 - Data services
- 48610000 - Database systems

II.2.3) Place of performance

NUTS codes

- UKM81 - East Dunbartonshire, West Dunbartonshire and Helensburgh & Lomond

II.2.4) Description of the procurement

Summary of main technical requirements:

- Message Bus system (unified namespace provider) will need to manage all data collected from machines and external sensors supplied within Lots 1 and 2.

- Message Bus will need to access, structure, visualise data acquired by solutions provided within Lots 1 and 2 as well as arrange data storage and enable further data integration.

- Message Bus will be used to enable data integration with other systems such as ERP, MES, Data analytics etc. Therefore, data should be structured and be available to other third party software such as ERP, MES, Data analytics etc.

- All data acquired will need to be visualised on live dashboards with minimum latency.

- Time stamp needs to be consistent throughout the IIoT network and all data streams should be synchronised.

- Data logging settings as well as data acquisition (DAQ) frequency/sampling rate for each variable (tag) should be available for adjustment by the NMIS team to optimise data streams

- Data storage will need to be arranged on the AFRC`s on premise server. On premise storage solution (server) will be provided. NMIS should be the owner of all data acquired.

- Development tools should be available to the NMIS team, so the DAQ can be controlled and adjusted by the NMIS digital team. Related training will need to be provided for NMIS team as part of this work. The idea behind the training is to ensure that NMIS team is capable

of managing the IIoT network, including but not limited to adding new machines, amending dashboards, changing sampling rates etc.

- Solution must be scalable with no or minimum cost increase to support NMIS expansion plans.

II.2) Description

II.2.1) Title

Real-time data acquisition from machinery and equipment with communication means located in the AFRC

Lot No

2

II.2.2) Additional CPV code(s)

- 48614000 - Data-acquisition system
- 72300000 - Data services

II.2.3) Place of performance

NUTS codes

- UKM82 - Glasgow City

II.2.4) Description of the procurement

Summary of main technical requirements:

- Installation and commissioning of standalone data acquisition system (DAQ) which would provide access to real-time data from 48 machines located in the AFRC.

- All variables available within a machine`s PLC/CNC and visible on the HMI for machine operators will need to be acquired and made available for further processing/dashboarding. In some cases, special drivers will need to be used to access data.

- Some machines controllers might not have standard unlocked communication protocols. In this case communication with OEM will be required to enable this option. In the case where it is proven to be impossible to acquire data from a machine, this machine will need to be treated as "manual/legacy" and be covered within Lot 1 (power consumption monitoring).

- Data will need to be acquired as close to real time as possible with min latency.

- Data acquisition (DAQ) frequency/sampling rate for each variable (tag) within each machinery needs to be available for adjustment by the NMIS team to optimise data streams

- Connectivity solution for each machine will need to be fully delivered working side-by-side with NMIS team to ensure ongoing training. We are looking for a completely delivered and integrated with other WPs solution, not just stand-alone software or hardware.

- It would be beneficial (not essential) if gateways can facilitate data acquisition from more than one machine as well as from power consumption measurement devices (e.g., current clamps) covered within Lot 1.

- It would be beneficial if gateways are able to store data locally for a short period of time (min 24 hours) to protect data in case of network outage

- Gateways (PLCs, IPCs, edge devices etc) will need to support standard communication protocols, such as MQTT, OPC UA, MTConnect etc. in order to make data accessible for the Message Bus (Lot 3) to enable further centralised data processing and dashboarding.

- Gateways (PLCs, IPCs, edge devices etc) will need to be capable of accepting Ethernet to 5G connectors in the future (as a minimum have a spare network port to accept connectors)

- Gateways will need to have their own power supply (standard UK plug).

- Development tools should be available to the NMIS team, so the DAQ can be controlled and adjusted by the NMIS digital team. Related training will need to be provided for NMIS team as part of this work. The idea behind the training is to ensure that NMIS team is capable of managing the IIoT network, including but not limited to adding new machines, sensors, changing sampling rates etc.

- On premise storage solution as well as networking infrastructure will be provided.

II.2) Description

II.2.1) Title

Power consumption and status (on/off/idle) monitoring for all machines and equipment located in the AFRC

Lot No

1

II.2.2) Additional CPV code(s)

- 38551000 - Energy meters

II.2.3) Place of performance

NUTS codes

- UKM82 - Glasgow City

II.2.4) Description of the procurement

Summary of main technical requirements:

- Installation and commissioning of an external system measuring real-time power consumption as well as providing information on current status (on/off/idle) for each machine located within the AFRC (73 machines)

- These measuring devices or their gateways will need to support standard open communication protocols, such as MQTT, OPC UA, MTConnect etc. in order to make data accessible for the Message Bus (Lot 3) to enable further centralised data processing and dashboarding. This communication must be open/unlocked.

- Each device will need to be calibrated to provide true representation of power consumption.

- External sensors solutions will need to be non-invasive to not interfere with machines warranty.

- It would be beneficial (not essential) if external sensors supplied as part of Lot 1 can use the same gateway(s) (i.e., IPC, PLC, edge devices etc) as Lot 2 to reduce number of systems to be integrated in the future. An example of this system could be IPC + I/Os.

II.3) Estimated date of publication of contract notice

13 September 2021

Section IV. Procedure

IV.1) Description

IV.1.8) Information about the Government Procurement Agreement (GPA)

The procurement is covered by the Government Procurement Agreement: Yes

Section VI. Complementary information

VI.3) Additional information

NOTE: To register your interest in this notice and obtain any additional information please visit the Public Contracts Scotland Web Site at
https://www.publiccontractsscotland.gov.uk/Search/Search_Switch.aspx?ID=664240.

(SC Ref:664240)