

REQUEST FOR PROPOSAL



To: ALL BIDDERS

Vienna, 1400
Austria

Attn:

CTBTO Ref. No.: 2025-0168/POLONSKAYA
(PLEASE QUOTE ON ALL COMMUNICATIONS)

Tel. No.: +43 (1) 26030-6350

E-mail: procurement@ctbto.org

Date: 30 Oct 25

Subject: Sensors and integration with SPOT robotic platform

Deadline for Submission: 13 Nov 25

Vienna Local Time: 17:00

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (hereinafter referred to as the 'Commission') hereby invites you to submit a proposal that meets the requirements of the attached documents.

You are kindly requested to complete and return the acknowledgment form by email as soon as possible.

If you have any questions you should contact the email address indicated above.

Yours Sincerely,


Selma Bukvic,
OiC, Procurement Services Section

ACKNOWLEDGEMENT FORM

Solicitation No: 2025-0168

Title: Sensors and integration with SPOT robotic platform

Closing Date: 13 Nov 25

Vienna Local Time: 17:00

Procurement Staff: Olga Polonskaya

CTBTO Req. No.: 0010027858

Please complete 'A' or 'B' or 'C'
and Return

WITHIN FIVE (5) DAYS

THE PREPARATORY COMMISSION FOR THE
COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION (CTBTO)

by email to
procurement@ctbto.org

A: We shall submit our proposal

By: _____
(date)

Company Name: _____

Contact Name: _____

Email/Tel: _____

B: We may submit and will advise

By: _____
(date)

Company Name: _____

Contact Name: _____

Email/Tel: _____

C: We will not submit a proposal for the following reason(s)

- ☐ our current workload does not permit us to take on additional work at this time;
- ☐ we do not have the required expertise for this specific project;
- ☐ insufficient time to prepare a proper submission;
- ☐ other (please specify) _____

Company Name: _____

Contact Name: _____

Email/Tel: _____

INSTRUCTIONS FOR PREPARATION AND SUBMISSION OF PROPOSALS

1. General

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (the “Commission”) with its headquarters in Vienna, Austria, is the International Organization mandated to establish the global verification system foreseen under the Comprehensive Nuclear-Test-Ban Treaty (CTBT), which is the Treaty banning any nuclear weapon test explosion or any other nuclear explosions. The Treaty provides for a global verification regime, including a network of 321 stations worldwide, a communication system, an International Data Centre and on-site inspections to monitor compliance with the Treaty.

This Request for Proposal (RFP 2025-0168) is for the provision of Services and Goods as described in the Terms of Reference for “*Sensor array and integration with Spot robotic platform*” (hereinafter referred to as the “Services”).

For this purpose, the Commission wishes to solicit a competitive offer (Proposal) for the required services in accordance with the attached Terms of Reference.

The Proposal shall meet all requirements stated in the Terms of Reference. For this project, the Commission is seeking capabilities, which will ensure that the services are performed in timely manner, acceptable quality and at a reasonable cost.

2. Documents included in this RFP

This RFP consists of the following documents:

1. Letter of Invitation;
2. These Instructions for Preparation and Submission of Proposals, including the Bidder’s Statement and the following attachments:
 - Attachment 1: Procedure for Submission of Electronic Offers in 2 sealed files;
 - Attachment 2: Evaluation Criteria and Method;
 - Attachment 3: Technical Compliance Matrix; and
 - Attachment 4: Financial Bid - Price Schedule Form.
3. Vendor Profile Form;
4. Statement of Confirmation;
5. The Commission’s Model Contract and its Annexes:
 - Annex A: The Commission’s License Agreement;
 - Annex B: The Commission’s General Conditions of Contract, also available at [CTBTO General Conditions of Contract 08-10-2021_final.docx](#) and incorporated hereby by reference;
 - Annex C: The Commission’s Terms of Reference.

Note: In the event of award, the Proposal will be incorporated as Annex D to the Contract.

6. List of CTBT State Signatories available at www.ctbto.org under [Status of Signatures and Ratifications | CTBTO](#) and incorporated hereby by reference.

3. Amendment of RFP Documents

At any time prior to the closing date for submission of Proposal, the Commission may, for any reason, modify the RFP documents by amendment. The Commission may consider extending the deadline in order to allow adequate time for considering the modifications in the preparation of the Proposal.

4. Language of the Proposal

The Proposal and all correspondence and documents relating to it shall be in English.

5. Format and Submission of the Proposal

The Proposal shall be typed, dated and signed by an official legally authorized to enter into contracts on behalf of your organization. The Proposal shall not contain any interlineation, erasures or overwriting except as necessary to correct errors, in which case such corrections shall be initialled by the authorized person(s) signing the Proposal.

The Proposal shall be submitted electronically according to Attachment 1 “PROCEDURE FOR SUBMISSION OF ELECTRONIC OFFERS IN 2 SEALED FILES”.

The Proposal shall be sent to procurement@ctbto.org only and not later than the closing date indicated in the Letter of Invitation.

6. Request for Clarifications and Contacting the Commission

The Commission will issue clarifications, if required. Bidders shall send their request for clarifications by e-mail as soon as possible after receipt of the solicitation documents, but in any case, no later than **ten (10) business days prior to the Closing Date**. Questions will only be accepted via e-mail sent to:

E-mail: procurement@ctbto.org
Subject: RFP 2025-0168 /Polonskaya - Request for Clarifications

Except in the case of responding to an RFP clarification, a bidder shall not contact the Commission on any matter relating to the Proposal after its submission and until the award of the Contract. Any attempt to influence the Commission in its evaluation of the Proposal or the contract award decision may result in the rejection of the Proposal.

7. Eligible Goods and/or Services

The goods and/or services to be rendered under the Contract shall have their origin in the States Signatories of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), the list of which is available in the CTBTO website at www.ctbto.org under [Status of Signatures and Ratifications | CTBTO](#). For purposes of this paragraph, "the origin" means the place from where the services are supplied.

8. Type of Contract and Payment

Type of contract and the terms and conditions of payment are described in the attached Model Contract.

9. Preparation of the Proposal

The Proposal shall contain, but not necessarily be limited to, the information described below. The Proposal shall be composed of the following separate parts:

I. Technical Proposal (no pricing/financial information shall be included); and

II. Financial Proposal.

PART I: TECHNICAL PROPOSAL

Please state the reference number and the date of this RFP in the Proposal and any correspondence relating to it.

No pricing/financial information shall be included in the Technical Section of the Proposal.

1. Point of Contact

The Proposal shall state the contact details and address (name, telephone number, and e-mail address) of the person/point of contact in your company dealing with this RFP.

2. Documents Establishing the Eligibility and Qualifications of the Bidder

Bidder's Statement, Statement of Confirmation and Bidder's Profile

The Bidder shall furnish documentary evidence of its status as an eligible and qualified vendor. In order to award a contract to a Bidder, its qualifications must be documented to the Commission's satisfaction and demonstrate that the Bidder has the financial, professional and technical qualifications necessary to perform the Services under the Contract.

- (a) The attached Bidder's Statement and Statement of Confirmation shall be duly filled-in and submitted together with the Proposal.
- (b) Expertise and experience of the Company/Organisation: bidder shall provide details regarding the experience of the Company/Organization and a list of the completed projects/contracts which are related or similar in nature to demonstrate conformity to the requirements of the ToR (Annex C) Section 3.
- (c) Key Personnel: This section shall provide information about proposed development team and include the comprehensive curriculum vitae (CVs) of key staff, clearly defining their roles and responsibilities. Curriculum Vitae (CVs) should establish competence and demonstrate qualifications in areas relevant to the requirements of the ToR.
In complying with this section, the Bidder assures and confirms to the Commission that the staff being nominated are available to fulfil the demands of the Contract during its stated full term.

3. Documents Establishing Technical Compliance of the Proposal

In addition to the duly filled-in Technical Compliance Matrix attached hereto, the Technical Proposal shall include a section-by-section response to the Terms of Reference and provide an explanation of the bidder's understanding of the services to be rendered to satisfy the requirements referenced in the Terms of Reference, as well as demonstrated compliance of proposed items specifications, integration approach, proposed software solution, risk assessment plan and required timeframes confirmation.

The bidder may provide additional related content in attachments. The Proposal shall also provide any other relevant issue which the bidder would like to bring to the attention of the Commission whether or not having cost implications.

4. Sub-Contractors

The Proposal shall include names, legal status, address and qualifications of subcontractor(s), if any, and the scope of the subcontracted services. The Proposal shall provide a statement that your company/organization shall be fully responsible for the performance of sub-contractors. All sub-contractors shall be legally established in one of the CTBT States Signatories, the list of which is available at www.ctbto.org under [Status of Signatures and Ratifications | CTBTO](#) and incorporated hereby by reference.

5. Commission's Inputs

A description of the expected inputs/resources to be made available by the Commission and at what stage of the services.

PART II: FINANCIAL PROPOSAL

The Financial Proposal shall be prepared in **United States Dollars or Euro** and shall breakdown, separately, the costs for each itinerary required in the Terms of Reference in accordance with **Attachment 4** (Price Schedule Form).

Indirect Taxes

The price quoted shall be net of Taxes. All applicable Taxes payable by the selected Bidder at the conclusion or implementation of the Contract in respect of the goods/services shall be quoted separately or be separately identified in the Price Schedule Form together with information on the nature of the tax and its method of calculation.

10. Completeness and Correctness of the Proposal

The Commission reserves the right to verify all information furnished by you in the Proposal through a source of its choice. Any inaccurate information so given may lead to the rejection of the Proposal.

11. Validity of the Proposal

The Proposal shall be valid for ninety (90) days after the deadline for its submission to the Commission, unless an extension of validity has been requested by the Commission.

12. Correction of Errors

The Commission will check the Proposal for any arithmetic errors. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected.

13. Evaluation of the Proposal

- (a) The Commission will conduct the evaluation based on the criteria and method specified in **Attachment 2** "Evaluation Criteria and Method".
- (b) The Commission reserves the right, as it deems appropriate, to award to a single bidder, to award to multiple bidders in any combination or not to award to any of the bidders as a result of this RFP.

14. Clarifications and Negotiations of the Proposal

The Commission reserves the right to request clarifications on the Proposal and to enter into negotiations regarding the Proposal before awarding the contract under this RFP.

15. Modification and Withdrawal of the Proposal

Bidders may modify or withdraw their Proposals after their submission, provided that written notice of the modification or withdrawal is received by the Commission by the closing date and time for the submission of the Proposal. The Proposal may not be modified subsequent to the closing date and time.

16. The Commission's Right to Reject the Proposal

The Commission reserves the right to accept or reject the Proposal or to annul this procurement process at any time prior to the award of contract without having to inform the bidders of the grounds therefore, without thereby incurring any liability to the bidders.

17. Costs of preparation and submission of the Proposal

Bidder shall bear all the costs associated with the preparation and submission of their Proposal and the Commission will not be responsible or liable for those costs, regardless of the outcome of this RFP.

18. Proprietary Information

All documentation and information contained in this RFP are proprietary to the Commission and shall not be duplicated, used or disclosed -in whole or in part- for any purpose other than to evaluate them and respond to the Commission's request for Proposal or otherwise without prior written agreement of the Commission.

19. Use of former Preparatory Commission for the CTBTO ("Commission") employees in the preparation of Proposals

A Bidder must not, in the absence of prior written approval from the Commission, permit a person to contribute to, or participate in, any process relating to the preparation of a Bid or the procurement process if the person:

- a. At any time during the 12 months immediately preceding the date of issue of the Solicitation was an official, agent, servant or employee of, or otherwise engaged by the Commission;
- b. At any time during the 24 months immediately preceding the date of issue of the Solicitation was an employee of the Commission personally engaged, directly or indirectly, in the definition of the requirements, project or activity to which the Solicitation relates.

BIDDER'S STATEMENT PLEASE FILL THIS FORM & SUBMIT WITH THE PROPOSAL
Warranty period applicable (it shall be for a minimum of 24 months, starting from the acceptance of the goods/services by the Commission) – please tick below:
Availability of local service in Vienna, Austria (if any):
State country of origin of goods and services quoted:
Quantity discount and early payment discount (if any):
Include documentary evidence of qualifications to perform the order, which shall establish to the Commission's satisfaction that the bidder has the financial, technical and production capability necessary to perform the order in its entirety and to provide spare parts and other necessary on-going services as required. Included in this Proposal : Yes ☐ No ☐
Confirmation that the bidder has reviewed the Commission's Model Contract, License Agreement and General Conditions of Contract and agreed to all terms and conditions. Yes ☐ No ☐ Remarks:
With regards to the software provided with the equipment, state and confirm whether the software licenses are transferable to third parties, i.e. the Commission or the Commission's State Signatories (Member States). Yes ☐ No ☐ Not applicable ☐ Remarks:
Name: Name & Title of Contact Person: Signature & date:

“Procedure for Submission of Electronic Offers in 2 Sealed Files”

The Commission invites you to submit your sealed offer (Bid, or Proposal) in response to the solicitation forming part of this request.

Please be sure to follow the instructions below very carefully, so that the documents you submit are encrypted, and cannot be opened without an encryption key (password). If the documents are not encrypted, they will not be accepted as part of this tender process.

CRITICAL INFORMATION:

Create separate zip files for the technical offer and the financial offer (labelling them clearly in the title) with different encryption keys. Instructions for how to do this are provided below.

Step 1: You provide the encryption key (password) for the *Technical Offer only* (in accordance with the below instructions)!

Step 2: After the Commission has performed the evaluation of the Technical Offer, if your Technical Offer is considered to be acceptable, the Commission will request the encryption key (password) for the Financial Offer you have already submitted by the tender Deadline.

Should you have any questions, please send an email to procurement@ctbto.org.

We recommend that you leave yourself plenty of time to complete the below process (including getting any necessary assistance from the Commission), as late offers will not be accepted.

INSTRUCTIONS:

1. In a **WINDOWS** environment, one way of meeting the requirements is as follows.

We recommend using the open-source, free software **7-zip**, but if you are comfortable with other tools, the result should be the same, as long as you can apply encryption to the archive. In the below, we'll use 7-zip as an example. (You can download the 7-zip code for Windows at: 7-zip.org)

2. In **LINUX** environment, you can use, for instance, “sha1sum” on the command line.

Creating the archives for submission

Regardless of whether the offer is a single file, or a collection of files, the files are easier to manage if delivered as a single, compressed file. Compressing the archive is a common way to meet size limitations in email systems.

As an example of how to submit your offer in the required format: assuming you are supplier “SOFTCOMP” and have the following files related to the offer for “RFP 2020-0010/EDWALD”. (*You will need to replace these elements with the real information for your actual offer in line with the relevant Instructions for Preparation and Submission of Proposals/Bids.*) Assuming further that you have installed the 7-zip software on the Windows system you are using.

We will only go through the creation of the Technical Offer (Proposal/Bid) component; the Financial Offer (Proposal/Bid) component is similar.

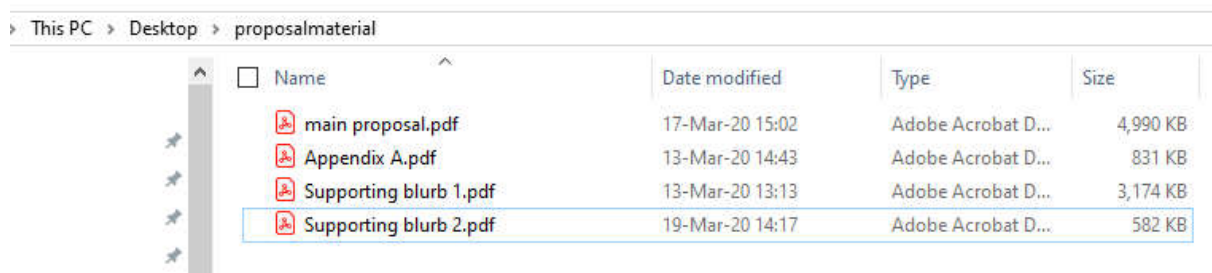


Figure 1 An example set of files to be submitted

Select the four files and right-click; a Dialog box pops up, with one of the options being “7-ZIP >”. Hover your cursor over the “>” part and a few more options appear, select the “Add to archive” option.

Another dialog box pops up (see ‘Figure 2, Creating an Archive’, next page):

Using the standard Windows methods, select a suitable location for the archive (if you don’t change it, the archive gets created right where the selected files are), and give it a name in the form of: “SOFTCOMP-2020-0010-EDWALD-TECHNICAL-BID”, of course replacing all the elements with the true values for the offer in question: the actual company indicator, and the actual RFP/ITB identification string. Note that it is not possible to put a slash “/” in the file name, and therefore put a dash “-” instead. Leave the file extension “.zip” as is.

Leave all the other settings as is, except: **add a password to the encryption** (see figure 2 below). This is done by typing the same password (of your choosing) twice in the two text fields in the lower right hand corner.

Make a note of this password. You must choose different passwords for the two zip archives, that is, the Technical and the Financial Proposal/Bid.

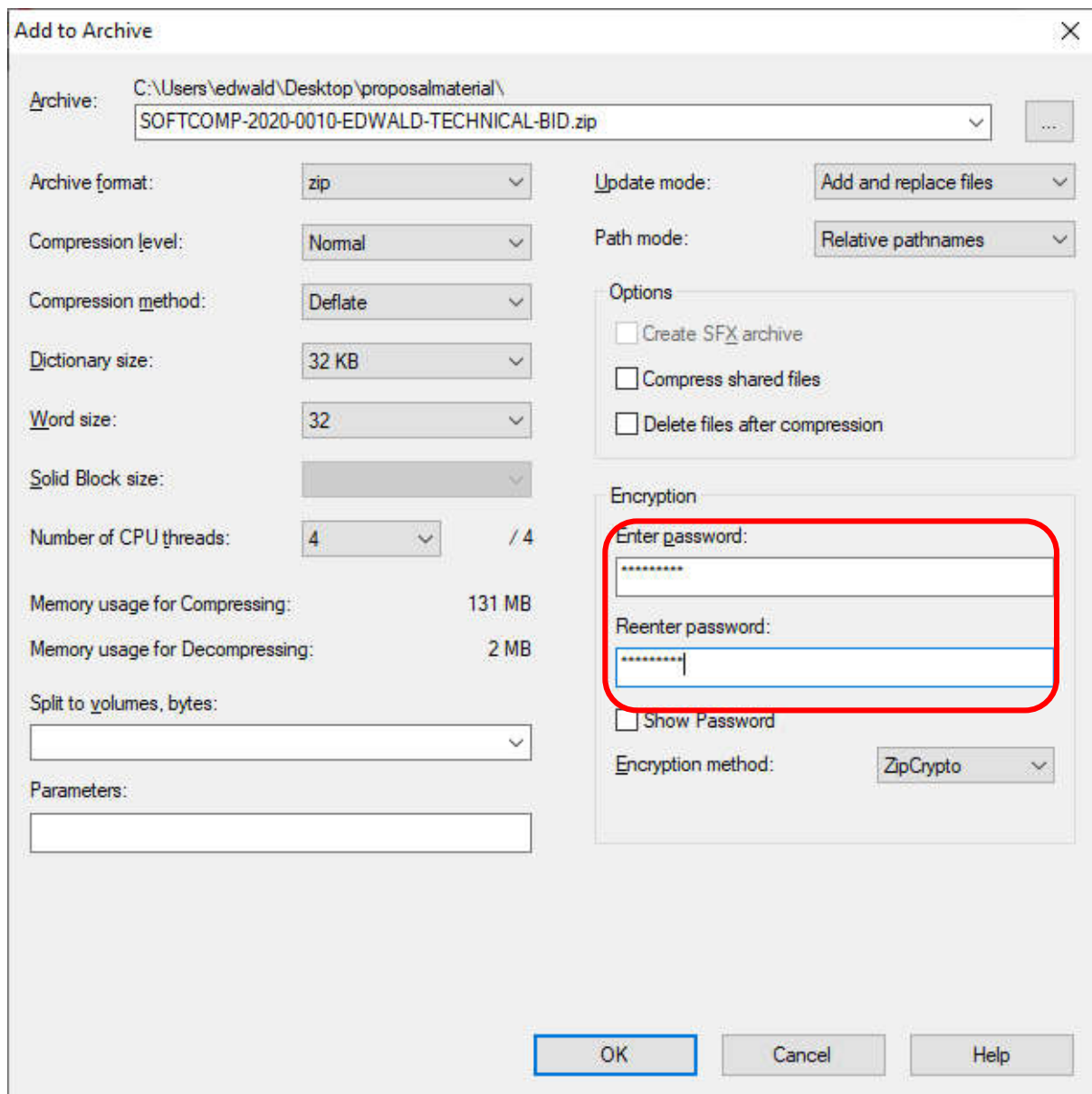


Figure 2 Creating an Archive

Now, we seek the “SHA1 Hash”, and electronic fingerprint of the archive you have just created. The hash is a string calculated from your file(s) and can be used to guarantee that the file has not been modified since you created it. Any change to the file will result in a different hash value.

There are many ways of calculating this; two common options are described below.

If the appropriate functionality is available in your Windows environment: Select the compressed archive in the Windows file manager, (eg. SOFTCOMP-2020-0010-EDWALD-TECHNICAL-BID.zip) and right click. One of the options to select is “CRC SHA >”. Hovering over the “>” brings a few more options to light, select the **SHA-1** option. A smaller dialog pops up: (see Figure 3, *SHA1* below). Clicking Ctrl-C grabs the contents of this box. You can close the box after copying the contents. (You can paste the contents into a mail message, for instance.)



Figure 3 *SHA1*

If this CRC SHA function is not available by ‘right-click’ on your Windows version, you can also do this from ‘the command line’, a slightly more complicated way. Open a CMD window (see sidebar below), move to the folder where your archive is, and execute the command: “certutil -hashfile *SOFTCOMP-2020-0010-EDWALD-TECHNICAL-BID.zip* sha1” where you obviously replace the name of the file with your real file name. The output of this command is the SHA1 “hash”. You can copy-and-paste the string for use in the email (below).

Sidebar: How to open a CMD window in Windows:

The way to open a Command window (or ‘terminal’) depends on the version of Windows you have. The different methods are very clearly described in the following article, but a quick internet search will find multiple descriptions.

<https://www.lifewire.com/how-to-open-command-prompt-2618089>

Finally,

1. Create a new email, Subject: example- “SOFTCOMP-2020-0010-EDWALD”. Add the two compressed archives, that is, the Technical Offer and the Financial Offer archives as attachments. The text of the email should contain the SHA1 information for both archives.
SEND THIS TO: sealed_bids@ctbto.org (note that there is an underscore “_” between “sealed” and “bids”). (Should the email become larger than your mail system allows, you can

try sending the two archives in separate emails. Take care to include the right SHA1 information with each file.)

2. Create a new email, Subject: example- "SOFTCOMP-2020-2010-EDWALD-Technical Offer" the contents of which must contain the Encryption Key for the Technical Offer (the password you used when creating the Technical Offer). (Again, note the underscore between 'bid' and 'keys'.)

SEND THIS TO: bid_keys@ctbto.org

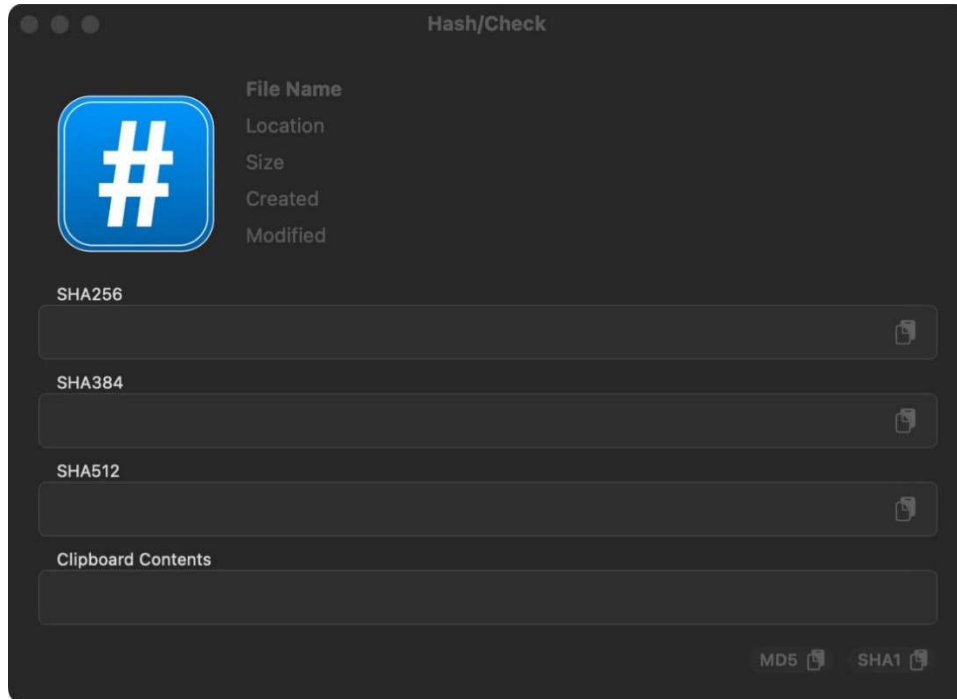
IMPORTANT NOTE: As stated above, only send the Encryption Key for the Technical Offer to the bid_keys@ctbto.org mailbox when sending your Technical and Financial Offer to the sealed_bids@ctbto.org mailbox. **You shall only send the Encryption Key for the Financial Offer to the Commission if and when informed by the Commission that your Technical Offer had been evaluated as "technically acceptable".**

The Financial Offer Encryption Key will need to be provided by you to the same e-mail (bid_keys@ctbto.org) within 48 hours of the Commission's request, clearly marked in Subject: Encryption Key for (example): "SOFTCOMP 2020-2010 EDWALD-Financial Offer". If your Offer is not considered "technically acceptable", the Commission will not request an Encryption Key for your Financial Offer, and it will remain unopened.

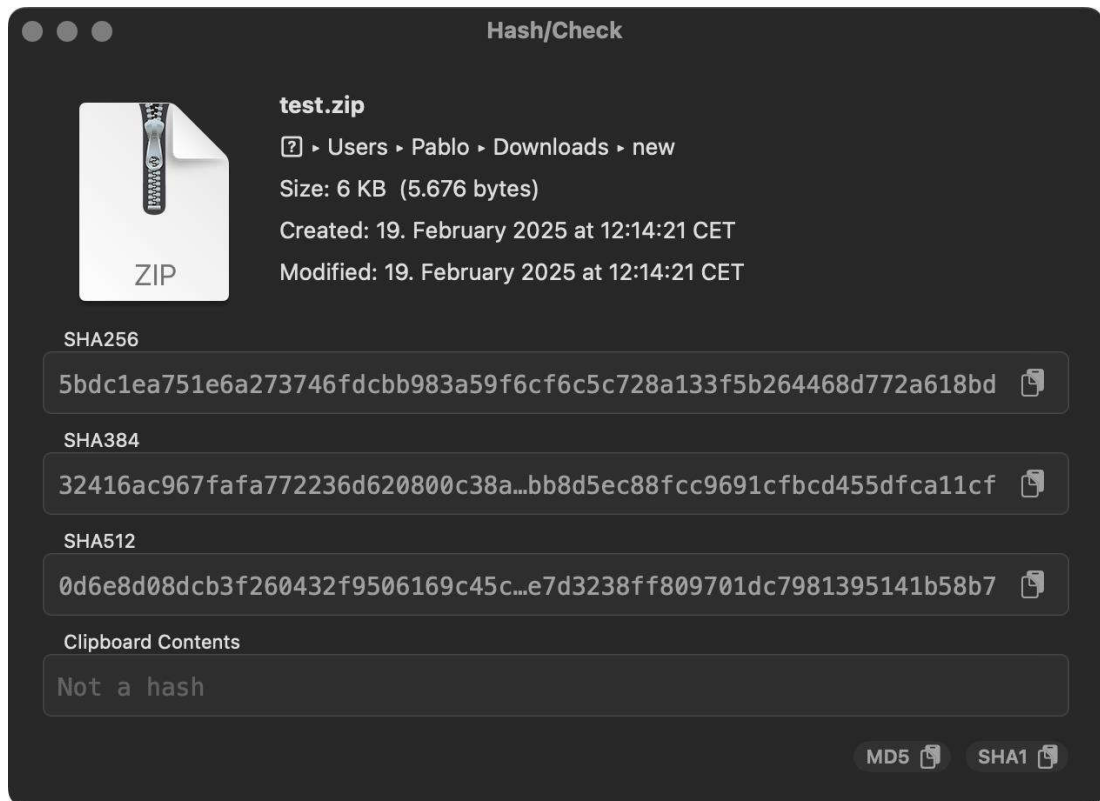
As mentioned above, should you have questions or difficulties, please send an e-mail to procurement@ctbto.org.

For MAC users:

1. Please download Hash/Check app:
<https://apps.apple.com/at/app/hash-check/id1550525767?l=en-GB&mt=12>
2. It is very simple to use. After installing, just open the app and click on “File” to open the zip file you want to inspect.

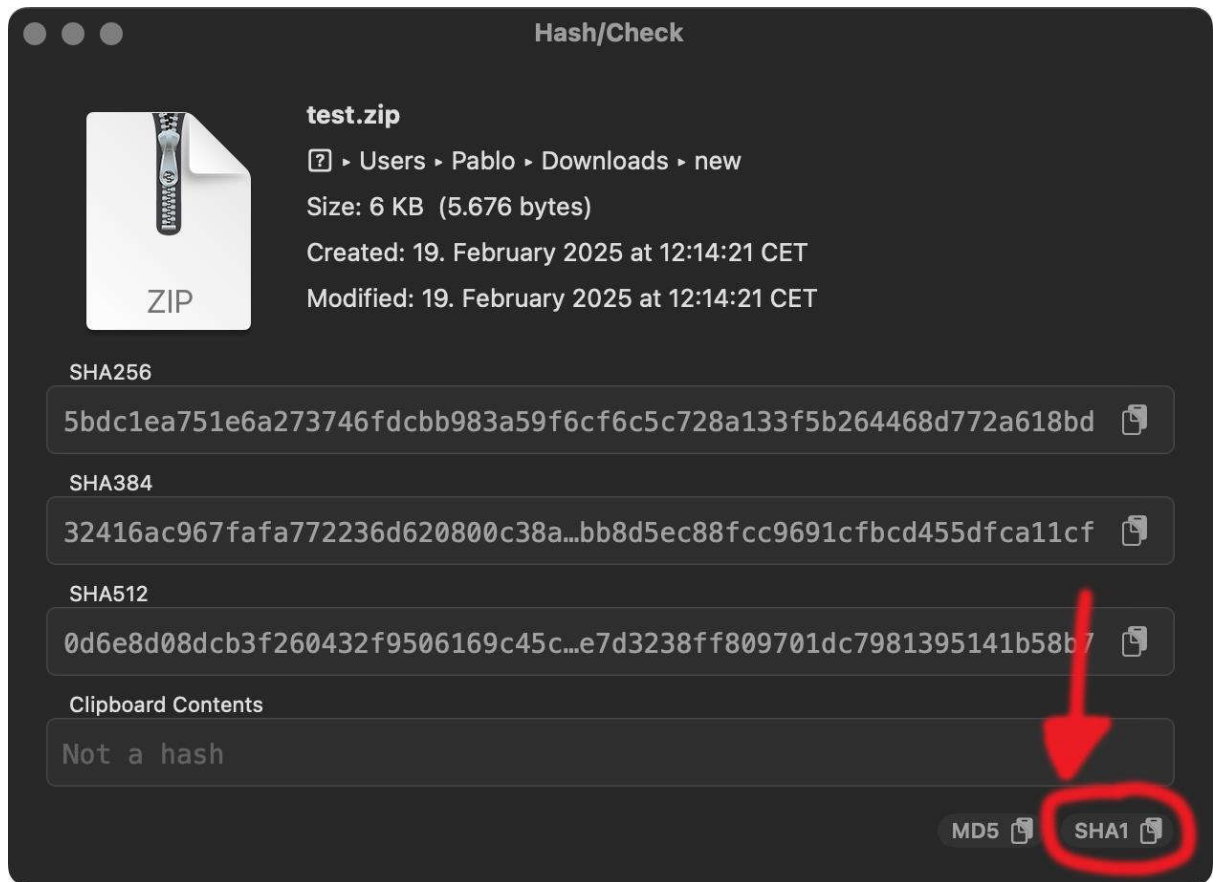


3. Please use your submitted technical and financial proposals

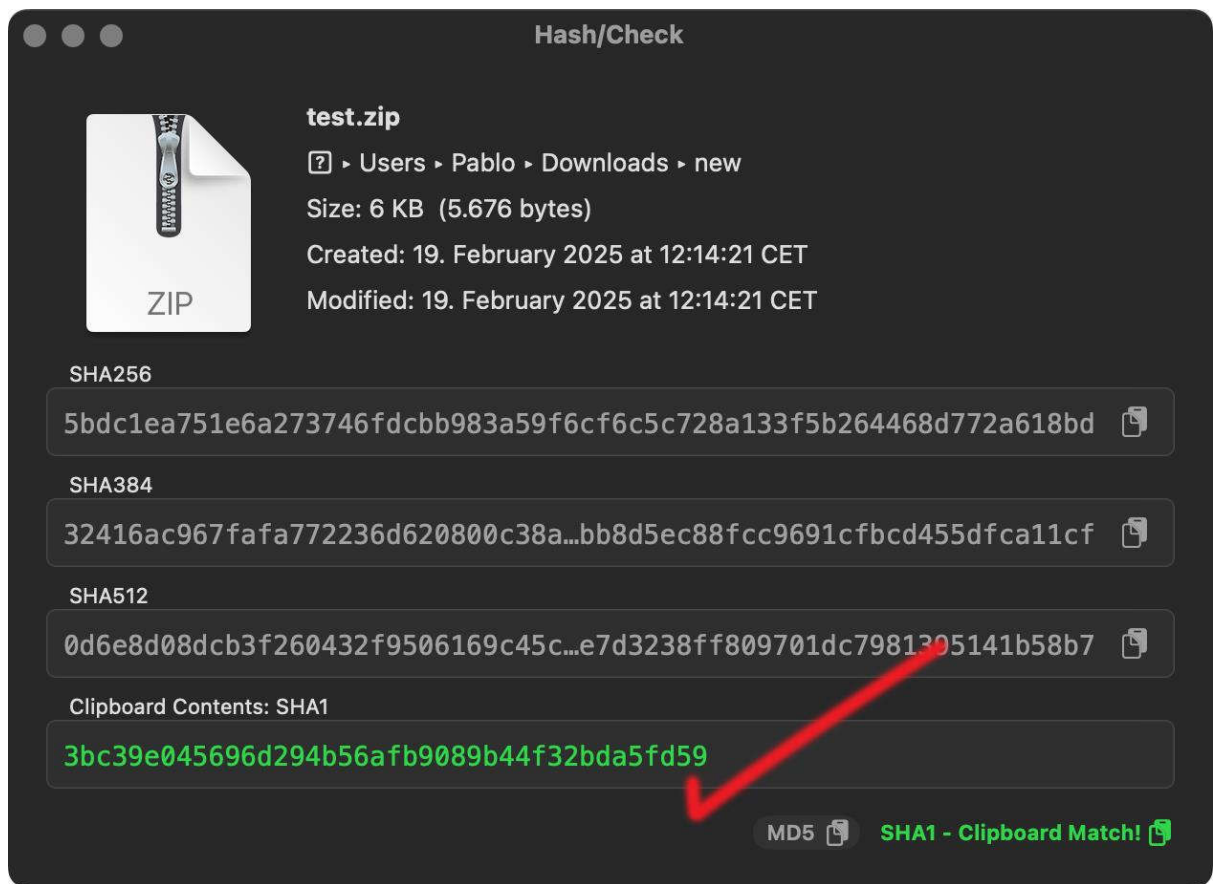


4. And it automatically creates several different hash values ... --- But the one we need SHA1 is not there ...

So you press on the little SHA1 icon on the bottom right ...



5. The SHA1 hash is calculated and copied to the clipboard automatically for further use.



-----OR-----

Another alternative would be to use the terminal and the command: shasum /path/to/file
Here is a little tutorial on how to use it. It is strait forward and simple to use. Please see
attached the instructions as a pdf as well.

<https://osxdaily.com/2012/02/05/check-sha1-checksum-in-mac-os-x/>

Finally,

1. Create a new email, Subject: example- "SOFTCOMP-2020-0010-EDWALD". Add the two compressed archives, that is, the Technical Offer and the Financial Offer archives as attachments. The text of the email should contain the SHA1 information for both archives. **SEND THIS TO:** sealed_bids@ctbto.org (note that there is an underscore "_" between "sealed" and "bids"). (Should the email become larger than your mail system allows, you can try sending the two archives in separate emails. Take care to include the right SHA1 information with each file.)

2. Create a new email, Subject: example- "SOFTCOMP-2020-2010-EDWALD-Technical Offer" the contents of which must contain the Encryption Key for the Technical Offer (the password you used when creating the Technical Offer). (Again, note the underscore between 'bid' and 'keys'.)

SEND THIS TO: bid_keys@ctbto.org

IMPORTANT NOTE: As stated above, only send the Encryption Key for the Technical Offer to the bid_keys@ctbto.org mailbox when sending your Technical and Financial Offer to the sealed_bids@ctbto.org mailbox. **You shall only send the Encryption Key for the Financial Offer to the Commission if and when informed by the Commission that your Technical Offer had been evaluated as "technically acceptable".**

The Financial Offer Encryption Key will need to be provided by you to the same e-mail (bid_keys@ctbto.org) within 48 hours of the Commission's request, clearly marked in Subject: Encryption Key for (example): "SOFTCOMP 2020-2010 EDWALD-Financial Offer". If your Offer is not considered "technically acceptable", the Commission will not request an Encryption Key for your Financial Offer, and it will remain unopened.

As mentioned above, should you have questions or difficulties, please send an e-mail to procurement@ctbto.org.

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Evaluation Criteria and Method
RFP No. 2025-0168 “Sensor array and integration with Spot robotic platform”

Ref No. in TOR	1. QUALIFICATION REQUIREMENTS (1st stage)	PASS/FAIL
2.1	Specifications of the Mesh Network in line with those set in section 2.1	PASS/FAIL
2.2	Specifications of the light system in line with those set in section 2.2	PASS/FAIL
2.3	Specifications of air quality monitor in line with those set in section 2.3	PASS/FAIL
2.4	Specifications of low resolution radiation sensor in line with those set in section 2.4	PASS/FAIL
3	Be an established company/organization and have min five (5) years of experience	PASS/FAIL
3	Bidder has minimum two (2) years of experience with robotic systems, including integrating custom payloads, developing or using SLAM, and designing software for mission planning and control.	PASS/FAIL
3	Minimum three (3) successfully completed radiation sensor or similar sensor integration projects, including at least one (1) within last 2 years	PASS/FAIL
3	Minimum two (2) years of experience developing software applications for the visualisation of radiation or other scalar data in 3D, including breadcrumb mapping of count/dose data with position data, visualisation using isopleths, and visualization using projections on point cloud data	PASS/FAIL
3	Have access to the Spot Software Development Kit (SDK) and related Application Programming Interfaces (API) to develop and customize software using these SDK and APIs	PASS/FAIL
3	Possess all licences and legal rights required to install and test the customized software on Spot, for example, the Spot Software Development Kit (SDK) or similar	PASS/FAIL
6	Commitment to the Acceptance Test to be held at the premises of the Contractor demonstrated in the Proposal	PASS/FAIL
8	Commitment to the timeframe requirements set in section 8	PASS/FAIL

The technical proposals that have passed stage 1 of the technical evaluation process, will be evaluated against the evaluation matrix below				
Ref No. in TOR	2. TECHNICAL REQUIREMENTS - (2nd stage)	Points		
		Max Points	Factor	Weighted score
Overall	Extent to which all aspects of the ToR have been addressed in sufficient detail and clarity	5	1	5
Overall	Understanding of the scope and organization of work and the responsibilities of the Contractor	5	1	5
2.7	Understanding demonstrated and approach proposed for the hardware and low-level software integration of the sensors and peripheral hardware	5	2	10
2.8	Understanding demonstrated and approach proposed for the supply and customisation of the mission planning, control, and the data visualisation software	5	4	20
3	Prior experience with project-specific hardware (i.e., Spot, Leica BLK Arc, Crowcon Xguard Bright gas monitor, Thermo Fisher Radeye G10, H3D M400 gamma detector) and engagement in related developer programs (e.g., Boston Dynamics “Technology Partner”, Leica Geosystems “Global Partners Network”)	5	4	20
3	The design and software development Team proposed in the Offer for project implementation has at least three (3) staff members that have actively participated in three (3) integration projects of the Contractor with radiation sensors and Spot or similar robotic platform in the last two (2) years	5	3	15
7	Risk management approach of the bidder addressing Section 7 of the ToR	5	3	15
TOTAL - Technical Evaluation		35		90
The minimum number of scores to pass the technical evaluation is 54.				

EVALUATION METHOD:

1. Technical Evaluation:

The technical evaluation process will be done in two stages:

- 1) Stage 1: Technical proposals will first be evaluated against the mandatory requirements outlined in section 1 above, on a PASS/FAIL basis.
Compliance with all mandatory requirements is required in order to pass stage 1 of the technical evaluation and to be further considered for stage 2 of the evaluation process;
- 2) Stage 2: The technical proposals that have passed stage 1 of the technical evaluation process, will be evaluated against the weighted criteria set forth in the evaluation matrix above.
In order to pass this stage, bidders must obtain at least 54 scores, in accordance with the scoring table indicated below:

Points	Scoring
0	Unsatisfactory - Response incomplete, inadequate and/or non-responsive to the criterion. Bidder does not clearly understand the criterion.
1 - 2	Weak - Does not meet the minimum technical, functional, or performance related criterion.
3	Good - Meets the minimum requirements of the criterion.
4	Very good - Exceeds the criterion in some areas.
5	Excellent - Exceeds the criterion in all areas.

2. Financial evaluation:

Once the technical evaluation is finalized, the financial offers of the technically compliant bidders will be evaluated in accordance with the formula given below:

$$X = \text{Max Available Points} * Y/Z$$

Legend:

X= points to be assigned to the offer being evaluated
Y= price of the lowest priced, technically compliant offer
Z= price of the offer being evaluated

3. Award:

The weight of the technical and financial components is 60% and 40% respectively. The Contract will be awarded to the bidder who receive the highest combined score resulting from the technical and financial evaluations, subject to commercial and contractual acceptability.

2.3. ATTACHMENT 3 Technical Compliance Matrix
RFP No. 2025- 0168 “Sensor array and integration with Spot robotic platform”

Part I

Below table sets out the Minimum content of the Proposal and the Requirements of the Technical Proposal. Bidders are requested to demonstrate compliance with the requirements and add any further information in support of their Proposal. Please refer to the relevant section of the Terms of Reference for further explanation of the requirements. The information provided will form an integral part of the technical evaluation process.

Item	Minimum content of the Technical Proposal
1. Executive Summary	Provide an overview of the proposal
2. Experience, Resources and Project Management	
Corporate Profile and Values	- Brief background of the company, mission/vision, ownership, size, location, number of personnel by type profile, etc. - Company business structure and its authority to execute all Work under the Contract. - If a consortium, provide a clear explanation of the business relationship between the members and governance for the execution of this project. - In case the Bidder requires the services of subcontractors, the Proposal shall include: a) Relationship of the Bidder’s business to any subcontractor(s) that will be used. b) Names, addresses, legal status, and qualifications of major sub-contractor(s) proposed by your organization. c) The scope of work and nature of subcontracting.
Corporate Experience	The proposal should detail the Bidder’s experience in executing work of similar scope and complexity.
Requirements for the Contractor	The Proposal should address and describe all requirements spelled out under Section 3 (Requirements for the Contractor) of the Terms of Reference (ToR) and provide CVs of proposed development team.
3. Meeting the Requirements	
	- Please describe your understanding of the services that are to be provided under this ToR, detailing key assumptions that impact the Technical Proposal. - Demonstrate compliance of proposed items specifications and provide description of integration approach to meet ToR requirements - Clearly specify the pre-existing software you intend to use as a basis for development; disclose its functionality and other available technical documentation. Specify the licensing terms and conditions for this software and specify scope of customization efforts. - Confirm requested data deliverables and acceptance test procedure. - Specify risk management approach to meet ToR requirements.
4. Contractor’s key staff	
Visa & Work Permits	Provide written confirmation that the Bidder understands and agrees to take responsibility for obtaining any Visa and/or work permits, which may be required to perform the Work under the Contract. The CTBTO does not sponsor work permits for contractors.
Documentation and Reporting	Provide written assurance that all reports, documentation, and communication (written and oral) supplied to the Commission shall be in English and submitted in electronic form.

Part II – Technical Compliance Matrix				
Ref No. of ToR	Requirements	Bidder’s Response		Indicate the section in your proposal
	A section-by-section response to each section of the Terms of Reference is included in the Proposal	Please tick whichever is applicable		
		“Yes”	“No”	
Sensors and peripheral hardware				
2.1.	Proposed Mesh network meets following: - Rajant Kinetic Mesh Radio Kit compatible with the Spot, 75 m radius coverage per radio indoors.			
2.2.	Proposed Light system meets following: - Facilitate visual simultaneous localisation and mapping (SLAM) of the BLK ARC laser scanner, - Be practical and robust and shall be compatible with the Leica BLK Arc laser scanner i.e., lighting does not interfere with or saturate sensor, - Be as light weight as possible with the option of having its own rechargeable battery, - Emit more than 1,000 lumens ambient light.			
2.3.	Proposed Air quality monitor (AQM) meets following: - Crowcon Xguard Bright gas monitor or equivalent, - Ingress protection: IP65 or better, - Operating temperature: -20 to 50°C, - Humidity: to 95% relative humidity.			
2.4.	Proposed Low resolution radiation sensor meets following: - Thermo Fisher Radeye G10 (or equivalent with at least the same or better sensitivity), - Humidity and temperature datalogger providing			

	real time integrated and georeferenced data outputs for the local gamma radiation dose, humidity, and temperature back to the user on the display.			
2.5.(optional)	<i>Proposed High resolution radiation sensor meets following:</i> (a) CdZnTe gamma detector (H3D M400 or equivalent) with energy resolution $\leq 1\%$ FWHM at 662 keV, or (b) Other gamma detector such as Cs2 LiLa (Br,Cl)6: Ce (CLLBC) or equivalent, with sufficient sensitivity to allow radionuclide identification (RID), with energy resolution $\leq 3.5\%$ FWHM at 662 keV, - Humidity and temperature datalogger providing real time integrated and georeferenced data outputs for the local gamma radiation dose, humidity, and temperature back to the user on the display.			
2.6.(optional)	<i>Proposed Gamma imager meets following:</i> - Sensitivity of gamma imager: 3 MBq Cs-137 source to be viewed in a 5-minute scan in approximately 20 m distance/area, - Dose trail Location tagged radiation dose measurements should follow the track of the robot within +/-20% of manual measurements in same locations, - Imaging dose rate minimum 1 $\mu\text{Sv/hr}$, - Imaging dose maximum rate 10 mSv/hr, - Dose trail min 0.5 $\mu\text{Sv/hr}$, - Dose trail max 100 mSv/hr, - Gamma ray energy range for imaging 250keV – 3000 keV, - Gamma ray energy range for spectroscopy 60 keV – 3000 keV, - Energy resolution for low resolution gamma ray spectroscopy (see section 2.4): - FWHM $\leq 8\%$ at 662 keV, - Energy resolution for high resolution gamma ray spectroscopy (see section 2.5): - Option (a): FWHM $\leq 1\%$ at 662 keV, - Option (b): FWHM $\leq 3.5\%$ at 662 keV.			

Integration Requirements				
2.7.	All set design, manufacturing implementation and documentation requirements for sensors and peripheral hardware stipulated in the TOR will be met			
Control and Visualization Software				
2.8.	Proposed control and visualisation software meet set specifications for required software and minimal customization for: • Low-level real-time control of sensors and peripheral hardware • Mission planning • Mission execution and control • Post-processing and visualization			
Qualification Requirements of the Contractor				
3	Required qualifications/experience of the Company and proposed staff are met. CVs for the proposed staff are provided.			
	Be an established company/organization and have minimum five (5) years of experience,			
	Have minimum three (3) successfully completed radiation sensor or similar sensor integration projects, including at least one (1) within last 2 years,			
	Have minimum two (2) years of experience with robotic systems, including integrating custom payloads, developing or using SLAM, and designing software for mission planning and control,			
	Have access to the Spot Software Development Kit (SDK) and related Application Programming Interfaces (API) to develop and customize software using these SDK and APIs			
	Possess all licenses and legal rights required to install and test the customized software on Spot, for example, the Spot Software Development Kit (SDK) or similar			
	Have a minimum of two (2) years of experience developing software applications for the visualisation of radiation or other scalar data in 3D, including breadcrumb mapping of count/dose data with position data, visualisation using isopleths, and visualization using projections on point cloud data,			
	Have Prior experience with project-specific hardware would be an asset (i.e., Spot, Leica BLK Arc, Crowcon Xguard Bright gas monitor, Thermo Fisher Radeye G10, H3D M400 gamma detector) and engagement in related developer programs (e.g., Boston Dynamics “Technology Partner”, Leica Geosystems “Global Partners Network”),			

	Committed to allocate a design and software development team of at least three (3) staff members that have actively participated in three (3) integration projects of the Contractor with radiation sensors and Spot or similar robotic platform in the last two (2) years. – CVs provided.			
Data Deliverables				
4	All requested manufacturer's documents, manuals, licenses (if applicable), installation instructions and other documents, as stipulated in the ToR will be provided			
Acceptance Test				
6	Acceptance Test shall be held at the premises of the Contractor. All terms of Acceptance Test stipulated in the ToR are acceptable and will be met.			
Risk Management				
7	To mitigate major risk of significant technical complexity of the mission planning and control software, the Contractor shall choose a substantially mature COTS software meeting most of the present requirements and customize Risk Management approach is specified in the Proposal.			
Timeframe Requirements				
8	Timeframe requirements provided in the ToR are acceptable and confirmed			

2.4. Attachment 4. Price Schedule Form
RFP No. 2025-0168 “Sensor array and integration with Spot robotic platform”

CURRENCY USD/EUR					
Ref. #ToR	Description	Unit each	Quantity	Unit cost, without VAT Currency	Total cost, without VAT Currency
	Sensors and and peripheral hardware				
2.1	MESH NETWORK	EA	1		€ 0.00
2.2	LIGHT SYSTEM	EA	1		€ 0.00
2.3	AIR QUALITY MONITOR (AQM)	EA	1		€ 0.00
2.4	LOW RESOLUTION RADIATION SENSOR	EA	1		€ 0.00
2.5	HIGH RESOLUTION RADIATION SENSOR (optional)	EA	1		€ 0.00
2.6	GAMMA IMAGER (optional)	EA	1		€ 0.00
	Integration				
2.7	Integration for 2.1- 2.4	EA	1		€ 0.00
2.7	Integration for 2.1- 2.4 + optional item 2.5 (if proposed)	EA	1		€ 0.00
	Integration for 2.1- 2.4 + optional item 2.6 (if proposed)				
2.7	Integration for 2.1- 2.4 + optional item 2.5+2.6 (if proposed)	EA	1		€ 0.00
	Control and visualisation software				
2.8	Control and visualisation software for 2.1- 2.4	EA	1		€ 0.00
2.8	Control and visualisation software for 2.1- 2.4 + Optional item 2.5 (if proposed)	EA	1		€ 0.00
2.8	Control and visualisation software for 2.1- 2.4 +Optional item 2.6 (if proposed)	EA	1		€ 0.00
	Control and visualisation software for 2.1- 2.4 + Optional item 2.5 +2.6 (if proposed)	EA	1		€ 0.00
	Any other costs (provide details)				
					€ 0.00

Notes:

- 1) Please indicate currency
- 2) Quoted total costs shall be firm and fixed.
- 3) Prices shall be free of tax. If tax is applicable please indicate it in a separate line.
- 4) Return shipment of the existing Commission's equipment for integration will be done at the cost of the CTBTO (see. Section 5 of the ToR)
- 5) kindly provide on the separte sheet the break down of the financial proposal

VENDOR PROFILE FORM (VPF) – FOR PRODUCTS/SERVICES/WORK

1. Name of Company:		
2. Street Address:	3. Telephone:	
P.O. Box: City:	4. E-Mail:	
Zip Code: Country:	5. Website:	
6. Contact Person: Title:		
7. Legal Status (e.g. Partnership, Private Limited Company, Government Institution) PLEASE INCLUDE A COPY OF THE CERTIFICATE OF INCORPORATION		
8. Year Established:	9. Number of Employees:	
10. Gross Corporate Annual Turnover (US\$m)*:	11. Annual Export Turnover (US\$m)*:	
12. Type of Business/Products: Manufacturer ☐ Sole Agent ☐ Supplier ☐ Other ☐ (please explain)		
13. Type of Business/Services/Work: Engineering ☐ Civil Work ☐ Governmental Institution ☐ Other ☐ (please explain)		
14. References (your main customers, country, year and technical field of products, services or work): **		
15. Previous Supply Contracts with United Nations Organizations (over the last 3 years)** Organization: Value in US\$ Equivalent: Year: Organization: Value in US\$ Equivalent: Year:		
16. Summary of any changes in your company's ownership during the last 5 years:		

* Please provide a copy of the most recent audited annual report and accounts. Note: Export includes services or work performed abroad or for foreign clients.
 ** Please provide supplementary documentation on these items.

17. List of Products/Services/Work offered:	
Product/Service/Work #	Product/Service/Work Description

18. This section shall be **signed and stamped** by an official legally authorized to enter into contracts on behalf of your organization:

Name:	Title:	Signature:	Date:
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Bank Details Bank Name: Bank Address: Exact Account Holder Name:	Beneficiary Details Beneficiary Name: (exactly as stated on bank statements) IBAN: (if applicable) Account number: SWIFT/BIC: ABA/Sort Code:
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Additional Details (if applicable)

 Correspondent bank:

 Correspondent account number:

 Correspondent SWIFT/BIC:

 Tax Identification Number:

FOR CTBTO USE ONLY		
Evaluated By:	Initials	Date:
Updated By:	Initials	Date:
Remarks:		

* Please provide a copy of the most recent audited annual report and accounts. Note: Export includes services or work performed abroad or for foreign clients.
 ** Please provide supplementary documentation on these items.

STATEMENT OF CONFIRMATION

On behalf of (name of firm or organization): _____, I hereby attest and confirm that:

- a) The firm/organization possesses the legal status and capacity to enter into legally binding contracts with the Commission for the supply of equipment, supplies, services or work.
- b) The firm/organization is not insolvent, in receivership, bankrupt or being wound up, and not under administration by a court or a judicial officer, and that it is not subject to the suspension of its business or legal proceedings for any of the foregoing reasons.
- c) The firm/organization has fulfilled all its obligations to pay taxes and social security contributions.
- d) The firm/organization has not, and that its directors and officers have not, within the last five years been convicted of any criminal offense related to professional conduct or the making of false statements or misrepresentations as to their capacity or qualifications to enter into a procurement or supply contract.
- e) The Commission, in the event that any of the foregoing should occur at a later time, will be duly informed thereof, and in any event, will have the right to disqualify the firm/organization from any further participation in procurement proceedings.
- f) The firm/organization did not/will not attempt to influence any other bidder, organization, partnership or corporation to either submit or not submit a proposal/bid/quotation.
- g) The firm/organization will not, in the absence of a written approval from the Commission, permit a person to contribute to, or participate in, any process relating to the preparation of a Quotation/Bid/ Proposal or the procurement process if the person:
 - a. at any time during the 12 months immediately preceding the date of issue of the Solicitation was an official, agent, servant or employee of, or otherwise engaged by the Commission;
 - b. at any time during the 24 months immediately preceding the date of issue of the Solicitation was an employee of the Commission personally engaged, directly or indirectly, in the definition of the requirements, project or activity to which the Solicitation relates.
- h) Neither the organization/firm, its parent entities (if any), nor any of its subsidiary or affiliated entities (if any) have been identified on, or associated with any individual, groups, undertakings and entities identified on, the list established pursuant to the UN Security Council Resolution 1267 (Consolidated Sanctions List).¹
- i) Neither the organization/firm, its parent entities (if any), nor any of its subsidiary or affiliated entities (if any) are subject to any form of sanction imposed by an organization or body within the United Nations System, including the World Bank.

¹ The Consolidated United Nations Security Council Sanctions List can be found on the following website:
<https://www.un.org/securitycouncil/content/un-sc-consolidated-list>

- j) Neither the organization/firm, its parent entities (if any), nor any of its subsidiary or affiliated entities (if any), is engaged in any practice inconsistent with the rights set forth in the Convention on the Rights of the Child, including Article 32 thereof, which, inter alia, requires that a child shall be protected from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.
- k) Neither the organization/firm, its parent entities (if any), nor any of its subsidiary or affiliated entities (if any) will use the funds received under contracts/purchase orders with the Commission to provide support to individuals, groups, undertakings or entities associated with terrorism.
- l) The prices in the firm/organization's proposal/bid/quotation have been arrived at independently, without consultation, communication or agreement with any other interested companies, competitor or potential competitor with a view to restricting competition.
- m) The Commission shall have the right to disqualify the firm/organization from participation in any further procurement proceedings, if it offers, gives or agrees to give, directly or indirectly, to any current or former staff member of the Commission a gratuity in any form, an offer of employment or any other thing of service or value, as an inducement with respect to an act or a decision of, or a procedure followed by, the Commission in connection with a procurement proceeding.
- n) The Commission shall have the right to disqualify the firm/organization from participation in any further procurement proceedings if it does not disclose to the Commission any situation that may appear as a conflict of interest, and if it does not disclose to the Commission if any official or professional under contract with the Commission have an interest of any kind in the firm/organization's business or any kind of economic ties with the firm/organization.
- o) The firm/organization expressly agrees to abide by the United Nations Supplier Code of Conduct.¹

Name (print): _____

Signature: _____

Title/Position: _____

Place (City and Country): _____

Date: _____

¹ <https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct>



CONTRACT No. XXXX-XXXX

between

THE PREPARATORY COMMISSION
FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY
ORGANIZATION

and

(INSERT NAME OF THE CONTRACTOR)

for

the provision of goods and services pertaining to
Sensor array and integration with Spot robotic platform

This Contract comprises this cover page, a table of contents, 8 (eight) pages of text, a signatories page, a List of Annexes and 4 (four) Annexes (A to D)

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MODEL CONTRACT

This CONTRACT is entered into between the PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION (hereinafter referred to as the “Commission”), having its office located at Wagramer Strasse 5, 1400 Vienna, Austria, and _____ (hereinafter referred to as the “Contractor”), having its registered office located at _____ [address] (both hereinafter individually referred to as the “Party” and collectively as the “Parties”).

The Parties hereto mutually agree as follows:

1. DEFINITIONS

In this Contract, words and expressions shall have the same meanings as respectively assigned to them in the General Conditions of Contract and the Terms of Reference. In addition, the following words and expressions shall have the meanings hereby assigned to them:

“**Annex A**” means the Commission’s License Agreement.

“**Annex B**” means the Commission’s General Conditions of Contract.

“**Annex C**” means the Commission’s Terms of Reference.

“**Annex D**” means the Contractor’s Proposal.

“**Contract**” means this document, its Annexes and any further modifications or such further documents as may be expressly incorporated in this Contract by the Parties in accordance with Clause 21 (Contract Amendment) below.

“**Contractor**” means the legal entity named in the preamble of this Contract or its successors. The Contractor shall be the only interface for all matters pertaining to execution of the work under this Contract.

“**Customized Software**” means the software developed by the Contractor under this Contract as further specified described in Annexes A, C and D.

“**Goods**” means equipment to be provided by the Contractor under the Contract.

“**Party(ies)**” means the Commission and/or the Contractor, as the context requires.

“**Pre-existing Software**” means the software owned by the Contractor and used as a basis for the development of the Customized Software, as further specified in Annexes A, C and D.

“**Rule(s)**” means any regulation(s), official directive(s), ordinance(s), guideline(s), customs and practices.

“Services” means the activities or tasks to be performed by the Contractor under the Contract as requested by the Commission.

“Taxes” means all direct and indirect taxes (including value added tax, general sales tax or goods and services tax), assessments, fees, customs duties, liens and charges in as much as they are levied in conclusion or implementation of the Contract, including customs restrictions and charges of similar nature in respect of articles imported or exported for the Commission’s official use.

“Work” means all the Goods and Services to be provided by the Contractor, including its affiliates and/or subcontractors, in order to fulfil all its obligations under the Contract, and the remedying of any defects therein.

2. AIM OF THE CONTRACT

The aim of this Contract is to provide Goods and Services, namely, “Sensor array and integration with Spot robotic platform “(hereinafter referred to as the “Work”), for the Commission.

3. ENTRY INTO FORCE AND DURATION OF THE CONTRACT

This Contract shall enter into force upon the date of the last signature by the authorized representatives of the Parties (hereinafter referred to as the “Effective Date”) and it shall remain in force until the Parties fulfill all their obligations hereunder.

4. COMMENCEMENT AND COMPLETION OF THE SERVICES

The Contractor shall commence the Work on the Effective Date. The Works shall be completed not later than 12 months from the Effective Date.

6. STANDARD OF WORK

The Contractor shall furnish the highest skill and judgement and cooperate with the Commission, including all the Commission’s consultants and agents, in best furthering the interests of the Commission and the aim of this Contract. The Contractor shall provide efficient business administration and supervision and perform the Work in the best way and in the most expeditious and economical manner consistent with the requirements set forth in this Contract.

7. RESPONSIBILITIES OF THE CONTRACTOR

- (a) The Contractor shall provide the Work described in Annexes C and D.
- (b) The Contractor shall grant to the Commission a license to the Pre-Existing Software in accordance with Annex A.

- (c) The Contractor shall develop and supply to the Commission the Customized Software and shall grant to the Commission exclusive intellectual property rights to the Customized Software in accordance with Annex A.
- (d) The Contractor shall provide qualified English-speaking personnel as necessary to perform the Services under this Contract. The key persons shall be available for possible tasks related to the Works throughout the duration of the Contract period. Any replacement of the key personnel shall be made in accordance with Clause 7 of Annex A.

8. WARRANTY

The provisions of Clause 28 of Annex B shall apply to the Work performed by the Contractor.

9. PERMITS, NOTICES, LAWS AND ORDINANCES

- (a) The Contractor shall obtain and pay for all permits and inspections necessary for the proper execution and completion of the Work that are customarily obtained upon execution of this Contract and that are legally required at the time the Proposal is received by the Commission.
- (b) The Contractor shall give all notices required by the nature of the Work.
- (c) If the Contractor notices that the Work or any part thereof required under this Contract is not in accordance with applicable laws and Rules, or with technical or safety standards, it shall promptly notify the Commission thereof in writing.

10. PROTECTION OF PERSONS AND PROPERTY

- (a) The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programmes in connection with the Work.
- (b) The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury and loss to:
 - (i) all employees on the Commission's premises and all other persons who may be affected thereby;
 - (ii) all the Work, equipment, its spare parts, materials and supplies to be incorporated therein, whether in storage on or off the Commission's premises, which are under the care, custody or control of the Contractor or any of its subcontractors; and
 - (iii) other property on the Commission's premises or adjacent thereto.
- (c) The Contractor shall give all notices and comply with all applicable laws and Rules bearing on the safety of persons and property and/or their protection from damage, injury and loss.

- (d) The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for the safety and protection of persons and property, including posting danger signs and other warnings against hazards and promulgating safety regulations.
- (e) When the use or storage of combustible, explosive or other hazardous materials is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.
- (f) The Contractor shall be responsible for the prevention of accidents on the Commission's premises during the execution of the Work.
- (g) In any emergency affecting the safety of persons or property, the Contractor shall promptly act to prevent threatened damage, injury and loss.
- (h) The Contractor shall promptly remedy all damage and loss to any property, referred to in Sub-Clause (b) above, caused in whole or in part by the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Sub-Clause (b) above, except damage and loss attributable to the acts or omissions of the Commission or anyone directly or indirectly employed by it, or of anyone for whose acts the Commission may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to its obligations under Clause 9 of Annex B.

11. RESPONSIBILITIES OF THE COMMISSION

The Commission shall designate members of its staff to act as points of contact for the Contractor to ensure that the Work is carried out in accordance with Annexes C and D, and shall promptly notify the Contractor thereof. The Commission shall respond promptly to requests for information by the Contractor regarding the Work.

12. CONTRACT PRICE

- (a) The Commission shall pay to the Contractor, in consideration of the full and proper performance of its obligations under the Contract as follows:
 - (iA firm fixed price of [EURO/US\$] _____ [in numbers and words], hereinafter referred to as the "Contract Price" for provision of the Work in accordance with Annexes C and D.
 - (ii)

[NOTE TO PROCUREMENT: THE PRICE INDICATED IN THIS CLAUSE SHALL EXCLUDE TAXES.]

- (b) The Contract Price shall cover all costs and expenses, excluding Taxes, incurred by the Contractor for the full and proper performance of all obligations under the Contract (including travel, allowances, management and remuneration of the personnel, national

income tax, medical insurance, and social security contributions). It also includes work performed by the Contractor's personnel outside the Commission's normal working hours.

- (c) The Contract Price shall be firm and fixed and shall not be subject to escalation. The Contractor shall not do any work, provide any materials or equipment, or perform any services which may result in any charges to the Commission over and above the Contract Price without the prior written consent of the Commission and a formal written amendment to this Contract.
- (d) **[PLEASE IDENTIFY WHETHER TAXES ARE APPLICABLE UNDER THIS CONTRACT AND SELECT ONE OF THE FOLLOWING OPTIONS AT THE TIME OF AWARD]:**

The Contractor shall be reimbursed by the Commission for such taxes on the basis of actual amounts paid and duly documented by the Contractor as per Clause 12 (e).

OR

No Taxes are applicable under this Contract.

13. PAYMENT

- (a) The Contract Price shall be paid in accordance with the following payment schedule and subject to the following conditions:

[A progress payment schedule based on milestone deliveries may be included in the proposal. Any applicable Taxes shall be identified separately, and not be included in the Contract amount, i.e. "Upon [milestone] the amount of [EURO/US\$] _____ [in numbers and words], and [indicate the applicable Tax] in the amount of [EURO/US\$] _____ [in numbers and words].
- (b) The Commission shall make the payments to the Contractor on the basis of an invoice submitted by the Contractor as per sub-Clause 13 (d) below. All payments shall be made within 30 (thirty) days of the receipt and acceptance of the invoice, provided that the Work has been satisfactorily completed and has been accepted by the Commission.
- (c) The making of any payment hereunder by the Commission shall not be construed as an unconditional acceptance by the Commission of the Work accomplished by the Contractor up to the time of such payment.
- (d) The Contractor shall submit an invoice electronically, from the Contractor's official e-mail address in PDF format, duly signed and sealed by the Contractor and submitted to the Commission's email address specified in Clause 22 below. Each invoice shall contain the Contract number (CTBTO and SAP numbers), detailed banking instructions, including the name and address of the Contractor's bank, account number, account holder's name and SWIFT, IBAN and/or ABA codes for payment by electronic transfer.

[NOTE TO PROCUREMENT: PARAGRAPH (e) BELOW ONLY APPLIES IF THERE ARE TAXES (SEE CLAUSE 11 (d) ABOVE). IF NO TAXES ARE APPLICABLE UNDER THIS CONTRACT, PARAGRAPH (e) SHOULD BE OMITTED.]

- (e) Applicable Taxes payable by the Contractor and/or its subcontractor(s) in respect of the Work shall be invoiced separately or be separately identified on the invoice. Actual payment of the Taxes must primarily be supported by original documentation such as invoices, bank account statements, transfer orders, or receipts issued by the local tax or customs authorities. If submission of such original documentation is not possible for justifiable reasons, their copies could be accepted by the Commission provided that they are duly signed and certified by local tax or customs authorities. In case the currency in which the Taxes are levied is not the currency of the Contract, bank statements (or equivalent) showing the exchange rate used for the conversion should be submitted to the Commission, in addition to any other supporting documentation.

14. TEMPORARY SUSPENSION OF WORK

The Commission may, at any time, temporarily suspend the Work, in whole or in part, being performed by the Contractor under this Contract by giving 30 (thirty) days' advance notice in writing to the Contractor. The Work so suspended shall be resumed by the Contractor on the basis of a revised time schedule and on terms and conditions to be mutually agreed upon between the Parties.

15. DELAYS AND EXTENSION OF TIME

- (a) If the Contractor is delayed at any time in the progress of the Work by any act or omission of the Commission or by any of its employees, or by any other contractor employed by the Commission, or by changes in the Work ordered by the Commission, or by any causes beyond the Contractor's reasonable control, or by any other cause which the Commission determines may justify the delay, then the time for completion of the Work shall be extended by an amendment to this Contract in accordance with Clause 21 below for such reasonable time as the Commission may determine.
- (b) Any request for extension of the time for reasons referred to in sub-Clause 15 (a) above shall be submitted to the Commission not later than 20 (twenty) days after the commencement of the delay, otherwise said request shall be deemed to be waived. Such request shall state grounds for the delay and shall provide an estimate of the probable effect of such delay on the progress of the Work.

16. CONTRACTOR'S CLAIMS AND REMEDIES

In no event shall the Contractor make any claim against the Commission for or be entitled to additional costs or compensation resulting from any delays in the progress or completion of the Work or any portion thereof, whether caused by the acts or omissions of the Commission, including, but not limited to, damages related to overheads, loss of productivity, acceleration due to delay and inefficiency. The Contractor's sole remedy in such event shall be an extension of time for completion of the Work, provided the Contractor otherwise meets the requirements and conditions set forth in this Contract.

17. ENTIRE AGREEMENT

This Contract represents the final agreement in respect of the Services and shall supersede all prior agreements and representations between the Parties in this respect. Annexes A to D shall constitute integral parts of this Contract and shall be of full force and effect.

18. DISCREPANCIES

If there are discrepancies or conflicts between any of the documents that are part of this Contract, the document to prevail shall be given precedence in the following order:

- (i) this document;
- (ii) License Agreement (Annex A)
- (iii) General Conditions of Contract (Annex B)
- (iv) Terms of Reference (Annex C);
- (v) Contractor's Proposal (Annex D).

19. SEVERABILITY

If any term and/or provision of this Contract is or becomes invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions of this Contract shall not in any way be affected or impaired thereby.

20. NO WAIVER

Failure by a Party to enforce a right shall not be deemed to be a waiver of that right unless otherwise expressly provided in this Contract.

21. CONTRACT AMENDMENT

No modification of, or change in, this Contract, or waiver of any of its provisions, or additional contractual relationship with the Contractor shall be valid unless approved in the form of a written amendment to this Contract, signed by duly authorized Representatives of the Parties.

22. TRANSMISSION OF NOTICES AND OTHER DOCUMENTS

Notices, invoices, reports and other documentation under the Contract shall be delivered or sent to the relevant Party as follows (or to such person/title, address, facsimile number or email address as the Party may substitute by notice after the date of the Contract):

- (a) The Commission:

For Contractual Issues:

Chief, Procurement Section
 Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization
 (CTBTO)
 Vienna International Centre
 Wagramerstrasse 5, P.O. Box 1200
 1400 Vienna, Austria
 Tel: + (43 1) 26030 6350
 E-mail: procurement@ctbto.org

For invoices:
 Accounts Payable
 CTBTO Financial Services Section
 Vienna International Centre
 Wagramerstrasse 5, P.O. Box 1200
 1400 Vienna, Austria
 Tel: + (43 1) 26030 6292
 E-Mail: Payable_Invoices@ctbto.org

For related enquiries:
Payments@ctbto.org

(b) The Contractor:

23. EFFECTIVENESS

- (a) Except as provided below, any communication in connection with the Contract will be deemed to be given as follows:
- (i) if delivered in person, at the time of delivery;
 - (ii) if by registered mail or courier, when received;
 - (iii) if by electronic communication, when retrievable by the Commission in document form.
- (b) A communication given under sub-Clause 23 (a) above that is received or becomes retrievable on a non-working day or after business hours at the seat of the Commission will only be deemed to be given on the next working day of the Commission.

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IN WITNESS hereof, the duly authorized Representatives of the Parties have executed this Contract:

For and on behalf of the **PREPARATORY COMMISSION FOR THE COMPREHENSIVE
NUCLEAR-TEST-BAN TREATY ORGANIZATION:**

[Name, Position/Title]

Date: _____

Place: _____

For and on behalf of **[CONTRACTOR]:**

[Name, Position/Title]

Date: _____

Place: _____

LIST OF ANNEXES

ANNEX A: THE COMMISSION'S LICENSE AGREEMENT

ANNEX B: THE COMMISSION'S GENERAL CONDITIONS OF CONTRACT

ANNEX C: THE COMMISSION'S TERMS OF REFERENCE

ANNEX D: THE CONTRACTOR'S PROPOSAL

ANNEX A

LICENSE AGREEMENT

1. PREAMBLE

- 1.1 This License Agreement is part of the Contract entered between the Commission and the Contractor (hereinafter collectively referred to as the “Parties”).
- 1.2 The Contractor possesses intellectual property rights to the software (hereinafter referred to as the “Pre-existing Software”) and relevant documentation (hereinafter referred to as the “Pre-existing Documentaion”).
- 1.3 The Contractor is willing to grant and the Commission desires to acquire a non-exclusive, non-transferable and irrevocable License to the Pre-existing Software as provided below.
- 1.4 The Contractor is willing to develop new software (“Customized Software”) based on the Pre-existing Software for the Commission and grant the Commission exclusive rights to the Customized Software as provided below.
- 1.5 The Parties hereto have agreed as follows.

2. DEFINITIONS

As used herein, the following terms shall have the following definitions:

- 2.1 “License Agreement” means the present document.
- 2.2 “License” means the license to the Software and Documentation granted under this License Agreement.
- 2.3 “Eligible Users” means the Commission’s employees and/or direct contractors.
- 2.4 “Pre-existing Software” means the software owned by the Contractor and used as a basis for the development of the Customized Software.

- 2.5 “Pre-existing Documentation” means all the Contractor’s copyrighted materials related to the Pre-existing Software.
- 2.6 “Customized Software” means the software newly developed by the Contractor within the scope of the Contract. As such, Customized Software does not include Pre-existing Software.
- 2.7 “Customization Documentation” means the materials that document functions of the Customized Software.

Capitalized terms shall have the same meaning as defined in the Contract and the General Conditions of Contract, unless expressly otherwise defined herein.

3. GRANT OF RIGHTS AND LICENSES

- 3.1 The Contractor hereby grants to the Commission a non-exclusive, non-transferable, irrevocable License to use the Pre-existing Software and Pre-existing Documentation, under the terms and conditions set forth herein.
- 3.2 The Commission is authorized to use the Pre-existing Software and Pre-existing Documentation only for activities related to the fulfilment of mandate and purposes of the CTBT including the performance of services of the Commission’s own commercial and/or government customers. The Commission is not authorized to sublicense, distribute, sell, or grant access to the Pre-existing Software.
- 3.3 Access to, and use of, the Pre-existing Software is restricted to Eligible Users.
- 3.4 The Commission agrees to protect the Pre-existing Software and the Pre-existing Documentation from use by, or disclosure or distribution to, persons who are not Eligible Users.

- 3.5 The Commission is authorized to make copies of the Pre-existing Documentation provided by the Contractor only for internal distribution. Copies of the Pre-existing Software may be made by the Commission only for development, back-up and archival purposes.
- 3.6 The Commission agrees not to remove or destroy any proprietary markings, restrictive legends, or intellectual property notices on or in the Pre-existing Software and Pre-existing Documentation.
- 3.7 All title, ownership rights and intellectual property rights in and to the Pre-existing Software and the Pre-existing Documentation shall remain with the Contractor. The Commission acquires no title, right or interest in the Pre-existing Software or the Pre-existing Documentation, other than the License(s) specifically granted herein by the Contractor and the title to the media upon which the Pre-existing Software is delivered.
- 3.8 The Contractor hereby grants to the Commission exclusive intellectual property rights to the Customized Software and the Customization Documentation. The Contractor shall take all the necessary steps, prepare and process all necessary documents and assist in securing such property rights and transferring them to the Commission.
- 3.9 All title, ownership rights and intellectual property rights in and to the Customized Software and the Customization Documentations shall remain with the Commission.

4. SUPPLY OF SOFTWARE AND DOCUMENTATION

- 4.1 The Contractor shall supply to the Commission a properly functioning and fully tested Pre-existing Software system, as well as its new versions, releases and/or upgrades.
- 4.2 The Contractor shall provide the Commission with the Pre-existing Documentation, as well as catalogues and other descriptive literature with respect to the Pre-existing Software and its new versions, releases and/or upgrades.

- 4.3. The Contractor shall supply to the Commission a properly functioning and fully tested Customized Software, including its source code, compiled packages, build instructions, and installers, and the Customization Documentation.

5. WARRANTY

- 5.1. The Contractor warrants that the licensing and use of the Pre-existing or Customized Software by the Commission in accordance with the terms of this License Agreement shall not infringe any copyright, patent or registered design rights of any third party.

6. INDEMNITY

- 6.1 If any claims of copyright infringement are asserted against the Commission by virtue of the infringement by the Contractor of a third party intellectual property rights through the grant of this Software License, the Contractor agrees, upon written notification of such claim by the Commission, to indemnify, hold and save harmless the Commission from and against all such suits, claims, demands and liability, including costs and expenses incurred by the Commission. The Commission shall give the Contractor due notice in writing of any such claim and, without prejudice to the Commission's privileges and immunities under international law, the Commission shall give the Contractor the opportunity to defend the Commission against any such claim at its discretion.
- 6.2 If, as a result of any claim, suit or proceeding so defended, any of the Pre-existing or Customized Software is held to constitute an infringement or its use by the Commission is enjoined, the Contractor shall, at its option and expense, either (i) procure for the Commission the right to continue using said Software; (ii) replace it with substantially equivalent non-infringing Software; or (iii) modify it so that it becomes non-infringing.
- 6.3. If the violation of Software rights is the result of the use of the Pre-existing or Customized Software in combination with other products not delivered by the Contractor, then the Contractor shall not be held liable.

7. INSOLVENCY AND BANKRUPTCY

- 7.1. Should the Contractor become insolvent or be adjudged bankrupt, the Commission, after having paid the Contract Price, will retain the License to use the Pre-existing and Customized Software, whether or not the Commission elects to terminate the Contract under Clause 21 of the General Conditions of Contract.

ANNEX C

TERMS OF REFERENCE

Sensor array and integration with Spot robotic platform

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. For more information, please visit www.ctbto.org

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.

As part of a first development stage, the Commission procured and now owns and operates a commercial off-the-shelf quadruped robotic platform from Boston Dynamics known as ‘Spot’. The platform is used for testing and development purposes. The Commission has integrated the Spot with the following additional hardware items:

- Boston Dynamics Spot Core I/O module,
- Leica Geosystems BLK Arc laser scanner,
- Leica Geosystems GA03 GNSS receiver.

As part of a second development stage, the Commission seeks to expand the array of sensors installed and integrated on the Spot. These terms of reference (ToR), describe the hardware and software that the Commission is seeking to procure to enhance the Spot functionality for health and safety related measurements in open as well as confined environments.

2. SCOPE

The Contractor shall:

1. Supply sensors and peripheral hardware specified in sections 2.1-2.4; the Contractor should optionally also supply the advanced sensors specified in sections 2.5-2.6,
2. Integrate (see section 2.7) the sensors and peripheral hardware supplied as per point 1 above with the Commission-owned equipment (listed in section 1) to the point that they operate seamlessly together,
3. Provide (see section 2.8) customized software for low-level sensor and hardware control, planning and control of the missions, and visualisation of the collected data.

2.1. MESH NETWORK

The Contractor shall supply one (1) Rajant Mesh network or equivalent to enable communication between the Spot and the operator over longer distances.

Rajant Mesh network or equivalent shall meet following specifications:

- Rajant Kinetic Mesh Radio Kit compatible with the Spot,
- 75 m radius coverage per radio indoors.

2.2. LIGHT SYSTEM

The Contractor shall supply one (1) light system to operate the Spot in confined and low-light conditions.

Light system shall meet following specifications:

- Facilitate visual simultaneous localisation and mapping (SLAM) of the BLK ARC laser scanner,
- Be practical and robust and shall be compatible with the Leica BLK Arc laser scanner i.e., lighting does not interfere with or saturate sensor,
- Be as light weight as possible with the option of having its own rechargeable battery,
- Emit more than 1,000 lumens ambient light.

2.3. AIR QUALITY MONITOR (AQM)

The Contractor shall supply one (1) Crowcon Xguard Bright gas monitor or equivalent.

Crowcon Xguard Bright gas monitor or equivalent shall meet following specifications:

- Crowcon Xguard Bright gas monitor or equivalent,
- Ingress protection: IP65 or better,
- Operating temperature: -20 to 50°C,
- Humidity: to 95% relative humidity.

2.4. LOW RESOLUTION RADIATION SENSOR

The Contractor shall supply one (1) low resolution radiation sensor.

Low resolution radiation sensor shall meet following specifications:

- Thermo Fisher Radeye G10 (or equivalent with at least the same or better sensitivity),
- Humidity and temperature datalogger providing real time integrated and georeferenced data outputs for the local gamma radiation dose, humidity, and temperature back to the user on the display.

2.5. HIGH RESOLUTION RADIATION SENSOR

The Contractor should optionally supply one (1) high-resolution radiation sensor.

High-resolution radiation sensor shall meet following specifications:

- (a) CdZnTe gamma detector (H3D M400 or equivalent) with energy resolution $\leq 1\%$ FWHM at 662 keV,
or
- (b) Other gamma detector such as Cs₂ LiLa (Br,Cl)₆: Ce (CLLBC) or equivalent, with sufficient sensitivity to allow radionuclide identification (RID), with energy resolution $\leq 3.5\%$ FWHM at 662 keV,
- Humidity and temperature datalogger providing real time integrated and georeferenced data outputs for the local gamma radiation dose, humidity, and temperature back to the user on the display.

2.6. GAMMA IMAGER

The Contractor should optionally supply one (1) gamma imager.

Gamma imager shall meet following specifications:

- Sensitivity of gamma imager: 3 MBq Cs-137 source to be viewed in a 5-minute scan in approximately 20 m distance/area,

- Dose trail Location tagged radiation dose measurements should follow the track of the robot within +/-20% of manual measurements in same locations,
- Imaging dose rate minimum 1 $\mu\text{Sv/hr}$,
- Imaging dose maximum rate 10 mSv/hr ,
- Dose trail min 0.5 $\mu\text{Sv/hr}$,
- Dose trail max 100 mSv/hr ,
- Gamma ray energy range for imaging 250keV – 3000 keV,
- Gamma ray energy range for spectroscopy 60 keV – 3000 keV,
- Energy resolution for low resolution gamma ray spectroscopy (see section 2.4):
 - $\text{FWHM} \leq 8\%$ at 662 keV,
- Energy resolution for high resolution gamma ray spectroscopy (see section 2.5):
 - Option (a): $\text{FWHM} \leq 1\%$ at 662 keV,
 - Option (b): $\text{FWHM} \leq 3.5\%$ at 662 keV.

2.7. INTEGRATION REQUIREMENTS FOR SENSORS AND PERIPHERAL HARDWARE

The Contractor shall:

- Design and document optimal physical arrangement(s) for the following hardware to be mounted and operated on the Commission-owned Spot robotic platform:
 - Sensors and peripheral hardware described in sections 2.1-2.4, and optionally in sections 2.5-2.6,
 - Commission-owned sensors and peripheral hardware described in section 1.
- Ensure that:
 - The combination of the hardware meets the weight limits, weight distribution requirements, and best practices associated with the use of the Spot,
 - The combination of the hardware meets power requirements of the Spot, allowing for a continuous use of the Spot platform with the additional hardware during at least 45 minutes on a single battery,
 - The cabling and interface arrangements are compatible with the available ports of the Spot and the Spot Core I/O and are adequate for field use (e.g., no loose cables, cables can be cleaned, etc.),

- o The mounts shall be compatible with the Spot platform.

Note: in case all the hardware described in sections 2.1-2.6 cannot be installed simultaneously due to weight, power, or space limits of the Spot, the Contractor shall suggest a break-down into several configurations. The same applies if such a break-down would allow for better implementation of the functional requirements specified in the section 2.8, e.g., the sensors specified in 2.5 and 2.6 may be deactivated.

- Design, manufacture, and supply all mounts and cables for the operation of the sensors and peripheral hardware described in section 2.1-2.4, and optionally in sections 2.5-2.6, and the Commission-owned sensors and peripheral hardware described in section 1.
- Design, implement, document, and deliver software packages for registering each of the hardware described in sections 2.1-2.4, and optionally in sections 2.5-2.6, as ‘payloads’ recognized by the Spot, which includes:
 - o Weight distribution and payload mount models,
 - o Calls for API registration services, network setup, etc.,
 - o ‘Extensions’ for running the low-level control of the hardware, including hardware drivers if applicable.
- Design, implement, document, and deliver a software package for mission planning, control, and data visualization that:
 - o Implements functional requirements specified in section 2.8,
 - o Runs as an ‘extension’ recognized by the Spot.

2.8. CONTROL AND VISUALISATION SOFTWARE

The Contractor shall develop and provide a customized software for the real-time control of sensors and peripheral hardware described in sections 2.1-2.4, and optionally in sections 2.5-2.6, as well as their integration with data from the BLK ARC laser scanner and the GNSS receiver owned by the Commission; mission planning and execution; and data visualisation, hereby referred to as ‘control and visualisation software’.

Control and visualisation software shall meet following specifications:

- Based on pre-existing commercial-off-the-shelf (proprietary or open-source, with technology readiness level (TRL) 7 or above as per ISO 16290:2013) software meeting

as many of the below specifications as possible, with minimal customization required to meet the remaining requirements.

- Low-level real-time control of sensors and peripheral hardware:
 - o Visualise the connection status, operation, and diagnostics of the mesh network (section 2.1),
 - o Control the operation of the light source (section 2.2) on the Spot (on/off button),
 - o Display real-time breadcrumb trail configurable for concentration levels of methane, carbon dioxide and carbon monoxide in real time (section 2.3),
 - o Display real-time local gamma dose-rate and cumulated gamma dose from the low-resolution radiation sensor (section 2.4); provide other relevant state-of-health information about the detector, e.g. temperature, humidity etc.,
 - o Display real-time local gamma dose-rate, latest spectrum (if available), and, optionally, the list of radioisotopes identified by the high-resolution radiation sensor (section 2.5) and/or gamma imager (section 2.6; provide other relevant state-of-health information about the detectors, e.g. temperature, humidity, dead-time,
 - o Display real-time information, state-of-health, and controls of the Spot.
- Mission planning:
 - o Follow the mock-ups to be mutually agreed between the Commission and the Contractor at the beginning of the development,
 - o Operate without connection to the Internet,
 - o Enable the geofencing of the Spot with permitted area entered via a geospatial vector file, such as 'shape file',
 - o Enable the addition of pre-planned routes (shape file) for the Spot to follow when GNSS position is available,
 - o Enable the addition of background satellite imagery,
 - o Enable the setup of mission-specific parameters, such as mesh-radio setup (section 2.1), light setup (section 2.2), warning/alarm thresholds for gas detector (section 2.3), warning/alarm thresholds for gamma dose-rates and doses (sections 2.4-2.5), warning/alarm thresholds for radioisotopes and their

activities (sections 2.5-2.6), target spatial resolution and timeouts for the search logic,

- o Enable advance offline setup of the mission and its transfer to the Spot.
- Mission execution and control:
 - o Follow the mock-ups to be mutually agreed between the Commission and the Contractor at the beginning of the development,
 - o Operate without connection to the Internet,
 - o Enable the Spot to be manually controlled by an operator, remotely via mesh radio or at a stand-off distance via Wi-Fi, to access an area and quickly assess if it is safe for people to enter,
 - o Enable the Spot to autonomously inspect the assigned region of interest in a defined sweep pattern, by collecting relevant information (visual photos, point cloud, gas concentration, radiation measurements) and automatically taking notes of points of interest,
 - o Enable the Spot to execute advance search/frontier exploration, when the Spot deviates from a pre-planned route once measured dose-rate exceeds defined thresholds and tries to localize the source by mapping dose-rate isopleths,
 - o Use the Spot's own autonomy and local awareness to allow for safe movements and going around obstacles, in both confined and open environments,
 - o Use Leica BLK Arc's simultaneous localization and mapping (SLAM) or better SLAM algorithm, using the 3D LiDAR, visual cameras, IMU, and GNSS receiver for global awareness, path planning, and obstacle avoidance,
 - o Use mesh radio for remote communication between the operator and the Spot, updating the operator on the mission status/state-of-health data of the Spot and the sensors, and providing the operator with mission controls,
 - o Implement autonomy (the mission shall be executed without frequent inputs from the operator) and resilience (the Spot shall tolerate temporary loss of mesh radio and minor software/hardware failures, but autonomously return in case of major issues or when the battery level falls below the threshold),
 - o Continuously log all the sensor and Leica BLK Arc data for post-processing and troubleshooting.

- Post-processing and visualization:
 - o Follow the mock-ups to be mutually agreed between the Commission and the Contractor at the beginning of the development,
 - o Display breadcrumb trail configurable to show either dose rate or counts per second as measured by the low-resolution radiation sensor (see section 2.4),
 - o Optionally, project gamma image onto 3D lidar point cloud, based on static or dynamic translation,
 - o Display calibrated radiation dose measurement tagged to location, with real time max and current dose measurement displayed,
 - o Optionally, display heat map video showing highest area of activity locally as a coloured view,
 - o Optionally, tool for preliminary radionuclide identification, customizable to the desired list of radionuclides,
 - o Exporting the collected data for post-processing in 3rd-party tools: spectra in a standardized format (readable by commercial gamma analysis software) for the entire scan; point cloud (low resolution and high resolution); augmented reality video.

3. QUALIFICATION REQUIREMENTS OF THE CONTRACTOR

The Contractor shall:

- Be an established company/organization and have minimum five (5) years of experience,
- Have minimum three (3) successfully completed radiation sensor or similar sensor integration projects, including at least one (1) within last 2 years,
- Have minimum two (2) years of experience with robotic systems, including integrating custom payloads, developing or using SLAM, and designing software for mission planning and control,
- Have access to the Spot Software Development Kit (SDK) and related Application Programming Interfaces (API) to develop and customize software using these SDK and APIs,

- Possess all licenses and legal rights required to install and test the customized software on Spot , for example, the Spot Software Development Kit (SDK) or similar,
- Have minimum two (2) years of experience developing software applications for the visualisation of radiation or other scalar data in 3D, including breadcrumb mapping of count/dose data with position data, visualisation using isopleths, and visualization using projections on point cloud data,
- Prior experience with project-specific hardware would be an asset (i.e., Spot, Leica BLK Arc, Crowcon Xguard Bright gas monitor, Thermo Fisher Radeye G10, H3D M400 gamma detector) and engagement in related developer programs (e.g., Boston Dynamics “Technology Partner”, Leica Geosystems “Global Partners Network”),
- Allocate a design and software development team of at least three (3) staff members that have actively participated in three (3) integration projects of the Contractor with radiation sensors and Spot or similar robotic platform in the last two (2) years.

4. DATA DELIVERABLES

The Contractor shall provide the following data deliverables:

- Manufacturers’ documents for all individual sensors and peripheral hardware described in sections 2.1-2.4, and optionally in sections 2.5-2.6, including, where relevant, certification of compliance paperwork.
- Description and a custom operating manual, including a quick guide and optimal arrangement(s), for the assembly of the sensors and peripheral hardware, and their installation onto the Spot.
- Compiled software packages, installation instructions, software documentation, and test protocols for the software packages required for registration and low-level control of the selected sensors and peripheral hardware.
- A licence to the Pre-Existing Software used as a basis for the development, the pre-existing software in the form of compiled modules, or installers, and the necessary pre-existing software documentation.
- Exclusive rights to the Customized Software, including its source code, compiled packages, build instructions, and installers, and the related documentation including software architecture document, user manual, and test protocols.

- Prior to the Acceptance Test (see section 6), the Contractor shall submit paperwork to demonstrate fulfilment of the requirements of the ToR.

5. RESOURCES PROVIDED BY THE COMMISSION

The Commission will ship the following equipment owned by the CTBTO to the Contractor for the installation and integration of required sensors and peripheral hardware and software described in Section 2.

- Boston Dynamics Spot,
- Boston Dynamics Spot Core I/O module,
- Leica Geosystems BLK ARC laser scanner,
- Leica Geosystems GA03 GNSS receiver.

Following the installation, the same equipment shall be used for the Acceptance Test (section 6). The Commission will be responsible for the shipment of all items and components from the premises of the Contractor to CTBTO TeST Centre upon testing and acceptance.

6. ACCEPTANCE TEST

On completion of the integration work, an Acceptance Test shall be held at the premises of the Contractor. The Acceptance Test will follow a testing protocol that shall be mutually agreed between the Commission and the Contractor at the start of the project implementation. The protocol shall be based on the functionality and requirements set in Section 2.

7. RISK MANAGEMENT

To mitigate major risk of significant technical complexity of the mission planning and control software, the Contractor shall choose a substantially mature COTS software meeting most of the present requirements and customize it further.

The Contractor shall provide a thorough risk assessment plan at the project's commencement to identify potential risks that could impact the successful execution of the outlined implementation activities in this ToR. Risks may include but are not limited to technical challenges, changes in project requirements/scope, resource constraints, schedule delays, integration difficulties, and third-party software dependencies. The risk assessment plan should be continuously updated, aligning with the delivery of project milestones and significant accomplishments.

Upon the project's satisfactory completion, the Contractor is obligated to conduct a final review of the initially identified risks. Risks that have been effectively mitigated or did not materialize should be officially closed, accompanied by appropriate documentation. The insights gained from the risk management process should be methodically documented and shared with the CTBTO, thereby contributing to the knowledge repository for forthcoming e-learning development endeavours.

8 TIMEFRAME REQUIREMENTS

Event	Location	Dates
Acceptance test protocol format finalized and agreed	Tele-conference	2 weeks after Contract signed
Mock-ups for the software finalized and agreed	Tele-conference	4 weeks after Contract signed
Acceptance test	Premises of the Contractor	12 months after Contract signed