THE NATIONAL ARCHIVES

ENVIRONMENTAL MONITORING SYSTEM

INVITATION TO TENDER – OPEN COMPETITION

DEADLINE FOR TENDER SUBMISSIONS – 5PM (UK TIME), 9 FEBRUARY 2024

1 ABOUT US

1.1 The National Archives (TNA) is a non-ministerial government department. The Chief Executive of The National Archives is the statutory Keeper of Public Records who reports to the Secretary of State for Digital, Culture, Media and Sport. We incorporate the Office of Public Sector Information and Her Majesty's Stationery Office. We also perform the Historical Manuscripts Commission's functions in relation to private records.

1.2 As the government's official archive and publisher for the UK government, we hold over 1,000 years of the nation's records for everyone to discover and use and are guardians of some of our most iconic national documents.

1.3 Our role is to collect and secure the future of the government record, both physical and digital; to make it accessible; to preserve it for generations to come.

1.4 The Collection Care Department are responsible for taking care of TNA's collection. This includes ensuring that the condition of the collection allows it to be seen by the public, Government departments, academic researchers and others.

1.5 To ensure that documents in the repositories remain in stable conditions, we currently monitor temperature and relative humidity in over 180 locations across the repositories. Since our current environmental monitoring system is reaching the end of its lifecycle we need to concentrate our efforts in replacing the current monitoring system.

1.6 For preventive conservation purposes, the environmental monitoring system runs continuously, 24 hours a day, 7 days a week. This continuous operation is essential to detect any issues or fluctuations in environmental conditions. This proactive approach is crucial in case prompt action is needed to mitigate risks and preserve collection's integrity and longevity. This environmental monitoring system also serves as a robust environmental sustainability research tool. Through continuous data collection and analysis, we engage in ongoing research, using the gathered information to understand environmental patterns and trends. This research informs decision-making activities, moving our sustainability efforts forward as we become more informed about specific areas for action and improvement.

2 PURPOSE

2.1 We are seeking to select a supplier that can provide both hardware and software for the replacement of the current environmental monitoring system with a more technological advanced and non-proprietary IoT LoRaWAN sensors. This system of sensors must be able to provide accurate and reliable environmental data that informs real time monitoring of TNA repositories.

NOTE: The availability of funds is dependent on TNA being successful in a grant application. If TNA is unsuccessful, this tender will not proceed and no contract will be awarded. Please bear this in mind when considering whether you wish to bid for this opportunity.

2.2 This system needs to be able to operate in a grid of 400 indoor sensors across the two existing buildings in The National Archives: Q1 and Q2. Q1 and Q2 are linked by a third building (known as The Link). An additional external weather sensor is also required (details below).

2.3 The sensors need to be able to monitor a range of environmental factors, including temperature, humidity, light, motion, CO_2 and Volatile Organic Compounds (VOC).

2.4 All 400 sensors need to monitor temperature and relative humidity, light and battery. 200 of these sensors must be capable of monitoring Volatile Organic Compounds (VOC), while the remaining 200 sensors must be capable of Carbon Dioxide (CO2) monitoring. Our preferred sensors are Elsys ERS VOCs https://www.elsys.se/en/ers-voc/ and Elsys ERS CO2 https://www.elsys.se/en/ers-co2/. However, if other sensor solutions are proposed these will need to be justified and scientifically tested, and results presented, before TNA will accept them; at tender submission stage, it is for you to provide compelling evidence that your proposed solution meets or exceeds the performance of our preferred solution.

2.5 An environmental weather station will be capable of monitoring external weather conditions. This station should be installed on the roof of one of our buildings in TNA and must equally integrate into the same IoT

LoRaWAN system considered for the other sensors. The weather station should have the capacity to measure key parameters including air temperature, relative humidity, wind speed, rainfall and sunlight intensity.

2.6 Documentation on each type of sensor needs to be provided by the supplier, including instructions on batteries, relocation instructions and calibration requirements for each variable the sensor measures.

2.7 Potential suppliers should note that there are eight main deliverables to this tender:

a) Hardware for the system which includes 400 LoRaWAN indoor environmental sensors, antenna gateways as needed, external environmental weather station and all necessary batteries.
b) Software solutions: database for data collection and storage and graphic interface visualization software solution. Our preferred software solutions are InfluxDB https://www.influxdata.com/ for the database solution and Grafana https://grafana.com/ for graphic visualisation interface;
c) Server dedicated to store data collected which would run the database and visualization platform;
d) High spec desktop with capabilities to run Unreal Engine;
e) Training on building graphic interfaces;
f) Migration of historic environmental data on temperature and relative humidity into the new system.
g) Connection of these sensors data to the Estates and Facilities Environmental Monitoring System EMS, by setting up of these sensors with Niagara platform which they run;

2.8 Potential suppliers should note that there are four main stages to this tender:

a) Delivery, installation and commissioning of LoRaWAN sensors and related hardware, server and desktop computer;
b) Provision of Software, installation of sensors, installation and configuration of server and desktop, configuration of access to dashboards;
c) Training support for the system provided;

d) Migration of historic environmental data to the new system.

2.9 During the delivery of this contract, the Appointed Supplier will need to work closely with members of the Collection Care Department (CCD) to deliver this system of sensors. We therefore require:

a) Direct communication lines should be provided within normal business hours to nominated members of CCD.
b) Response to queries within 2 working days.

2.10 The maximum available budget for this Procurement is £110,000, excluding VAT but inclusive of all other taxes and expenses.

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3 Requirements, Objectives and Deliverables

3.1 Project requirements are as follows:

3.1.1 Delivery of IoT LoRaWAn sensors

The Appointed Supplier will provide the following sensors to TNA premises at Kew, Richmond, Surrey TW9 4DU:

- 200 Temperature, relative humidity and CO2 sensors (ELSYS ERS CO2 suggested);
- 200 Temperature, relative humidity and VOC sensors (ELSYS ERS VOC suggested);
- 1 External environmental weather station;
- All other hardware required for the functionality of the proposed system (including antenna gateways, extra sensors, extra pieces of hardware required, etc.);
- Server dedicated to store data collected by sensors;
- High spec desktop capable of running Unreal Engine;

3.1.2 System installation

After the delivery of hardware to TNA the supplier can proceed with installing the sensors at an agreed date and do the necessary computational work to make the system of sensors, server and desktop operational.

While we are open to considering various proposed solutions, we have a preferred solution, which entails the use of an antenna communicating with a server composed of a virtual machine. This preferred solution consists of a Linux OS with the MQTT broker running InfluxDB on the the virtual machine. A visualisation platform will connect with InfluxDB to display graphical representations of the data. We highly recommend Grafana as our preferred visualisation platform, although we are willing to explore an additional visualisation platform alongside Grafana for a trial period. This trial period will allow us to evaluate the suitability of the alternative platform and possibly change to it depending on its suitability. For this solution the supplier will need to install the aforementioned software and make the necessary work to make the system operational.

All members of supplier staff attending our site must pass baseline security clearance National security vetting: clearance levels - GOV.UK (www.gov.uk) Individuals who do not comply with these requirements will be refused entry.
Supplier staff will be accompanied by a supervising member of Collection Care staff throughout.

3.1.3 Preferred Software Solution

Our preferred solution involves the following components:

a) Antenna/Gateway Communication: The antenna will serve as the primary means of data communication.

b) Server Configuration: A virtual machine will be provided and set up by the Appointed Supplier for data processing and storage. This virtual machine will run a Linux operating system with the MQTT broker running InfluxDB.

c) Data Visualization: A visualization platform will connect to the InfluxDB database to present data in a graphical format. Grafana is our preferred choice for the visualization platform as we have currently tested it in the past. However, we will consider another solution running in parallel with Grafana (see below).

d) Alternative Visualization Platform: While this is optional, in case the supplier strongly recommends a specific data visualization platform, we are open to consider an alternative visualization platform in addition to Grafana. To ensure we make an informed decision, we would like to propose a trial period during which both platforms will be evaluated. This trial period will help us assess its suitability and its use would be further agreed with the successful supplier.

3.1.4 Further System Requirements

Independently of the solution provided, please note:

1) Historic data collected with Hanwell system over the years needs to be transferred by the supplier to the system provided. This data needs to be organized by time and location with details to be agreed by the successful supplier.
2) Seventeen IoT sensors currently in use by CCD need to be connected to the provided solution. These sensors are from Elsys and Synetica manufactories.
3) Data collected from these sensors is also shared with our EMS/BMS system which uses Niagara platform. Details to be agreed by the successful supplier.
4) All data collected is to be owned by TNA and should be available to download by users.
5) Data from the sensors need to be available for download at any point by the user in a bulk download considering at least one year of all environmental data from all sensors in a single batch.
6) All solutions provided need to be available to login by the users in TNA. The login access given to TNA users should be administrator level in all solutions provided. (e.g. access logins to influx DB, access logins to visualization platform, etc.).

3.1.5 Training Provided

Training session to member of CCD in the visualization platform is to be provided by the supplier. If relevant to the proposed platform, this must include dashboard creation and visualization, types of graphs, data interoperability with other platforms (i.e. InfluxDB).

4 HOW TO RESPOND

4.1 If you have any clarification questions related to your Tender Response, please submit these to procurement@nationalarchives.gov.uk by **5pm (UK time), 26 January 2024**.

4.2 Please submit your Tender Response with all attachments required to procurement@nationalarchives.gov.uk by **5pm (UK time), 9 February 2024**.

4.3 It is for you to determine what format your Tender Response should take so as to describe your offer in a clear, comprehensive fashion. However please ensure your Tender Response includes as a minimum:

- Your **understanding** of the project, timetable and deliverables. NOTE: you must obtain a minimum unweighted score of 7 in this category to be considered for contract award; If a different system than the preferred is suggested, please take time to explain in detail how it operates and what is required to be set up in place. Please note that you might be invited for a system demonstration.
- Details of your prior **experience** or delivering requirements of this type;
- Your **agreement** to your staff who will attend our site undergoing security checks.
- Your **agreement** to work deliver this work to CCD department and maintain every communication line within the agreed stakeholders.
- a description of how you propose to deliver **environmental benefits** in the performance of this contract, to include collaborative ways of working with the supply chain and working towards net zero greenhouse gas emissions. Please ensure that within this proposal you describe clearly how you will achieve your proposed objectives, plus a description of how – and by when - you will implement your commitments and how you plan to monitor, measure and report on the associated impacts; and

e) Your **contract price**. Your submitted contract price must include any and all duties and levies (except UK VAT, which should be excluded) which may be payable on your proposed solution as submitted. If

some or all of your proposed solution includes goods or services which are sourced from outside the UK, you must tell us (a) which goods/services are sourced from outside the UK, (b) the associated commodity code(s), (c) the associated duties and levies payable and (d) confirmation that your contract price includes all such duties and levies (except UK VAT). For the avoidance of doubt, your contract price should reflect the equivalent of Incoterm DDP (Delivery Duty Paid) and therefore the full cost to The National Archives should your bid be successful. Please note that the contract price should be divided into the 8 deliverables requested, in section 2.7.

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4.4 **For information only**: Please tell us about what **support** you are able to offer once the system has been commissioned, e.g. parts, labour, repair/maintenance, software upgrades, and your Service Levels related to these support services. Note this support does not form part of this tender and your response in this category will not be scored.

4.5 We may require a **demonstration** of your proposed solution (see Section 5.4). Our preference is for demonstrations to take place at TNA's premises in Kew, Richmond, Surrey. If this is not going to be possible, please make clear where a demonstration can take place; reasonable travel by TNA staff at our own expense will be considered.

5 EVALUATION CRITERIA

5.1 Your Tender Response will be evaluated using the following criteria:

Category	Maximum pre-weighted score	Weighting	Maximum weighted score
1. Your **understanding** of the project, timetable and deliverables. NOTE: you must obtain a minimum unweighted score of 7 in this category to be considered for contract award	10	3	30
2. Details of your prior **experience** or delivering requirements of this type.	10	4	40
3. Your **agreement** to your staff who will attend our site undergoing security checks.	Pass/fail	Pass/fail	-
4. Your **agreement** to work deliver this work to CCD department and maintain every communication line within the agreed stakeholders.	Pass/fail	Pass/fail	-
5. Environmental benefits.	10	1	10
6. Contract **price.**	10	2	20

5.2 Price scores will be evaluated as follows:

The bidder submitting the lowest compliant price will be awarded the maximum of 10 (unweighted) points. All other bidders will be awarded a (unweighted) points score by applying the following formula:

((lowest submitted price/bidder's submitted price)*10)

To illustrate this via a worked example:

Bidder 1 submits a price of £10,000

Bidder 2 submits a price of £17,000

Bidder 3 submits a price of £31,000

Bidder 1 is awarded 10 (unweighted) points –((10,000/10,000)*10) = 10

Bidder 2 is awarded 5.88 (unweighted) points –((10,000/17,000)*10) = 5.88

Bidder 3 is awarded 3.23 (unweighted) points –((10,000/31,000)*10) = 3.23

5.3 Other categories will be evaluated according to the table below:

10 Points	**Outstanding:** • Potential Supplier has provided a response that addresses all parts of the requirement. • Potential Supplier has provided evidence to support all elements of their response. • The evidence supplied is convincing and highly relevant to the requirement. • Potential Supplier's response is clear and easy to understand. • Where relevant, Potential Supplier has demonstrated a high level of capability to deliver new and innovative service approaches.
7 Points	**Good:** • Potential Supplier has provided a response that addresses all parts of the requirement. • Potential Supplier has provided evidence to support most elements of their response. • The evidence supplied is good and relevant to the requirement. • Potential Supplier's response is clear and easy to understand. • Where relevant, Potential Supplier has demonstrated some level of capability to deliver new and innovative service approaches.
4 Points	**Average:** • Potential Supplier has provided a response that addresses some parts of the requirement. • Potential Supplier has provided evidence to support some elements of their response, but not all. • The evidence supplied has some limited relevance to the requirement. • Potential Supplier's response is not always clear and easy to understand. • Where relevant, Potential Supplier has demonstrated limited capability to deliver new and innovative service approaches.

1 Point	**Poor:** • Potential Supplier has provided a response that fails to address most parts of the requirement. • Potential Supplier has provided little or no evidence to support most elements of their response. • The evidence supplied is very weak and has very limited relevance to the requirement. • Potential Supplier's response is not always clear and easy to understand. • Where relevant, Potential Supplier has demonstrated little or no capability to deliver new and innovative service approaches.

5.4 Following evaluation of written submissions, we reserve the right to request demonstration(s) of your proposed solution to ensure it meets our requirements. After demonstration, your submission may be re-scored taking the findings of the demonstration into account.

6 PROCUREMENT TIMETABLE

6.1 The procurement timetable is as follows:

Ref.	Description	Date
1	Invitation to Tender published	8 January 2024
2	Deadline for Potential Suppliers to submit clarification questions to procurement@nationalarchives.gov.uk	5pm 26 January 2024
3	Deadline for Potential Suppliers to submit Tender Responses to procurement@nationalarchives.gov.uk	5pm 9 February 2024
4	Timebox for evaluation of Tender Reponses, including possible product demonstrations	12 February 2024 to 1 March 2024
5	Award decision (after which a 10 day mandatory standstill period will apply)	By 8 March 2024

* *Any clarification question received that TNA deems to be relevant to more than one Potential Supplier may be shared with all Potential Suppliers.*

7 CONTRACT TERMS

7.1 The contract will be awarded subject to our standard terms and conditions, which can be found here.

7.2 TNA reserves the right not to award and to complete its objectives through other means.