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Award

Resonant Acoustic Mixing (RAM) technology: the RAM Facility

THE UNIVERSITY OF BIRMINGHAM

F15: Voluntary ex ante transparency notice

Notice identifier: 2024/S 000-020940

Procurement identifier (OCID): ocds-h6vhtk-047bf9

Published 9 July 2024, 2:57pm

Section I: Contracting authority/entity

I.1) Name and addresses

THE UNIVERSITY OF BIRMINGHAM

Edgbaston

BIRMINGHAM

B152TT

Contact

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Email

K.Samsonik@bham.ac.uk

Telephone

+44 1214146899

Country

United Kingdom

Region code

UKG31 - Birmingham

UK Register of Learning Providers (UKPRN number)

10006840

Internet address(es)

Main address

<https://www.birmingham.ac.uk/>

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

Resonant Acoustic Mixing (RAM) technology: the RAM Facility

Reference number

SC12816/24

II.1.2) Main CPV code

- 38000000 - Laboratory, optical and precision equipments (excl. glasses)

II.1.3) Type of contract

Supplies

II.1.4) Short description

We are establishing the world's first facility for testing, using and exploring the mixing and chemical (including mechanochemical) performance of Resonant Acoustic Mixing (RAM) technology: the RAM Facility. The RAM Facility at the University of Birmingham will provide opportunity for external users to develop and explore new processes, both at small scale (up to 1 kg), as well as pilot scale (at least 5 kg), supported by cutting-edge expertise and on-site analytical tools.

The pivotal components of this pioneering facility will be two RAM systems, manufactured, provided, and supported by Resodyn, who are the holders of the underlying ResonantAcoustic® Mixing technology.

II.1.6) Information about lots

This contract is divided into lots: No

II.1.7) Total value of the procurement (excluding VAT)

Value excluding VAT: £1,252,177.52

II.2) Description

II.2.3) Place of performance

NUTS codes

- UK - United Kingdom

II.2.4) Description of the procurement

Our decision to exclusively source Resodyn for the RAM systems OmniRAM and LabRAM II is founded on several key factors. Resodyn holds a unique position as the only holder of proprietary technologies that underpin RAM and are the only manufacturer that can produce systems that span the capacity of LabRAM II and OmniRAM.

It is important to outline the crucial distinction between the RAM technology, and the more conventional shakers and vibration test systems. Namely, RAM systems are configured using a series of plates and springs that are uniquely designed to operate specifically and exclusively at resonance. This means that the kinetic energy of the oscillating springs trades off energy with the oscillating potential energy of the plates, at resonance, without the loss of energy. Hence, virtually all of the energy that is used to drive the resonant system is used to mix the materials in the mix vessel. This enables the RAM technology to perform high-acceleration vibration while minimising energy use and unwanted sound/vibration external to the system. These are unique advantages characteristic of RAM technology that cannot be achieved by any other mixing, blending or vibrational mixing approaches that do not operate at resonance.

Also, being the manufacturer, as well as the developer and holder of proprietary technology, Resodyn has the expertise that positions them uniquely for the installation of RAM instruments which, if not properly installed, could cause damage to the instrument and surroundings due to the high energy and high intensity nature of the acoustic vibrations. The proprietary nature of Resodyn's technology is affirmed by a series of patents, as summarized in Attachment A. Furthermore, Resodyn has extensive design, materials specification/selection and equipment assembly know-how that has been developed since 2000 that is used in the production of this specialized equipment.

As Resodyn are the only manufacturer of the RAM technology, and are also the only ones who can provide the support, training and installation for these systems, we cannot obtain this type of equipment from any other provider. Resodyn is the sole provider of instruments and replacement parts for RAM systems.

This unique position of Resodyn as both manufacturer and patent holder of RAM technology translates into our sole reliance on them to provide not only the hardware and software components but also the indispensable training, support and consumables essential for the operation of these RAM instruments (consumables include various specialized bellows, specially designed (ruggedized) accelerometers and RTD instruments). Their proprietary

knowledge and technical expertise extend to servicing the equipment and offering invaluable guidance on resolving technical challenges, which is facilitated by having a site and representative based in the UK. This makes them the unrivalled choice for our RAM Facility. No other company possesses the capability to furnish us with the complete suite of resources and support necessary to uphold the exceptional standards of service, research and innovation that the pioneering project of world's-first RAM Facility strives for. This service is particularly essential, as the RAM mixing processes are not intuitive and proper/efficient/safe operation of the equipment requires specialized training that only Resodyn can provide by skills developed across many industrial applications and over several decades.

Resodyn holds a unique position for several reasons, which sets them apart from other companies and makes them the only choice for the RAM Facility:

Proprietary Technology: Resodyn's ResonantAcoustic® Mixing technology is the only one that allows performance exclusively at resonance, and it is proprietary and patented, as indicated by the list of patents provided. This means that Resodyn have exclusive rights to this innovative technology, giving them a competitive advantage. Other companies may use different mixing or blending technologies that do not offer the same advantages or capabilities (in particular, they would not be designed to operate strictly at resonance, which voids the energy efficiency, reduced vibration and sound compared to RAM technology). Moreover, non-RAM based technologies are not compatible with the aim and goals of the RAM Facility.

Unique properties of Resodyn ResonantAcoustic® Mixing technologies that are specifically sought for the RAM Facility are:

- Benchtop ResonantAcoustic® Mixing instrument operating strictly and exclusively at resonance, that can process samples at accelerations of up to 100 g, with up to 1,000 gram payload, equipped with a stroboscope, and capable of operating 24/7, exclusively at resonance. Each system has programable control features that allow the preprogramming of hundreds of mixer operating variables that include acceleration, vacuum and temperature as a function of time, to include real-time readouts and data collection for post-mix analysis and reporting.
- Pilot-scale ResonantAcoustic® Mixing system that operates strictly and exclusively at resonance, and can process samples of volumes up to 7 litres, translating into a 5 kg payload at maximum acceleration of 100 g, or more at lower accelerations. The system needs to be capable of operating 24/7, exclusively at resonance. Each system has programable control features that allow the preprogramming of hundreds of mixer operating variables that include acceleration, vacuum and temperature as a function of time, to include real-time readouts and data collection for post-mix analysis and reporting.
- Pilot-scale sample loading system compatible with the pilot-scale ResonantAcoustic®

Mixing system, based on a hoist

- Benchtop and pilot-scale ResonantAcoustic® Mixing instruments that operate strictly and exclusively at resonance, and are equipped for operating under vacuum, along with required consumables and support equipment (e.g. tubing, mixing vessels suitable for operations under vacuum)
- Benchtop and pilot-scale ResonantAcoustic® Mixing instruments that operate strictly and exclusively at resonance, equipped with ready-to-go temperature control systems (including digital controller, thermal sensors, cables and suitable vessels)
- Benchtop and pilot-scale ResonantAcoustic® Mixing instruments that operate strictly and exclusively at resonance, and have built-in full digital control and process monitoring and logging of operation parameters in real-time.
- RAM instruments that operate strictly at resonance, while recording and providing live readouts (plots and digital values) of payload acceleration, mixer power, mix vessel vacuum/pressure, mixed materials temperature and RAM machine resonant frequency.

These properties are unique to RAM instruments manufactured and designed by Resodyn, and are not available from other providers.

II.2.11) Information about options

Options: No

Section IV. Procedure

IV.1) Description

IV.1.1) Type of procedure

Negotiated without a prior call for competition

- The products involved are manufactured purely for the purpose of research, experiment, study or development

Explanation:

As Resodyn are the only manufacturer of the RAM technology, and are also the only ones who can provide the support, training and installation for these systems, we cannot obtain this type of equipment from any other provider. Resodyn is the sole provider of instruments and replacement parts for RAM systems.

This unique position of Resodyn as both manufacturer and patent holder of RAM technology translates into our sole reliance on them to provide not only the hardware and software components but also the indispensable training, support and consumables essential for the operation of these RAM instruments (consumables include various specialized bellows, specially designed (ruggedized) accelerometers and RTD instruments). Their proprietary knowledge and technical expertise extend to servicing the equipment and offering invaluable guidance on resolving technical challenges, which is facilitated by having a site and representative based in the UK. This makes them the unrivalled choice for our RAM Facility. No other company possesses the capability to furnish us with the complete suite of resources and support necessary to uphold the exceptional standards of service, research and innovation that the pioneering project of world's-first RAM Facility strives for. This service is particularly essential, as the RAM mixing processes are not intuitive and proper/efficient/safe operation of the equipment requires specialized training that only Resodyn can provide by skills developed across many industrial applications and over several decades.

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

The procurement is covered by the Government Procurement Agreement: No

Section V. Award of contract/concession

A contract/lot is awarded: Yes

V.2) Award of contract/concession

V.2.1) Date of conclusion of the contract

9 July 2024

V.2.2) Information about tenders

The contract has been awarded to a group of economic operators: No

V.2.3) Name and address of the contractor/concessionaire

Resodyn Acoustic Mixers

130 N. Main St ,Ste. 630

Butte MT

Country

United States

NUTS code

- US - United States

Justification for not providing organisation identifier

Not on any register

The contractor/concessionaire is an SME

No

V.2.4) Information on value of contract/lot/concession (excluding VAT)

Initial estimated total value of the contract/lot/concession: £1,252,177.52

Total value of the contract/lot/concession: £1,252,177.52

Section VI. Complementary information

VI.4) Procedures for review

VI.4.1) Review body

The University of Birmingham

Birmingham

B15 2TT

Country

United Kingdom