

# Request for Proposal (RFP) for the Provision of light weight Radar Back-End Processor for UAV application

## RFP No. 1030/19/09/2022

Date of Issue	Monday, 05 September 2022	
Compulsory briefing session	No briefing session	
Closing Date	Monday, 19 September 2022 at 16h30	
Place	<b>Online only submission at <a href="mailto:tender@csir.co.za">tender@csir.co.za</a></b> If the size of the documents exceed 25MB, send multiple emails. Use the RFP number and description as the subject on the email.	
Enquiries	Strategic Procurement Unit	E-mail: <a href="mailto:tender@csir.co.za">tender@csir.co.za</a>
CSIR business hours	08h00 – 16h30	
Category	Engineering	

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## Glossary

<b>Abbreviation</b>	<b>Term</b>	<b>Description</b>
B-BBEE	Broad-Based Black Economic Empowerment	A term describing South African Government Policy regarding the economic upliftment of persons previously excluded from involvement in the economy of South Africa
CSIR	Council for Scientific and Industrial Research	A statutory body established in terms of Scientific Research Council Act 46 of 1988, as amended

## List of Acronyms

<b>Acronym</b>	<b>Site Name</b>
CSIR	Council for Scientific and Industrial Research
OEM	Original Equipment Manufacturer
RFP	Request for Proposal
SAR	Synthetic Aperture Radar
UAV	Unmanned Arial Vehicle

## SECTION A – TECHNICAL INFORMATION

### 1 INTRODUCTION

The Council for Scientific and Industrial Research (CSIR) is a leading scientific research and technology development organisation in Africa. In partnership with national and international partners, CSIR undertakes directed and multidisciplinary research and technology innovation that contribute to the improvement of the quality of life of South Africans and the world at large. The CSIR's main site is in Pretoria while it is represented in other provinces of South Africa through regional offices.

### 2 BACKGROUND

The purpose of this RFP is to invite tenders for the selection of a supplier that will be able to provide a suitable digital back-end radar processor as per specifications in this RFP that will form the basis of a future UAV SAR Sensor Payload product line.

### 3 REQUEST FOR PROPOSAL

Proposals are hereby invited from suppliers that have a proven track record for the supply of Radar Signal Processor technology. Preference will be given to original equipment manufacturers that provide support to customers to integrate, configure their offered solution into their customers products.

The RFP details the main requirements for the selection of a supplier to provide CSIR with the required Radar Back-End Processor solution that will be integrated within the CSIR Synthetic Aperture Radar (SAR) sensor payload offering.

#### 3.1 High-level Requirements for Radar Back-End Processor solution

The high-level requirements for the solution are summarised as follows:

1. The Radar Back-End Processor hardware must include the following as a minimum:
  - a. Radar Back-End Processor hardware packaged within an enclosure that contains the integrated electronic modules;

- b. Board support package with a library of firmware and software building blocks for required radar processing functions;
  - c. Comprehensive set of documentation and example code to enable CSIR engineers to configure the Radar Back-End Processor for the required real-time SAR processing.
2. The Radar Back-End Processor solution must be adaptable, reconfigurable and modular.
3. The Radar Back-End Processor solution must make provision for the following functionality:
- a. Radar Waveform Generation at and intermediate frequency of up to 1.8 GHz with a up to 600 MHz of bandwidth
    - i. Waveforms should as a minimum include arbitrary up/down chirps of programmable length and bandwidth up to 600 MHz
    - ii. The ability to adjust the waveform pulse repetition interval, ideally at a pulse to pulse level but as a minimum at a burst to burst level
    - iii. Waveform generation can be in the first or 2<sup>nd</sup> Nyquist zone.
  - b. Radar timing & control signal generation
    - i. The ability to create synchronous strobes for timing and control of other radar sub-systems. This should include the ability to control strobes for at least 2 external devices.
    - ii. The ability to synchronise with a pulse per second strobe from a GPS source, to allow waveform generation to start on an exact second boundary, and also to be able to time align and/or frequency align with a GPS source.
  - c. A multi-channel digital receiver (at least two channels) that can receive IF signals up to 1.8 GHz with up to 600 MHz of bandwidth, sample these and perform real-time signal processing. Sampling can be in the 1<sup>st</sup> or 2<sup>nd</sup> Nyquist zone.
  - d. Signal processing
    - i. Digital Receiver Processing such as digital up/down conversion and bandpass or low-pass filtering
    - ii. Digital Pulse Compression (Matched Filtering) Processing with the ability to adjust to pulse-codes as they were transmitted on a pulse to pulse basis
    - iii. Equalisation Processing to equalise all channels in amplitude and phase.
    - iv. Channelisation of sub-channels from the wider instantaneous bandwidth. For example breaking a 600 MHz bandwidth into 3 portions of 200 MHz BW each and passing this data on to the recorder / 10 GbE link
    - v. Ability to add custom firmware which are CSIR developed IP.

- e. Digital and analogue general purpose I/O
  - f. Data acquisition & distribution
    - i. After the data is captured in the firmware, the digital receiver should support writing data to either internal or external SSDs at a rate of at least 500 MB/s
    - ii. The system should also support streaming the captured data to another processor via a 10 Gigabit ethernet link (ideally compatible with the 10 GbE link of an NVIDIA Orin Processor). The data rate on this link should support up to 800 MB/s.
  - g. Ability to phase lock to a reference clock and perform phase synchronisation of multiple processors on a pulse-by-pulse basis. This is to allow the digital back-end to be extended to control larger digital arrays.
4. The solution must be light-weight and compact (as specified in the performance specifications) to allow integration and operations within a smaller UAV.
  5. The solution must be robust and able to operate in harsh environmental conditions.

### 3.2 Interface Specifications for Radar Back-End Processor solution

1. Mezzanine expansion slots to allow different option for A/D and D/A to be configured.
  - a. Should support at least two mezzanine (plugin) cards to allow configuration of solutions for A/D and D/A.
  - b. As a minimum the solution should support at least two channels of A/D and D/A at minimum of 2.2 GHz sampling rate and 14bit A/D resolution, for example:
    - i. A dual channel 2.4 GHz 14-bit Digital to Analog Converter Mezzanine Card based on the Analog devices AD 9129 or similar
    - ii. A dual channel 2.4 GHz 14-bit Analog to Digital Converter Mezzanine Card based on the Analog Devices AD9689
2. 1 Gigabit Ethernet (GigE) Network Interface (RJ-45) that allows the GPU processor (provided by CSIR) to control and set up the digital back end.
3. At least two USB-3 or USB-C Host Interfaces or internal M.2 SSD to allow data recording
4. At least one 10 Gigabit SFP Network Interfaces to allow streaming of digital back-end data to the GPU processor for further processing
5. 10 MHz 50Ω coaxial connector for reference clock
6. Intra-module Synchronization Interfaces allowing multiple digital back-ends to be time and phase synchronised allowing larger arrays to be handled by the same technology.
7. PCIe/Power Mezzanine Slot



- a. Standard module 7-28VDC input
- b. PCIe Dual USB-3 Interface or internal M.2 Interface

### **3.3 Performance Specifications for Radar Back-End Processor solution**

1. IF Signal Frequency range up to 1.9GHz
2. Instantaneous Bandwidth: up to 600 MHz
3. At least 55 dB of spurious free dynamic range in the Analog to Digital converter when sampling a 300 MHz IBW Chirp signal.
4. Data Communication speed: at least 10 Gbps via 10 GbE interface
5. Data Recording capacity: at least 2 TB if onboard SSD
6. Data recording rates: at least 500 MB/s
7. Power Consumption: < 50W
8. Size of enclosure:
9. Conduction cooled operations from -10°C to 50°C
10. Total Mass of solution < 1kg

Note: Size, Mass and Power specifications are critical for the application

### **3.4 Support Requirements**

The supplier must be able and willing to provide technical support the CSIR team to integrate and configure their Radar Processing Back-end solution into the UAVSAR Sensor product.

### **3.5 Export Restrictions**

The supplied digital back-end should not carry ITAR restrictions

## **4 RFP REQUIREMENTS**

The following must be submitted as part of the Technical proposal:

1. Covering letter and/or company profile stating the company's history and track-record of supplying their product for similar applications.
2. A technical proposal and/or product brochure must be provided with the technical details of the offered solution that contains a comprehensive description, functional and performance specifications of the offered technical solution.
3. Completed Compliance Matrix (Refer to Annexure A.)
4. Reference letter(s) from previous client(s)

This information will be utilised to confirm compliance to the requirement specifications in Section 3 of this document and will determine the scoring in Annexure A.

### **4.2 Financial Proposal**

The following must be submitted as part of the financial proposal:

1. Proposed cost/ commercial offer on official company letterhead.
2. Applicable Terms and Conditions to the quote
3. The pricing must be firm and inclusive of all costs and disbursements required to render the required services to the CSIR.
4. Provide a valid original or certified copy of B-BBEE certificate or valid sworn affidavit.
5. Completed and signed SBD 1 form.
6. Completed and signed SBD 4 form.

### **4.3 Functional / Evaluation Criteria**

1. Refer to Annexure A for the evaluation and scoring criteria used in this process.
2. 100 % technical compliance is required for the technical solution
3. Proposals with functionality / technical points of less than the pre-determined minimum overall percentage of 70% will be eliminated from further evaluation.

### **4.4 Elimination Criteria**

1. Proposals will be eliminated under the following conditions:

- Submission after the deadline;
- Proposals submitted at incorrect location (Bids must be submitted electronically at [tender@csir.co.za](mailto:tender@csir.co.za) );
- Suppliers listed on National Treasury List of restricted suppliers
- Suppliers listed on National Treasury List of defaulters suppliers
- Completed and signed SBD 1 form.
- Completed and signed SBD 4 form.

## 5 PRICING SCHEDULE

Bidders must price as per the below pricing schedule for the purposes of evaluation:

No.	Product ID	Description	Qty	Item Cost	Total Cost
				<b>Sub-total</b>	
				<b>VAT</b>	
				<b>Total</b>	

Clearly state the Currency for the quote.

### Notes to Pricing:

Bidders are to note that if the price offered by the highest scoring bidder is not market-related, CSIR may not award the contract to that bidder. CSIR may:

- negotiate a market-related price with the Respondent scoring the highest points or cancel the RFP;
- if that bidder does not agree to a market-related price, negotiate a market-related price with the bidder scoring the second highest points or cancel the RFP;
- if the bidder scoring the second highest points does not agree to a market-related price, negotiate a market-related price with the bidder scoring the third highest points or cancel the RFP.

- If a market-related price is not agreed with the bidder scoring the third highest points, CSIR may cancel the RFP.

**NB: The above cost must be inclusive of all costs required to render the required services as per above scope of work;**

## **6 NATIONAL TREASURY CENTRAL SUPPLIER DATABASE REGISTRATION**

Before any negotiations will start with the winning bidder it will be required from the winning bidder to:

- be registered on National Treasury's Central Supplier Database (CSD). Registrations can be completed online at: [www.csd.gov.za](http://www.csd.gov.za);
- provide the CSIR of their CSD registration number; and
- provide the CSIR with a certified copy of their B-BBEE certificate. If no certificate can be provided, no points will be scored during the evaluation process. (RSA suppliers only)

## SECTION B – TERMS AND CONDITIONS

### 7 SUBMISSION OF PROPOSALS

- 7.1 All proposals must be submitted electronically to [tender@csir.co.za](mailto:tender@csir.co.za). No late proposals will be accepted.
- 7.2 Responses submitted by companies must be signed by a person or persons duly authorised.
- 7.3 Respondents must use the RFP number as the subject reference number when submitting their bids.
- 7.4 All e-mailed proposal submissions are to be clearly subject-referenced with the RFP number. Proposals must consist of two parts, each of which must be sent in two separate e-mails with the following subject:
- PART 1: Technical Proposal RFP No: 1030/19/09/2022
  - PART 2: Pricing Proposal RFP No: 1030/19/09/2022
- 7.5 The e-mail and file sizes should not exceed a total of 25MB per e-mail.
- 7.6 The naming/labeling syntax of files or documents must be short and simple (e.g., Product Catalogues).
- 7.7 All documents submitted electronically via e-mail must be clear and visible.
- 7.8 All proposals, documents, and late submissions after the due date will not be evaluated.
- 7.9 The CSIR will award the contract to qualified tenderer(s)' whose proposal is determined to be the most advantageous to the CSIR, taking into consideration the technical (functional) solution, price, and B-BBEE.
- 7.10 Proposals submitted must be in the following file formats:
- PDF

**NB: NO HARD COPIES OR PHYSICAL SUBMISSIONS WILL BE ACCEPTED**

### 8 TENDER PROGRAMME

The tender program, as currently envisaged, incorporates the following key dates:

- Issue of tender documents: 05/09/2022
- Last day of tender queries 13/09/2022
- Closing / submission Date: 19/09/2022

## **9 DEADLINE FOR SUBMISSION**

- 9.1** Proposals shall be submitted at the e-mail address mentioned above no later than the closing date of 19/09/2022.
- 9.2** Where a proposal is not received by the CSIR by the due date and stipulated e-mail address, it will be regarded as a late submission. Late submissions will not be considered.

## **10 AWARDING OF TENDERS**

Awarding of tenders will be published on the National Treasury e-tender portal or the CSIR's tender website. No regret letters will be sent out.

## **11 EVALUATION PROCESS**

### **11.1** Evaluation of proposals

An evaluation team will evaluate all proposals for functionality, price, and B-BBEE. Based on the results of the evaluation process and upon successful negotiations, the CSIR will approve the awarding of the contract to successful tenderer/s.

### **11.2** A two-phase evaluation process will be followed:

The first phase includes evaluation of elimination and functionality criteria,

The second phase includes the evaluation of price and B-BBEE status.

Pricing Proposals will only be considered after functionality phase has been adjudicated and accepted. Only proposals that achieved the specified minimum qualification scores for functionality will be evaluated further using the preference points system.

### **11.3** Preference points system

The 80/20 preference point system will be used where 80 points will be dedicated to pricing and 20 points to B-BBEE status. If all tenders received are more than R50m, the proposal will be cancelled and re-issued.

## **12 PRICING PROPOSAL**

- 12.1** Pricing proposal must be cross-referenced to the sections in the Technical Proposal. Any options offered must be clearly labelled. Separate pricing must be provided for each option offered to ensure that pricing comparisons are clear and unambiguous.

- 12.2** For South African Suppliers the Price needs to be provided in South African Rand (excl. VAT), with details on price elements that are subject to escalation and exchange rate fluctuations clearly indicated.
- 12.3** Foreign suppliers not registered in South Africa may quote the price in USD or EURO and this must be clearly indicated in the Quotation.
- 12.4** Price should include additional cost elements such as freight, insurance until acceptance, duty where applicable.
- 12.5** Only firm prices\* will be accepted during the tender validity period. Non-firm prices\*\* (including prices subject to rates of exchange variations) will not be considered.

\*Firm price is the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax which, in terms of a law or regulation is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;

\*\*Non-firm price is all prices other than “firm” prices.

- 12.6** Bidders must quote as per the pricing schedule.
- 12.7** Payment will be according to the CSIR Payment Terms and Conditions unless otherwise agreed to.

## **13 VALIDITY PERIOD OF PROPOSAL**

Each proposal shall be valid for a minimum period of six (6) months calculated from the closing date.

## **14 APPOINTMENT OF SERVICE PROVIDER**

- 14.1** The contract will be awarded to the tenderer who scores the highest total number of points during the evaluation process, except where the law permits otherwise.
- 14.2** Appointment as a successful service provider shall be subject to the parties agreeing to mutually acceptable contractual terms and conditions. In the event of the parties failing to reach such agreement CSIR reserves the right to appoint an alternative supplier.

**14.3** Awarding of contracts will be announced on the National Treasury website and no regret letters will be sent to unsuccessful bidders.

## **15 ENQUIRIES AND CONTACT WITH THE CSIR**

Any enquiry regarding this tender shall be submitted in writing to CSIR at [tender@csir.co.za](mailto:tender@csir.co.za) with "RFP No. 1030/19/09/2022 as the subject.

Any other contact with CSIR personnel involved in this tender is not permitted during the RFP process other than as required through existing service arrangements or as requested by the CSIR as part of the RFP process.

## **16 MEDIUM OF COMMUNICATION**

All documentation submitted in response to this RFP must be in English.

## **17 COST OF PROPOSAL**

Tenderers are expected to fully acquaint themselves with the conditions, requirements and specifications of this RFP before submitting proposals. Each tenderer assumes all risks for resource commitment and expenses, direct or indirect, of proposal preparation and participation throughout the RFP process. **The CSIR is not responsible directly or indirectly for any costs incurred by tenderers.**

## **18 CORRECTNESS OF RESPONSES**

**18.1** The tenderer must confirm satisfaction regarding the correctness and validity of their proposal and that all prices and rates quoted cover all the work/items specified in the RFP.

The prices and rates quoted must cover all obligations under any resulting contract.

**18.2** The tenderer accepts that any mistakes regarding prices and calculations will be at their own risk.



## **19 VERIFICATION OF DOCUMENTS**

- 19.1** Tenderers should check the numbers of the pages to satisfy themselves that none are missing or duplicated. No liability will be accepted by the CSIR in regard to anything arising from the fact that pages are missing or duplicated.
- 19.2** Only one electronic copy of the proposal (Technical and Financial) must be submitted via e-mail to [tender@csir.co.za](mailto:tender@csir.co.za). If the bidder sends more than one proposal, the first submission shall take precedence should it not have been recalled/withdrawn in writing by the bidder.
- 19.3** Pricing schedule and B-BBEE credentials should be submitted with the proposal, but as a separate document and no such information should be available in the technical proposal.

## **20 SUB-CONTRACTING**

- 20.1** A tenderer will not be awarded points for B-BBEE status level if it is indicated in the tender documents that such a tenderer intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a tenderer qualifies for, unless the intended sub-contractor is an exempted micro enterprise that has the capability and ability to execute the sub-contract.
- 20.2** A tenderer awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an exempted micro enterprise that has the capability and ability to execute the sub-contract.

## **21 ADDITIONAL TERMS AND CONDITIONS**

- 21.1** A tenderer shall not assume that information and/or documents supplied to CSIR, at any time prior to this request, are still available to CSIR, and shall consequently not make any reference to such information document in its response to this request.
- 21.2** Copies of any affiliations, memberships and/or accreditations that support your submission must be included in the tender.
- 21.3** In case of proposal from a joint venture, the following must be submitted together with the proposal:
- Joint venture Agreement including split of work signed by both parties;
  - The original or certified copy of the B-BBEE certificate of the joint venture;

- The Tax Clearance Certificate of each joint venture member;
- Proof of ownership/shareholder certificates/copies; and
- Company registration certificates.

**21.4** An omission to disclose material information, a factual inaccuracy, and/or a misrepresentation of fact may result in the disqualification of a tender, or cancellation of any subsequent contract.

**21.5** Failure to comply with any of the terms and conditions as set out in this document will invalidate the Proposal.

## **22 CSIR RESERVES THE RIGHT TO**

**22.1** Extend the closing date;

**22.2** Verify any information contained in a proposal;

**22.3** Request documentary proof regarding any tendering issue;

**22.4** Give preference to locally manufactured goods;

**22.5** Appoint one or more service providers, separately or jointly (whether or not they submitted a joint proposal);

**22.6** Award this RFP as a whole or in part;

**22.7** Cancel or withdraw this RFP as a whole or in part.

## **23 DISCLAIMER**

This RFP is a request for proposals only and not an offer document. Answers to this RFP must not be construed as acceptance of an offer or imply the existence of a contract between the parties. By submission of its proposal, tenderers shall be deemed to have satisfied themselves with and to have accepted all Terms & Conditions of this RFP. The CSIR makes no representation, warranty, assurance, guarantee or endorsements to tenderer concerning the RFP, whether with regard to its accuracy, completeness or otherwise and the CSIR shall have no liability towards the tenderer or any other party in connection therewith.

**DECLARATION BY TENDERER**

**Only tenderers who completed the declaration below will be considered for evaluation.**

**RFP No: 1030/19/09/2022**

I hereby undertake to render services described in the attached tendering documents to CSIR in accordance with the requirements and task directives / proposal specifications stipulated in **RFP No. 1030/19/09/2022** at the price/s quoted. My offer/s remains binding upon me and open for acceptance by the CSIR during the validity period indicated and calculated from the closing date of the proposal.

I confirm that I am satisfied with regards to the correctness and validity of my proposal; that the price(s) and rate(s) quoted cover all the services specified in the proposal documents; that the price(s) and rate(s) cover all my obligations and I accept that any mistakes regarding price(s) and rate(s) and calculations will be at my own risk.

I accept full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on me under this proposal as the principal liable for the due fulfilment of this proposal.

I declare that I have no participation in any collusive practices with any tenderer or any other person regarding this or any other proposal.

I accept that the CSIR may take appropriate actions, deemed necessary, should there be a conflict of interest or if this declaration proves to be false.

I confirm that I am duly authorised to sign this proposal.

NAME (PRINT) .....

CAPACITY .....

SIGNATURE .....

NAME OF FIRM .....

DATE .....

WITNESSES	
1	.....
2	.....
DATE:	
.....	

## 24 ANNEXURE A – Technical criteria and scoring

### 24.1 Technical Compliance

Full compliance to technical Requirement Specifications is required since this Radar Back-End Processor needs to be integrated into the Synthetic Aperture Radar System.

*Indicate compliance of the product solution to each specifications in the compliance matrix.*

No	Requirement	Compliance
<b>Section 3.1</b>	<b>High-level Requirements for Radar Back-End Processor solution</b>	<b>Comply Not Comply</b>
3.1) 1.a	Radar Back-End Processor hardware packaged within an enclosure that contains the integrated electronic modules	
3.1) 1.b	Board support package with a library of firmware and software building blocks for required radar processing functions	
3.1) 1.c	Comprehensive set of documentation and example code to enable CSIR engineers to configure the Radar Back-End Processor for the required real-time SAR processing	
3.1) 2.	The Radar Back-End Processor solution must be adaptable, reconfigurable and modular	
3.1) 3.	The Radar Back-End Processor solution make provision for the required functions as specified, including: <ul style="list-style-type: none"> <li>• Radar Waveform Generation</li> <li>• Radar timing &amp; control signal generation</li> <li>• Multi-channel digital receiver</li> <li>• Signal processing <ul style="list-style-type: none"> <li>○ Digital Receiver Processing</li> <li>○ Digital Pulse Compression (Matched Filtering) Processing</li> <li>○ Equalisation Processing</li> <li>○ Chanellisation of sub-channels from the wider instantaneous bandwidth</li> </ul> </li> <li>• Digital and analogue I/O</li> <li>• Data acquisition &amp; distribution</li> <li>• Ability to phase lock to a reference clock and phase synchronisation of multiple processors on a pulse-by-pulse basis</li> </ul>	
3.1) 4.	The solution must be light-weight and compact (as specified in the performance specifications) to allow integration and operations within a UAV.	
3.1) 5.	The solution must be robust and able to operate in harsh environmental conditions.	
<b>Section 5.5</b>	The solution is not classified as an ITAR component and does not include and component with ITAR restrictions	

No	Requirement	Compliance
<b>Section 3.2</b>	<b>Interface Specifications for Radar Back-End Processor solution</b> Solution makes provision for all the required interfaces:	<b>Comply</b> <b>Not Comply</b>
3.2) 1.a.	Support at least two mezzanine (plugin) cards to allow configuration of solutions for A/D and D/A.	
3.2) 1.b.	Support at least two channels of A/D and D/A at minimum of 2.2 GHz sampling rate and 14bit A/D resolution.	
3.2) 2.	1 Gigabit Ethernet (GigE) Network Interface (RJ-45)	
3.2) 3.	At least two USB-3 or USB-C Host Interfaces or internal M.2 SSD	
3.2) 4.	At least one 10 Gigabit SFP Network Interfaces	
3.2) 5.	10 MHz 50Ω coaxial connector for reference clock	
3.2) 6.	Intra-module Synchronization Interfaces allowing multiple digital back-ends to be time and phase synchronised	
3.2) 7.	PCIe/Power Mezzanine Slot	

No	Requirement	Compliance
<b>Section 3.3</b>	<b>Performance Specifications for Radar Back-End Processor solution</b>	<b>Comply</b> <b>Not Comply</b>
3.3) 1.	IF Signal frequency range for A/D and D/A: Up to 1.9 GHz	
3.3) 2.	Instantaneous Bandwidth: at least 600 MHz	
3.3) 3.	At least 55 dB of spurious free dynamic range in the Analog to Digital converter when sampling a 300 MHz IBW Chirp signal	
3.3) 4.	Data Communication speed: at least 10 Gbps via 10 GbE interface	
3.3) 5.	Data Recording capacity: at least 2 TB for onboard SSD	
3.3) 6.	Data recording rates: at least 500 MB/s	
3.3) 7.	Power Consumption: < 50W	
3.3) 8.	Size of enclosure: <= 220mm(L) x 85mm(W) x 35mm (H)	
3.3) 9.	Conduction cooled operations from -10°C to 50°C	
3.3) 10.	Mass: under 1kg	

## 24.1 Scoring Matrix

No	Tender Requirement	Criteria Score	Maximum Score	Tender Score
1	Technical Compliance	Comply = 70 Non Compliant = 0	70	
2	Supplier categorisation <ul style="list-style-type: none"> <li>Original Equipment Manufacturer (OEM) of compliant solution</li> <li>Not OEM but able to provide technical compliant solution</li> <li>Supplier unable to provide technical compliant solution</li> </ul>	OEM = 10  Qualified supplier = 5  Unsuitable supplier = 0	10	
3	Supplier Support <ul style="list-style-type: none"> <li>Supplier capable and willing to support integration and configuration of supplied solution</li> <li>Supplier incapable or not willing to support integration and configuration of supplied solution</li> </ul>	Support = 10  No Support = 0	10	
4	Reference Letter <ul style="list-style-type: none"> <li>3 or more reference letters</li> <li>1 – 2 reference letters</li> <li>0 Reference letters</li> </ul>	>2 letters = 10  1 – 2 letters = 5  0 letters = 0	10	
	<b>Total SCORE</b>		<b>100</b>	

## 25 ANNEXURE B – RETURNABLE CHECKLIST

**NOTE:** The bidder is required to complete each and every schedule listed below to the best of his ability as the evaluation of tenders and the eventual contract will be based on the information provided by the bidder. Failure of a bidder to complete the schedules and forms to the satisfaction of the CSIR will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is not responsive.

The bidder must complete the following returnable documents:

<b>RETURNABLE DOCUMENTS –</b>			
<b>PART A: TECHNICAL RETURNABLES</b>			
<b>Description:</b>	<b>Included</b>		
	<b>N/A</b>	<b>Yes</b>	<b>No</b>
Covering letter and/or company profile			
Technical proposal and/or product brochure			
Completed Compliance Matrix			
Reference Letter(s)			
<b>PART B: PRICING PROPOSAL</b>			
Pricing Proposal / Quotation			
B-BBEE Certificate (If applicable)			
Completed SBD1 Form			
Completed SBD 4 form			
Supplier declaration			
South African Central Supplier Database (CSD) Report (If Applicable)			

***Any other relevant document may be submitted, to substantiate the bidder's proposal.***

**26 ANNEXURE C – SBD 1**

**27 ANNEXURE D – SBD 4**