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To Whom It May Concern

Limited Tender for fire detection system

This is an RFQ (Request for Quote) for supply, installation, commissioning and testing of Cleanroom smoke and fire detection system as part of a limited tender for the Centre for Nano Science and Engineering (CeNSE.) at IISc., Bangalore.

CeNSE is a multidisciplinary research department at IISc that houses a 14,000 sq. ft. cleanroom and characterization facility used by 50 faculty members from various disciplines at IISc. CeNSE is also a user-facility which has hosted over 6000 participants from more than 700 universities and institutes all over the world. Consequently, any tool in CeNSE receives significant exposure to scientific community in India and beyond. The vendors are requested to factor in the value of this exposure in to their quotes.

Being a user-facility which is operational 24x7, we needs systems with high efficiency, easily serviceable and maintained with minimum discomfort to the user population for the foreseeable future (at least 5 years), and has a track record of reliability at comparable facilities in India and abroad. Details of existing facilities and the user program can be gleaned from:
http://nnfc.cense.iisc.ac.in/
http://www.mncf.cense.iisc.ac.in/
https://www.inup.cense.iisc.ac.in/

1. Vendors will be required to submit a technical proposal and a commercial proposal in **two separate sealed envelopes**. Quotes in violation of this will be rejected.
2. **The deadline for submission of proposals is the 15th of January 2019, 5:00 pm Indian Standard Time.** Proposals should arrive at the Main office, GF-15, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India, on or before the above deadline.
3. The decision of the purchase committee is final.
4. The technical proposal should contain
    a. Relevant technical datasheets. The committee reserves the right to cross-check the information in these datasheets with publicly available information.
    b. A compliance table with 5 columns. The first column must list the technical requirement, in the order that they are given in the technical configuration below. The second column should describe the capability of the tool for that specific requirement. In case the technical requirement is a question, second column must provide a technical answer. Please be quantitative and consistent with the technical datasheets. Third column must specify whether the technical requirement is met with a “Yes”, “No”, or “Partially”. If the response is “Partially” or “No” the third column, the fourth column must explain the extent of the deviation and, if possible, the reasons for the deviation. The fifth column is for other “Remarks”. You can use it to compare your tool with that of your competitors or provide more details/justifications.
    c. Technical capabilities of any *suggested* accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.

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d. Any additional capabilities or technical details, that you would like to bring to the attention of the purchase committee. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors

5. The technical proposal will be evaluated against the technical requirement. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
6. If multiple systems fulfill the requirements, vendors can offer multiple bids.
7. The commercial bid must contain:
    a. Itemized cost of the system and *required* accessories, such as software, power supply, etc.
    b. itemized cost, as an option, for any *suggested* accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
    c. The quotes should be CIF Bangalore, India. So please include cost of shipping to Bangalore. The quote does not need to account for Customs duties.
    d. Please indicate the warranty provided with the tool. Warrant of 3 years of more is preferred.
    e. Provide itemized cost for *required/expected* spares for 3 years of operation. This number will be used to estimate the life cycle cost of the tool.
    f. The cost of annual maintenance contract (AMC). The details of AMC are given below. This number will be used to estimate the life cycle cost of the tool.
    g. Length of time that the tools will be supported with service and spares from the date of installation. Our requirement is that the tools be supported for at least 5 years from the date of installation. To quote lowest price, vendors often quote for obsolete or soon-to-be obsolete equipment. This is **NOT** acceptable. For a user-facility like CeNSE, it is vital that the equipment be serviceable and supported for the foreseeable future. The length of guaranteed support will be used to estimate the life-cycles cost of the tool.
8. The AMC, valid for 3 years, must
    a. cover 1 scheduled and 1 emergency visit per year;
    b. the emergency visit should be supported with a 24-hour response window.
    c. In case the OEM is foreign, clarify if maintenance will be done by a trained local engineer (OEM representative within India) or a specialist from abroad.
    d. include in the commercial offer, an itemized list of spares (e.g. maintenance kits) that are essential for scheduled visits.
9. The commercial bids will be evaluated based on life-cycle cost of the tool. This includes the cost of purchase, maintenance, spares, etc.
10. The RFQ must include references of 3 previous installations, preferably in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently.
11. We encourage vendors to give technical presentations, physically or over Skype, so that we can better understand the technical capabilities of their tools and vendors can better understand the requirements. To schedule the presentations, the vendors can contact Dr. Savitha P, GF-20, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (savithap@iisc.ac.in).
12. Any technical questions or request for site-visit/audit can be directed to Dr. Savitha P, GF-20, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (savithap@iisc.ac.in).

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Details of the Facility/Site

Forced air-circulation

National Nano Fabrication Center is a 14,000 sq. ft. cleanroom with class 100 and class 1000 where semiconductor devices are fabricated. Salient feature, relevant to a smoke and fire detection system for the cleanroom, is the design of the air flow.

1. The cleanroom is a multilevel structure configuration, with a plenum at the top handling fresh air, exhaust ducts, fan filtering units and gas-lines. A middle level where instruments are kept and subfloor with some utility equipment and some gas-lines.
2. The air in the cleanroom is continuously circulated from the plenum to the cleanroom to the subfloor and back to plenum, in a laminar fashion using a range of fan-filtering units (FFU). The forced air flow makes traditional smoke detectors ineffective, since smoke never "rises-up" to the detector. **Any fire-detection system for the cleanroom must address this fundamental challenge.**
3. There are 3 AHUs that provides purified air into the cleanroom and 3 exhausts blowers that blow air outside. However, we not a completely air-circulated system. Unquantifiable amounts of the air bleeds out of the system to the surrounding corridor and when people enter/exit.
4. Users continuously work inside the cleanroom. Population varies from 0 to 50, without a set pattern. For safety of the occupants, the O2 inside the room must always be maintained at safe level. Any fire-safety system must account for this need.
5. The cleanroom already has a rudimentary VESDA system. In this RFQ we plan to augment the system and make it more effective. Any new system should be compatible with the existing protocols. Should be of the similar or better sensitivity. It must also seamlessly interface with existing BMS. For details of current system, please contact Dr. Savitha P, GF-20, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (savithap@iisc.ac.in).

Types of hazards

The cleanroom has several fire hazards, including self-heating equipment, high-power lasers, chemicals, pyrophoric gases and high electrical-load. A limited list of these hazards is:

1. Several high-temperature furnaces that heat up to 1200 C.
2. High-power excimer UV lasers that output several watts of power. Enough to burn holes through materials.
3. 20+ type of toxic, flammable and oxidizing, and pyrophoric gases, that are connected to a range of equipment.
4. Wet chemical hoods where several 10s of liters of concentrated acids, bases, solvents, and oxidizers are used and stored.
5. Chemical waste effluent pipelines that carries waste acids and bases.
6. Electronic circuit boards (PCBs), electrical bus bars and electrical panel with a combined peak load of 500 kW

Any fire-detection system must account for the range of hazards and must be designed keeping the geography (placements) of the hazards. For a more in-depth understanding and audit, vendors can visit the facility with prior appointment. Contact Dr. Savitha P, GF-20, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (savithap@iisc.ac.in).

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Technical Requirements

1.	Main application	a) Continuously monitor and detect any fire in the facility within seconds. b) Interface with the building software so that the fire-alarm is triggered automatically. c) The system should be very sensitive. Some quantifiable metric of sensitivity. d) The system should conform to some cleanroom safety standard, e.g. i) Industrial Risk Insurers IM.17.1.1 Guiding Principles for the Protection of Semiconductor Manufacturing Facilities ii) SEMI S14-1016 - Safety Guidelines for Fire Risk Assessment and Mitigation for Semiconductor Manufacturing Equipment iii) NFPA 318, Standard for the Protection of Cleanrooms, National Fire Protection Association iv) Factory Mutual Property Loss Prevention Data Sheets 7-7/17-12, Semiconductor Fabrication Facilities
2.	Backward Compatibility	a) The cleanroom already has a rudimentary VESDA system. Any new system should be compatible with the existing protocols; should be of the similar or better sensitivity; and must seamlessly interface with existing BMS.
3.	Facility type	a) The system must be compatible with semiconductor cleanroom class 100 and class 1000. b) The main technical challenge in designing a suitable system is highlighted in the previous section. For a more in-depth understanding and audit, vendors can visit the facility with prior appointment. c) Fire from any of the hazards listed above must be detected. d) Vendor MUST show evidence of prior installation at similar (or larger) scale cleanroom facilities.
4.	Detection system	a) VESDA or similar advanced technology with equivalent or better sensitivity b) Please clarify if the system can detect fire or both smoke/fire. c) Follow N+1 standard in system redundancy, so the downtime is minimized
5.	Other requirements	a) The detection system must interface with our current building management system (BMS). Responsibility of interfacing with existing BMS rests with the vendor. b) The detection system must be addressable, i.e. the geographic location of the alarm must be provided to the BMS. c) The system must have the ability to be triggered manually. For e.g. if the gas alarm triggers, the fire alarm must also trigger. d) Prefer for the system to interface with the current hooters. This can be through the BMS or directly. If new hooters need to be introduced, they need distributed in enough numbers such that alarm is audible from all corners of the cleanroom. e) The quote must be turnkey. Any new hardware, e.g. hooters, plumbing, software, electrical boxes, wiring, etc. must be included in the quote. f) Please clearly specify any utility requirements, e.g. water, air, electrical

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		sockets, etc.
6.	Footprint & weight of cylinder storage and other equipment	a) Cleanroom real estate is very expensive. Compact systems are preferred. Please specify the total foot print in cm x cm, volume, and weight.
7.	System software	a) Front panel displaying equipment and process status along with appropriate software to be supplied. b) System must interface with the building management software. c) Complete logs of all the process and system parameters to be available and stored for future trouble shooting d) Please specify the date the system was launched and the time the software will be supported. This is long-time investment. The system MUST have lifetime support.
8.	Periodic Maintenance	a) The system should require minimal maintenance. Mention the recommended preventive maintenance schedule for the system. Provide details of what constitutes preventive maintenance. b) Provide an itemized cost of any accessories needed for periodic preventive maintenance for 3 years. This will be used to calculate life-cycle costs c) Can the preventive maintenance be done by a trained on-site engineer (CeNSE employee) or requires a specialist from the OEM? d) Please provide cost of a 3-year AMC with required kit/consumables in the commercial offer. Scope of AMC is given in Procedures. e) Please note, that system should be supported by a trained local representative with a 24-hour window of response.
9.	Installation and Training	a) Installation and training at customer site, by the experts from OEM should be part of the package. b) During the installation all the specifications of the processes should be verified for acceptance by the customer.
10.	Power & utilities	a) The instrument should work with Indian electrical standards b) Mention the power requirement. c) Mention ALL utility requirement (water, air, exhaust, cooling, etc.) d) Mention environmental restrictions, i.e. operational temperature, humidity etc. e) Support hardware, such as chillers, air compressor and UPS requirements, if any, must be mentioned.
11.	Safety	a) Mention any special safety requirement of the system b) The system must come with a complement of interlocks to prevent common user errors.

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12.	Recommendation	a) The system must submit references from at least 3 previous installations at similar or larger cleanrooms. b) The names and contact addresses of the referees must be submitted with the proposal, so the purchase committee can contact them independently.
13.	Acceptance tests	a) As per industry standards

Thanking you,

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