



SARAO
South African Radio
Astronomy Observatory

INVITATION TO BID

REQUEST FOR INFORMATION (RFI) OF COMPUTER COOLING SYSTEM SOLUTION FOR SARAO DATA CENTRE.

Bidder Name:	
Number:	NRF SARAO SNET 001 2019
Closing Date	30 September 2019
Closing Time:	11: AM
Briefing session: date:	16 September 2019 @ 11: 00 AM
Briefing Session:	The Auditorium
Venue:	SARAO Cape Town Office, Black River Park Building (North Entrance),
Address:	2 Fir Street, Observatory
Bid documents collected from:	SARAO website, Government Gazette, National Treasury's E-Tender Portal, and NRF website
Bid Box Address	2 Fir street, Old Times Media Building, Black River Park, North Entrance, Observatory, 7925 Tender box opening hours: 08h00-16h00 on weekdays GPS coordinates: 33°55'58.9-"S; 18°28'14.8-"E Dimensions of tender box opening: 40X300mm
Envelope Addressing	On the face of each envelope, the Bid Number and Bidder's Name, Postal Address, Contact Name, Telephone Number and email address

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INTRODUCTION

INTRODUCTION TO THE NRF

The National Research Foundation Act, Act 19 of 2018, establishes the National Research Foundation (“NRF”) as the juristic legal entity that will contract with the awarded bidder. The NRF supports and promotes research and human capital development through funding, the provision of National Research Facilities and science outreach platforms and programmes to the broader community in all fields of science and technology, including natural science, engineering, social science and humanities. Please visit the NRF website (<https://www.nrf.ac.za>) for more information.

INTRODUCTION TO THE BUSINESS UNIT

The South African Radio Astronomy Observatory (SARAO) is a National Facility of the National Research Foundation (NRF) housing and operating South Africa’s national radio telescope shared facilities including such as the MeerKAT and KAT-7 telescopes in the Karoo in the Northern Cape, the Hartebeesthoek Radio Astronomy Observatory (HartRAO) in Gauteng, the African Very Long Baseline Interferometry (AVN) programme in nine African countries. SARAO manages the associated human capital development and commercialisation endeavours of government’s investment in astronomy. SARAO has offices based in Johannesburg and Cape Town, as well as the radio-protected SKA host site in the Karoo, 90km from Carnarvon in the Northern Cape, which hosts the Square Kilometre Array mid-frequency telescopes, MeerKAT, and KAT-7 radio telescope installations, as well as a number of guest instruments, including the HERA telescope. Further information about SARAO can be found on www.ska.ac.za and www.NRF.ac.za.

INTRODUCTION TO THE SKAO

The SKA Organisation has been established with its headquarters at Jodrell Bank in Manchester, United Kingdom. It has jointly awarded its Square Kilometre Array (SKA) to South Africa and its eight African partner countries together with Australia. The SKA will be Africa’s largest science project acting as a hub for both local and international collaboration. The SKA Organisation is undertaking the following five key science projects:

- Probing the Dark Ages
- Galaxy Evolution
- The Origin and Evolution of Cosmic Magnetism
- Strong Field Tests of Gravity using Pulsars and Black Holes
- The Cradle of Life.

The first phase of the SKA1-MID project includes the addition of 133 antennas to the 64-dish MeerKAT radio telescope and the second phase of the project and will include up to 2 000 antennas distributed across South Africa and its eight African partner countries. SKA1-MID consists of:

- The existing MeerKAT phase of 64 antennae (precursor to the SKA) and the 133 antennae included in the current phase.
- A core area (approximately 2,5km in radius) which is land owned by the NRF and includes the MeerKAT radio telescope and will include approximately 75% of the antennae.
- Three spiral arms extending out from the core to for about 120km each.

Further information about SKAO at www.skatelescope.org.

BACKGROUND TO SCIENCE PROCESSING CENTRE (SPC) FACILITY

The Science Processing Centre (SPC) is a bespoke data centre facility in early design phase that will host the SKAO's SKA1-MID Science Data Processor (SDP) data centre and the South African SKA Regional Centre (ZA_SRC) data centre in Cape Town, South Africa. The facility shall provide all the required infrastructure to support the high performance computing (HPC) equipment in each data centre. Such infrastructure includes power, back-up power, road access, office facilities, loading bays, receiving area and integration/testing room (assembly/staging area).

Although at an early stage of design it is estimated that the power requirement for the facility will be between 3-10 MW which includes power for the computing equipment, cooling systems, backup power systems and all ancillaries. It is expected that commercial off the shelf (COTS) HPC equipment will be installed in up to 200 19" racks (750 mm x 1400 mm x 48 RU) on a solid load-bearing floor. The number of racks will depend upon the cooling solution chosen. Each rack is expected to consume between 15 and 95 kW. It is expected that 95% of the heat load generated by the COTS equipment will be transferred out of the data centre and dissipated into the atmosphere by a facility level cooling system, most likely using liquid water. The remaining 5% of the heat load is expected to be dissipated by air.

The facility aims to achieve the highest possible levels of energy efficiency by optimising the equipment used and reducing the power usage effectiveness (PUE) to 1.05 or below. The use of so called "hot water cooling", where ingress temperatures exceed 45°C is noted as a possible solution.

QUALIFICATIONS

We invite individuals, consultants, systems integrators, and manufacturers with a proven track record in the high performance computing industry to respond.

Please provide:

- Relevant certifications and qualifications of systems
- Contactable reference sites where the solution has successfully deployed and operated.

INFORMATION REQUESTED

SARAO requests detail in two major areas 1) systems, methods, principles and products to interface to COTS HPC equipment in the server rack and 2) facility level infrastructure systems, methods, principles and products for providing interface and cooling of area 1). All equipment to be utilised by the facility needs to be generally available (GA) by 3rd quarter of 2022.

For both areas we request information on:

1. Local and international suppliers
2. Available products with an indication of the product maturity and data sheets
3. List pricing and expected segment discounts for those products
4. Local and international system integrators, service suppliers and support
5. Details on any end-to-end systems that cover both areas 1) and 2) as one complete system.

In addition we request information on upstream and downstream processes and technologies that relate to:

- Waste Heat Reuse
- Water conservation
- Minimising environmental impacts
- 50 year operational life cycle management strategies
- Integrated High Performance Computing and cooling systems with the COTS requirements relaxed.

SELECTION CRITERIA

Optimising positive criteria include:

1. Higher energy efficiency
2. Maximising free cooling
3. Lower TCO
4. Enhanced server reliability
5. Smaller footprint
6. Lower noise

Minimising negative criteria include:

1. Investment
2. Need for retrofit or redesign of servers
3. Need for extremely specialised operator and maintenance

RFI RESPONSE DOCUMENT OWNERSHIP

All RFI responses submitted by vendors and/or implementation partners become the property of the NRF, who will use it solely for purposes of further planning for SARAO cooling system solution a and implementation at the NRF.

Important to note:

1. Please note that this enquiry is not a Request for Quotation/Proposal but a Request for information only and therefore non-committal and does not constitute a guarantee of business, or an agreement to negotiate a binding agreement.
2. Due to the specific need that this RFI process has to fulfil, NRF wishes to clarify that this invitation is not intended to impede, amend or replace any current or future procurement process that NRF has engaged in or will engage in.
3. This RFI is a stand-alone information-gathering and market-testing exercise, intended only to inform and assist NRF further decisions. No respondent, through submission of information will gain any right to participate in any future process, and participates herein on the basis that it is providing information voluntarily to strengthen a potentially beneficial process for all stakeholders. In addition, no participant shall be prevented or excluded from participation in the bidding process due to submission of information in response to this RFI
4. All participants responding to this RFI process need to ensure that they have received all information and remain solely responsible for satisfying themselves as to the information required in responding hereto and

are fully responsible for all costs incurred in relation hereto and under no circumstances will any resultant cost be borne by NRF.

5. NRF reserves the right not to proceed with any further engagements on the requirements presented.

INVITATION TO BID (SBD 1)			
Bid number		NRF SARAO SNET 001 2019	
Closing date and time		30 SEPTEMBER 2019	
The NRF recognises the date and time as recorded on its systems for closure purposes			
HIGH LEVEL SUMMARY OF BID REQUIREMENTS			
REQUEST FOR INFORMATION (RFI) OF COMPUTER COOLING SYSTEM SOLUTION FOR SARAO DATACENTRE			
Number of ORIGINAL bid documents for contract signing			1
Number of EVALUATION copies (Mark pages as "Evaluation Copy" and number all pages sequentially):		1	
TWO ENVELOPE SYSTEM		N/A	
PRICE VALIDITY PERIOD FROM DATE OF CLOSURE		N/A	
Bidding procedure enquiries are directed in writing to:		Technical information queries are directed in writing to:	
Section	SCM	Section	Contract Lead
Contact person	Ms Nolwazi Mthembu	Contact person	Jeremy Main
E-mail address	nmthembu@ska.ac.za	E-mail address	jmain@ska.ac.za

SUPPLIER INFORMATION			
Name Of Bidder:			
Physical Address:			
Telephone Number			
Code		Number	
Cell Phone Number			
Code		Number	
Facsimile Number			
Code		Number	
E-Mail Address			

