TO: All Bidders
FROM: Sally Alvarez de Scheiner
Chief, Procurement Services Section
DATE: 6 November 2023
REF.: RFP No 2023-0139/SANZ

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SUBJECT: Extension of Deadline and Clarifications No. 1 – RFP No 2023-0139/SANZ

Dear Bidders,

Please find attached Clarifications No. 1 related to queries raised by bidders in respect to RFP No 2023-0139/SANZ Development of data processing software for gravitational field mapping.

Kindly note that Section 1 and 2 of the Terms of Reference have been amended a per attached version (Rev. 2 November 2023 – new text in red font for ease of reference) and therefore the Terms of Reference part of the RFP are hereby replaced in whole with the attached version (Rev. 2 November 2023),

Furthermore, the deadline for the submission of proposal is hereby extended to Friday, 10 November 2023, 17:00 hours, Vienna (Austria) local time.

The attached Clarifications no. 1 and revised Terms of Reference are an integral part of the RFP documents and shall be considered in the preparation and submission of proposal. In case you have already submitted your proposal, if you deemed it necessary, you may submit a revised proposal to take into consideration the attached clarifications and revised Terms of Reference, if and as appropriate.

We are looking forward to receiving your bid prior to the extended deadline on 10 November 2023 17:00 hours, Vienna (Austria) local time.

Sincerely,

Sally Alvarez de Schreiner
Chief, Procurement Services Section

Attachment:
- Question and Answer - Clarifications No. 1
- Terms of Reference – Rev. 2 November 23
<table>
<thead>
<tr>
<th>Item#</th>
<th>Question</th>
<th>Answer</th>
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</table>
| 1    | The RFP states that the programming language should be Python. Is it acceptable to present a proposal that combine JavaScript and Python in the deliverable. | Yes, it is acceptable to present a proposal that combines JavaScript and Python.  
See revised Section 2 “Scope of Work” in the attached amended Terms of Reference. |
| 2    | Can the Commission provide further detail on the format of data to be input for the terrain correction. Can it be assumed that the data will all be in a standard XYZ format to enter into the OSI GRV software, regardless of the origin of the data. | Additional details are now added in the attached amended Terms of Reference – Section 2 “Scope of Work” – Section 2.1. |
| 3    | The DTM used in the terrain correction is likely the only input not acquired directly by the OSI GRV site team. Given the wide range of data that could be available during an OSI, can the Commission provide further detail on the anticipated minimum resolution of the DTM likely to be used in the terrain correction and how this might vary with distance from the GRV target area? | Further details are now added in the attached amended Terms of Reference – Section 2 “Scope of Work” – Section 2.1 |
| 4    | Can the Commission confirm whether there is preference for how the OSI GRV software is delivered? Ie as a web based interface, or a tablet based application? | Please refer to Section 1.1 of the Terms of Reference - the software needs to be a software application compatible with the OSI Working Area setup. The application is not a tablet-based application. It could be a browser-based application but does not have to be. |
| 5    | Would the developed system need to run both as a Client-Server configuration or as a standalone client-based application, or both. Would there ever be a need to access the server (if there is one) over the internet rather than a local network? | Please refer to Section 1.1 of the Terms of Reference.  
The OSI Working Area environment can be described as a client-server configuration where OSI applications are run in a local, air-gapped network. There will not be a need to access the server over the internet. The servers host a virtual desktop infrastructure (VDI) environment with a mixture of Linux and Windows virtual machines. |
| 6    | Authentication and Security – We will apply our normal levels of security to any designed system in terms of data transfer and storage encryption, and user account management. Are there any special requirements such as connections with SSO (e.g Active Directory) in this respect. | As stated in Section 2.2 of the Terms of Reference, the details of the implementation plan will be discussed as a part of the planning of the work at the CTBTO TeST Centre in Seibersdorf, Austria. The Commission does not use SSO but a local active directory. |
| 7    | Can the Commission provide an anticipated award / start date for the project. This could not be located in the FP. | An award is estimated in December 2023. |
| 8    | Looking at it from a process view, is there any chance for a better understanding to have the chance of having a workshop front up for a better scoping of your requirements. | A pre-bid conference is not envisaged for this RFP. |
9. Can we propose a different approach (different to that proposed from your side) to define the final SOW for implementation?  
   Please refer to Instructions to Bidders, part I Technical Proposal, description of services. 
   Any proposed approach shall comply with the functional requirements outlined in the Terms of Reference.

10. Is there a chance to work together with Microsoft on this topic for a local Austrian Azure Cloud Implementation of the final solution?  
    No, this will not be necessary. This is an offline, air-gapped system, not cloud based.

11. We noticed that the software is required to include “input options compatible with the OSI gravimeter and the surveying data”. However, it would be helpful if you could kindly provide more context regarding the type of gravimeter and the nature of the surveying data.  
    More information is now included in the attached revised Terms of Reference – Section 2.1 – the current model of the OSI gravimeter is Scintrex CG-5, and the GRV software should be compatible with a direct Scintrex CG-5 and CG-6 data input. Additionally, at least generalized input for gravity data and the surveying data is needed. Any further details of the input options will be agreed on as a part of the planning of the work at the CTBTO TeST Centre in Seibersdorf, Austria.

12. The item “Options to reject data points…” is listed under the corrections that the software should enable. We believe this might be a general requirement rather than a correction. If our understanding is incorrect, could you please clarify its meaning?  
    Yes, this should be a cross-cutting feature rather than an individual correction. In Section 2.1 of the Terms of Reference, it is specifically referred to an ability to reject data points at the start of the data processing based on criteria such as standard deviation and stability over several measurement cycles, but it should be possible to also reject data points at any point stage of the correction steps.

13. We would appreciate more information on “Gravimeter calibration factors”, which is also listed under corrections. We’re assuming it’s a general requirement, but it’s not entirely clear what role the calibration factors play in the software. Are they part of the input or should we consider another input route?  
    This refers to the possible need to apply the calibration factors separately, e.g., in case of a LaCoste-Romberg gravimeter. In case of Scintrex CG-5 and CG-6 there is no need to apply separate calibration factors.

14. Could you please provide more details about the output format? Specifically, we’re interested in knowing which formats are compatible with the forward modelling and inversion software used by the Commission and GIMO?  
    Please see Section 2.1 in the attached revised Terms of Reference.

15. In what month/year does the Commission anticipate issuing a Purchase Order for this project? For planning purposes, it would be helpful to know if this is likely to be in December 2023, or in January or February 2024? Travel costs to Vienna and then Seibersdorf are likely to be prohibitive during December; we assume no PO will be issued before December 1, 2023. Is this assumption correct?  
    See answer to Question 7 above.

16. The Commission writes it is expecting delivery of validated software and documentation within 15 weeks of the acceptance of an implementation plan. Using an Agile methodology with 3 week Sprints, this implies only 5 cycles of work from initial design, through architecture, creation of a CI/CD pipeline for all modules, coding, testing, Timeframe is specified in Section 3 of the Terms of Reference; the proposed timeframe will be part of the Evaluation Criteria (see Attachment 2 of the RFP).
and at least one cycle of user feedback and changes. This is especially problematic for the creation and acceptance of software with a brand new and unfamiliar GUI, where end user feedback is mandatory but difficult to obtain promptly. Could the time to final delivery of the data processing software and documentation be extended, if the contractor demonstrates to the Commission's satisfaction this is required in the implementation planning phase?
ANNEX B

Terms of Reference

Development of data processing software for gravitational field mapping

Revised 02/11/2023
1 BACKGROUND

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (hereinafter referred to as the “Commission”) operates a global verification regime to monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty. It provides timely data, assessments and other products and services to Signatory States of the Treaty. More information on CTBTO is available at www.ctbto.org.

An On-Site Inspection (OSI) is the final verification measure to verify States’ compliance with the CTBT. The purpose of an On-Site Inspection (OSI) is to clarify whether a nuclear weapon test explosion or any other nuclear explosion has been carried out in violation of Article I (of the CTBT) and to the extent possible, to gather any facts which might assist in identifying any possible violator.

Gravitational field mapping (GRV) is one of the geophysical techniques that can be used during an OSI. Currently, the Commission is working to develop OSI GRV workflow, including a data processing and visualization software for the OSI microgravity applications, compatible with the Geospatial Information Management system for On-site inspections (GIMO) and the OSI IT architecture (see below).

The Commission outlines here the Terms of Reference (ToR) for “Development of data processing software for gravitational field mapping”, hereinafter referred as to “Work/Services”.

1.1 OSI IT architecture

To handle and manage the information, the inspection team deploys and uses a secure local area network (LAN) at the base of operations; the LAN consists of a mobile cluster of servers, 30 zero clients and other related infrastructure, including optical cables and switches. The servers host a virtual desktop infrastructure (VDI) environment with a mixture of Linux and Windows virtual machines (see Figure 1). The software needs to be a software application compatible with this OSI Working Area setup.
2 SCOPE OF WORK

Since there are no commercially available options that would readily suit the OSI needs, the Commission seeks to build a dedicated 2D/3D OSI GRV data processing software for the relative gravity data reduction with a graphical interface. The programming language should be Python (for the GUI also other solutions, e.g., JavaScript, are acceptable in combination with Python) and the rights shall belong to the Commission.

2.1 GRV software specifications

The GRV data processing and visualization software shall include at least:
- Input options compatible with the OSI gravimeter and surveying data (at least direct inputs for Scintrex CG-5 and CG-6 data, and a generalized gravity data input + generalized input for positioning data).
- The following corrections:
  * Options to reject data points based on various criteria (e.g., based on standard deviation and stability over several measurement cycles for the raw data, and visually based on user discretion at any point during the processing)
  * Gravimeter calibration factors (needed, e.g., in case of a LaCoste-Romberg gravimeter for which the calibration factors are provided separately from the collected data)
  * Drift correction with ability to handle several base station locations
  * Tidal correction
  * Latitude correction
  * Free-air correction (relative to agreed set of reference ellipsoids)
  * Bouguer correction (with options for determining the appropriate density)
  * Terrain correction (with a range of input options for terrain data)

[Generally the OSI applications may require detecting gravity anomalies of about 10-20 µGals. To achieve this, the required digital terrain model resolution may be better than 1 m in close vicinity of the GRV target area (and the digital terrain data may be acquired by the OSI GRV team), while further away resolution of a couple of meters might be sufficient. The GRV software should allow for changing resolution of the digital terrain model data depending on the distance from the GRV data point. The required overall area for the terrain correction will depend on the topography but can be estimated to be a couple of tens times a couple of tens of kilometers at maximum. The digital terrain data available in different parts of the world may come in a range of formats, however, use of GIS software can be assumed to take place before inputting the terrain data into the GRV software, and a standard XYZ format for the input is a good starting point.]
  * Atmospheric pressure correction
  * Regional trend removal

- Visualization options for the 2D/3D raw data, corrections, and final anomaly profile/grid
- Output options compatible with the forward modelling and inversion software of the Commission, and the GIMO (tentatively, at least GamField for forward modeling and Oasis Montaj for forward and inverse modeling).
- GUI for all the functions of the software (e.g., JavaScript may be used for the GUI implementation)
- Documentation for the use of the software
The exact details of the Work, including the input and output formats, are to be agreed together with the Commission upon the start of the Work (see below).

2.2 Visits to CTBTO TeST Centre, Seibersdorf, Austria

The Contractor shall participate in two (2) three-day visits to the CTBTO TeST Centre in Seibersdorf, Austria:

1) To get familiar with the planned OSI GRV data flow and GIMO within the OSI IT architecture, and to plan the implementation of the Work, and

2) To install, test and validate the GRV software at the CTBTO TeST Centre, Seibersdorf, Austria

3 DELIVERABLES AND TIMEFRAME REQUIREMENTS

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<tr>
<th>Deliverable</th>
<th>Location (if any)</th>
<th>Timeframe requirements</th>
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<tbody>
<tr>
<td>Implementation Plan</td>
<td>Planning at the CTBTO TeST Centre, Seibersdorf, Austria (2.2)</td>
<td>Within 4 weeks from the date of the Purchase Order</td>
</tr>
<tr>
<td>Provision of data processing software, with documentation, for gravitational field mapping (2.1)</td>
<td>Installation and validation at the CTBTO TeST Centre, Seibersdorf, Austria (2.2)</td>
<td>Within 15 weeks from acceptance by the Commission of the Implementation Plan (above)</td>
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4 COMMUNICATION

The Commission will appoint a Technical Officer as the Point of Contact (PoC) for this project, who will closely liaise with the Contractor throughout the period of this project. In this regard the Contractor shall:

- Coordinate and regularly update the Commission on all activities under these ToR,
- Respond effectively and accurately to any question on the Services from the Commission,
- Ensure that all communication will be in English and, if not in person, through e-mail, phone or video conferencing, and
- Provide deliverables in accordance with Section 2 “SCOPE OF WORK” and Section 3 “DELIVERABLES AND TIMEFRAME REQUIREMENTS” above.
The Commission reserves the right to provide comments and request revisions on any deliverable as well as to request additional information/modifications to be considered or provided within two weeks of receipt of a deliverable.

5 QUALIFICATIONS

Requirements for the Contractor:

5.1 A minimum of five (5) years’ experience managing software of a similar scope and complexity.

5.2 A minimum of five (5) years’ experience in applying Agile methodologies and leveraging CI/CD practices to software engineering projects.

5.3 A minimum of five (5) years’ experience in utilising Git version control, particularly in software development, to manage codebase history.

Requirements for the Contractor’s Personnel:

5.4 An advanced university degree in software engineering, geophysics or other relevant field.

5.5 A minimum of five (5) years of experience in software development with Python.

5.6 A minimum of two (2) years of experience in and proven knowledge of software development for gravity data processing.

5.7 Effective communication skills in English.