NTPC Limited

(A Govt. of India enterprise)

Invites

Expression of Interest (EOI)

for

3D Laser Scanning of Power Plants and creation of 3D Model

DOCUMENTS OF EOI

This EOI document comprises of the following sections:

(i) Section-I: Invitation for Expression of Interest

(ii) Section-II: Information to APPLICANTs

(iii) Section-III: Application Form and Annexures

SECTION-I:

INVITATION FOR EXPRESSION OF INTEREST

DETAILED NOTICE INVITING EXPRESSION OF INTEREST (EOI)

EOI No.: STN-ENGG/2023-24/001 **Date: 03.05.2023**

Expression of Interest for 3D Laser Scanning of Power Plants and creation of 3D Model

1.0 NTPC is India's largest power utility with installed capacity of more than 71,000 MW (including its JVs). The company is engaged in the business of generation and sale of bulk power. NTPC is having pan-India presence with own stations coal based, gas based, Hydro, Wind and Solar plants. Established in 1975, NTPC has fleet of thermal power generating units which are getting older.

2.0 NTPC leverages technology in its internal and external operation to increase competitive advantage & profitability. Development of 3D models of the existing assets and management of data through the model will help in achieving the level of digital asset information management for the plants.

3.0 Design review 3D model for Main Plant and BOP (Balance of Plant) is currently kept as deliverable in the scope for new NTPC projects. However, these models are engineering 3D model and are not the as-built 3D model. So, it is not certain, whether the actual assets are exactly in line with the engineering 3D model. Further, with passage of time, many new retrofits, modifications take place, which further increases the reality gap between the originally supplied engineering 3D model and the actual physical status of the assets. The information gap with respect to the reality as mentioned above makes the decisions of future retrofits prone to errors and clashes. In the current state of increased R&M needs, it is furthermore important that the as-built status of the physical assets is available for errorless and speedy decision making.

4.0 In furtherance to the above, NTPC has decided to take up the work for 3D Laser Scanning of its power plant facilities and creation of intelligent 3D models. The above requirement has been envisaged in two separate parts:

i. **Part-I:** 3D laser scanning of power plant facilities and creation of non-intelligent 3D Models. The non-intelligent 3D model shall be the deliverable of Part-I

ii. **Part–II:** The non-intelligent 3D model to be made Intelligent 3D Model through modelling software. With features like P&ID creation, meta data integration provisions the Intelligent 3D model shall effectively be a DIGITAL TWIN of the physical asset with all features of Asset Management.

The requirements of Part-I and II are further detailed below:

5.0 **Part-I Requirements:**

NTPC has many old and new power stations at various geographical locations in India. 3D Laser scanning and non-intelligent 3D model creation of any power plant facilities will be the first step towards having the digital as-is basis information of that particular facility.

The non-intelligent 3D model should have the following minimum features:

A. User should be able to virtually walkthrough the 3D Model. High-resolution photo realistic

images of the scanned area should also be captured along with scanning and to be overlapped in the 3D Model.

B. The 3D Model should have the tags assigned to the equipment and component level. User should be able to assign additional tags.

C. Virtual walk-through facility for the plant facility should be available with Measurement, Coordinates, snapshot, annotations, and mark-up capabilities.

D. Features of generating GA drawings of the modelled facilities should be possible.

E. The non-intelligent 3D model should be delivered in common data format like PTS, PTX, ZFS, FLS etc. so that it can be readily recognized by 3D modelling platforms like SP3D, PDMS/E3D, Plant 3D etc. The point cloud data should also be handed over to NTPC.

5.1 The power plant facilities to be scanned can be of any areas like the whole Boiler or a part of its facilities at different elevations, the whole Main Powerhouse or a part of its facilities at different elevations, the FGD plant, other Balance of Plants. It can also be the whole plant as well. It is obvious that different facilities are of different congestion and involves different complexities.

5.2 As per the requirement of Part-I, NTPC plans to take up the activity of 3D laser scanning and creation of non-intelligent 3D model of its facilities as and when required. NTPC through this EOI invites willing APPLICANTs from India who has the experience of conducting Laser scanning in large industries like power, oil and gas etc. and creation of 3D model confirming to the features as mentioned in clause 5.0 (A to E) above.

5.3 Further, the APPLICANT should be willing to be engaged with NTPC for the above exercise on per unit-based rate contract. Based on the varying congestion and complexity of different areas, the per unit area based rate for conducting 3D Laser scanning and creation of 3D model can be different for different areas.

The below table may be referred to for better understanding:

Sl. No.	Area	Rate
1	Boiler (All / any facilities coming inside boiler canopy)	Rate / m^2 of area covered
2	Main Powerhouse (All / any facilities coming inside Main Powerhouse)	Rate / m^2 of area covered
3	Switchyard (AIS) / Transformer yard / All outdoor tank and surrounding areas / CW pump house / CT pump house	Rate / m^2 of area covered
4	Switchyard (GIS)	Rate / m^2 of area covered
5	Ash Handling Plant / Coal Handling Plant / DM-PT Plant / Fuel Oil Pump House internal / Fire water pump house internal / Compressor House internal	Rate / m^2 of area covered
6	Pipe rack / Pipe trestle	Rate / m^3 of volume

		covered

5.4 Based on the information collected and assessment of the vendor capabilities, NTPC may go for tendering for area / volume-based rate contract for its various power plant facilities.

6.0 **Part-II Requirements:**

Through this section, NTPC invites willing APPLICANTS from India who can provide with modelling software which can create intelligent 3D models out of any non-intelligent 3D models which are in common data format like PTS, PTX, ZFS, FLS etc.

The intelligent 3D Model should have the following minimum features:

A. The 3D model to be as per industry standard color code.
B. Walk through to be possible in the 3D model by users.
C. Making intelligent P&IDs, interfacing & correlating the final intelligent 3D model with updated intelligent P&IDs. This will include verification of existing P&IDs (Available in soft copy) supplied by NTPC and converting it to intelligent P&IDs to reflect the latest status asper site condition.
D. Intelligent P&ID (2D) and (3D model) should be integrated to each other with the built-in facility of compare & update so as to exchange the properties to and fro.
E. Creating master tag database for the plant using latest tag management system using the currently implemented tag philosophy in NTPC plant.
F. Attach the available documents with related tags and 2D and 3D models. This would allow tag to tag and tag to document navigation.
G. Meta Data Integration - Integration for visualization of vital information related to assets extracted from existing SAP, PI on Virtual Plant.
H. Connectivity to asset management system for seamless view of all assets related information.
I. The solution shall allow easy incorporation of possible future changes/modifications in physical model of the plant or changes in the documents etc., that may take place in future.
J. Capability of creating a Virtual reality(VR) model out of the 3D intelligent model.

7.0 Based on the information collected and assessment of the vendor capabilities, NTPC may go for tendering for creation of intelligent 3D Models (Non-intelligent 3D model will be the input provided by NTPC) of power plant facilities.

8.0 Through the above-mentioned tendering, NTPC may tie up with the successful bidder for a period

of 3 years, during which the vendor shall create the intelligent 3D models (non-intelligent 3D model will be the input provided by NTPC) as and when required. During this duration of engagement, imparting training to selected NTPC team for independent creation of intelligent models shall also be the deliverable from the vendor.

9.0 Suggestive technical specification for the above works (Part-I and II) is enclosed as Annexure-A to Section-I of this EOI.

SECTION-II: INFORMATION TO APPLICANTS

10.0 **Eligibility for Participation in EOI**

- The APPLICANT shall be a Company / Sole Proprietorship / Partnership / Limited Liability Partnership / Consortium / Cooperative Society registered in India.
- The APPLICANT should note about the technical specifications mentioned in **Annexure-A** to Section-I. After collection of data in this EOI, the scope of work may be updated.
- APPLICANT is expected to furnish all technical details related to the products/solutions available with them related to this EOI as part of **Annexure-B** to Section-I.

11.0 **DOWNLOAD AND SUBMISSION OF EOI**

A. Interested APPLICANTs may download the documents of EOI **free of cost** from https://ntpctender.ntpc.co.in

B. For consideration of EOI, APPLICANTs are required to e-mail signed and scanned copy of EOI, duly filled and complete in all respect, through e-mail mentioned hereunder:

akhileshpoddar@ntpc.co.in

C. APPLICANTS may send their queries related with EOI through e-mail at akhileshpoddar@ntpc.co.in

D. **Date of publication of EOI : 03.05.02023**

E. **Last date for submission of Application:** 15 days from date of publication of EOI (till 17:00 hrs. IST)

F. **Last date for queries/ seeking clarifications: 13.05.2023**

G. **Response Validity: 6 months from the last date for EOI Submission**

H. NTPC shall not be liable for any postal/ Mail delivery issue and delays whatsoever in receipt of EOI documents and EOI received after the stipulated date and time shall not be entertained. EOIs submitted without supporting documents (as mentioned in Sec-I clause 10.0 and Annexures mentioned in Sec-III) will be summarily rejected.

I. NTPC reserves the right to reject or accept any or all applications, cancel/withdraw the EOI process without assigning any reason whatsoever, and in such case, APPLICANT shall not have any claim arising out of such action.

J. Language of the responses to EOI or any query/clarifications/correspondences shall be in English only.

K. APPLICANTs shall mention the name and contact details of two persons, with complete address, phone number and email id.

L. The responsibility of Compliance of all applicable statutory provisions are within the entire scope of the Agency and shall indemnify NTPC in case of any claim, procedure, dispute what soever towards the execution of the work in its entirety.

M. NTPC Ltd. may, at its sole discretion, ask for additional information/ documents and/ or seek clarifications from the APPLICANT(s) after the Deadline for submission of response, inter alia, for the purpose of removal of inconsistencies or infirmities in their responses.

12.0 **Validity of Responses**

The APPLICANT shall submit the responses which shall remain valid up to six (6) months after the response Deadline ("Response Validity"). NTPC reserves the right to reject any response, which does not meet the above-mentioned validity requirement.

NTPC may solicit the APPLICANT's consent for an extension of the period of validity of the response. The request and the response in this regard shall be in writing. In the event any APPLICANT refuses to extend its response validity as requested by NTPC, NTPC shall terminate processing of such APPLICANT's responses. An APPLICANT accepting NTPC request for validity extension shall not be permitted to modify its response.

SECTION-III: APPLICATION FORM AND ANNEXURES

Instructions to APPLICANTs

- This Expression of Interest (EOI) is to identify interested parties for Work mentioned at:

  Clause No. 5.0 of Section -I of this EOI

  AND / OR

  Clause No. 6.0 of Section-I of this EOI

  For expression of interest, Application Form and Annexures given in Section-III shall be duly filled and sent to NTPC by the APPLICANT in soft copy. Following are the list of Annexures:

  - **Annexure -1**: Application Form
  - **Annexure- 2**: APPLICANT's Profile
  - **Annexure- 3**: Acceptance of Fraud Prevention Policy of NTPC
  - **Annexure- 4**: Any other information

- **APPLICANTs should go through Section-I and Section-II thoroughly before filling and submitting the application.**

- The Annexure-B to Section-I should also be duly filled and submitted
- Along with submission of application & form, APPLICANT must ensure that they have provided following information without which EOI shall be rejected:

  - GSTN and PAN of firm (or individual if applying as individual).

  - Address/ Contact number/ e-mail address/ Name of Contact person.

(Annexure-1)

(EXPRESSION OF INTEREST: APPLICATION FORM)

(To be submitted on APPLICANT's Letter Head)

Ref No. **Date:**

Deputy General Manager, Station Engineering
NTPC Limited, WR-II HQ,
Plot No. 87, Sector 24, Atal Nagar, Nava Raipur
Raipur, Chhattisgarh-492018

Dear Sir,

Sub: Expression of Interest for 3D Laser Scanning of Power Plants and creation of 3D Model, as per Detailed Notice Inviting Expression of Interest (EOI), (Ref No. EOI No.: STN-ENGG/2023-24/001) dated 03.05.2023

We, the undersigned, express our interest for the subject EOI and declare the following:

(a) We are duly authorized to represent and act on behalf of _____(name of the firm/company/individual).

(b) We have examined and have no reservations to the EOI document including Amendment No(s) & Clarification No(s)_____(if any).

(c) With reference to your invitation for EOI dated_____, we are furnishing herewith all the required details as per the prescribed Annexures.

(d) We hereby express our willingness to participate in RFP/ forth coming tender as and when NTPC Ltd invite the same. Our willingness is for the following:

1. Only Part-I as mentioned in Clause 5.0 of the EOI ☐
2. Only Part-2 as mentioned in Clause 5.0 of the EOI ☐
3. Both Part-1 and 2 as mentioned in Clause 5.0 of the EOI ☐

(e) NTPC and /or its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents and information submitted in connection with this application and to seek clarifications from our bankers/suppliers and clients.

(f) This application will also serve as authorization to seek/ request information as deemed necessary from any individual or authorized representative of any institution referred in the supporting document provided by APPLICANT.

(Annexure-1)

(g) NTPC and /or its authorized representatives may contact the following nodal persons for further information on any aspects of the application:

Name and designation of contact Person	Address for Communication	Telephone No	Email ID

(h) This application is made in the full understanding that:

This EOI is not intended for empanelment of APPLICANT or pre-qualification of APPLICANT.

1. EOI process will be subject to verification of all information submitted at the discretion of NTPC.
2. NTPC Ltd reserves the right to reject or accept any or all applications, cancel/withdraw the EOI process without assigning any reason whatsoever and in such case, APPLICANT shall not have any claim arising out of such action.

(i) We declare that we have read and abide by the provisions of Fraud Prevention Policy of NTPC and submit the form of Acceptance of Fraud Prevention Policy duly filled as per NTPC's format.

(j) The undersigned declare that the statements made and the information provided in the duly completed application are complete, true and correct in every detail

SIGNATURE

(AUTHORISED

SIGNATORY)

(OFFICE STAMP)

DATE_____NAME_____DESIGNATION_____

PLACE_____

(Annexure-2)

Applicant's Profile

1. **Name of the interested party**: ……
2. **Address** : ……
3. **Classification of Company**

   Public Limited ☐

   Partnership ☐

   LimitedPrivate ☐

   Limited ☐

   Others Please Specify: ……

4. **Contact Details** NAME: ……..... DESIGNATION: ……..,,…….. MOBILE NO.: ……. EMAIL-ID: …….
5. Years of experience in the business: ……
6. Annual Turnover in the last three financial years and Net worth:

Sl. No.	Financial Year	Annual Turnover Amount in INR
1		
2		
3		

Sl. No.	Description	As on last date of preceding financial year
1	Paid-up share capital	
2	Net worth	
3	% of net worth to paid-up share capital	

7. PO Copy of the similar contracts enclosed ------ (Y / N)

8. End user certificate for successful operation for the above contracts enclosed ------ (Y / N)

(Annexure-3)

(FORM FOR ACCEPTANCE OF FRAUD PREVENTION POLICY)

We have read the contents of Fraud Prevention Policy of NTPC displayed on the tender website https://ntpctender.ntpc.co.in/and undertake that we shall strictly abide by the provisions of Fraud Prevention Policy of NTPC.

SIGNATURE

(AUTHORISED SIGNATORY)

(OFFICE STAMP)

DATE_____NAME_____DESIGNATION_____

PLACE_____

(Annexure-4)

(ANY OTHER INFORMATION)

If Applicant desires to share any other additional Information relevant to the work / assignment likebrochure, future plan or any suggestion, it may be given in this Annexure.

Annexure-A to Section-I

1.0 Suggestive Technical Requirement of the Contract

1.1 3D LASER SCANNING:

1.1.1 The Tenderer shall use Laser Scanners with valid calibration. This is to ensure the scanner complies with the basic prerequisites associated to the electrical zone classification requirements of the manufacturing plants where the scanning shall be done. The laser scanners shall qualify the Performance Evaluation Tests as per manufacturer's standards.

1.1.2 The scanner used by the Tenderer shall be of the latest technology with proven experience of being used in the Process & Power Industry to the minutest level of accuracy. Some examples of scanners from manufacturers such as Faro, Leica and Z+F.

1.1.3 Typical range of operation of the 3D scanning process could be anywhere from 30 meters to distances beyond 300 meters depending on the complexity of the plant. Additionally, the Laser scanner shall be capable of capturing point data of 360 degrees x 300 degrees cloud data set of sufficient density to generate photo-realistic quality images. The images generated, shall be 360 degrees in the horizontal and 300 degrees in the vertical.

1.1.4 Laser Scanner shall have the following minimum performance specifications-

a) Beam Divergence – 0.3 milliradians (mrad)
b) Beam Diameter – 2.12 mm circular at exit
c) Linearity error up to 25 meters - **<** 1mm
d) Measurement accuracy of 1.0 mm + 10ppm over full range of 350 m
e) Spatial resolution accuracy on average of 2 mm @10 m & 3.5 mm @25 m
f) Data acquisition Rate - **<** 20,00,000 pixel/sec

1.1.5 The laser scanning system that shall be deployed should not have any difficulty in extracting the edges or details like process drain points, etc. from indistinct data clouds. The Output from the system shall involve minimal (preferably no) manipulation to achieve acceptable recording quality.

1.1.6 The Tenderer shall submit the scanning execution plan. The execution plan shall detail out how the scanning will start and what necessary precautions need to be taken care to identify the scanning progress and status.

1.1.7 The plant that is to be scanned shall first be visited by the bidder to evaluate the site conditions. Following points shall be attended to-

a) Identification of the possible scan locations in accordance with the topography of the site to provide complete coverage of the structure and areas. In case of requirement of any scaffolding requirements, which may impact the quality and count of number of scans.

b) Use of scaffolding for laser scanning should be avoided.

c) Assessment of target types and layouts in 3D laser scanning is an important factor for attainment of registration accuracy. The type of target (viz. paper, paddle or sphere) shall be established in the initial stages. Preferred option is to use paper targets. Target layout design in terms of number of targets used, distances between targets and the scanner, material/texture of the surfaces the targets are attached to, are some of the critical factors for achieving high accuracy in the registration process. These need to be carefully studied and documented prior to start of the laser scanning process.

d) Verification of the accessibility to the locations while taking into consideration the feasibility to place the markers/targets along the site in a manner by which a minimum of five common targets are visible from two consecutive locations.

e) Study of the denseness of the plants to estimate the number of scans to be taken from the different locations.

1.1.8 Laser scanning shall be performed on all levels (different elevation) of the technological structures. All above ground facilities including intermediate access platforms & segmental platforms of different equipment, isolated electrical and instrumentation terminals and panels, etc. shall be covered during scanning of the designated plant area.

1.1.9 Since the plant may be operational during the scanning process, necessary provisions shall be made jointly by NTPC and bidder to work in an operating unit and in between Operations emergencies of plant.

1.1.10 It is necessary to ensure the completeness of the data collected during the scanning survey as it shall form basis of the record of the plant. Accordingly, Data voids should be minimized (if not nullified) during the scanning process on field through selection of appropriate scanning positions (overlapping if necessary) and minimizing any obstructions to the scanner during site visit.

1.1.11 Overlapping scans are generally required to ensure a full record of an object is collected. Accordingly, there should be minimum overlapping of at least 5 common points between two scan positions to facilitate better stitching of Point Cloud Data (PCD data).

1.1.12 During the process of laser scanning, it is important to ensure the captured point cloud control points are aligned with the plant coordinate system, to make sure that the different scan all line up on the plant coordinates correctly. Normally, each plant site will have its site co-ordinate system for referencing the scanned data. In such cases, the Benchmark to be referenced through plot plan for the complex and available Easting, northing and elevation co-ordinates shall be considered as basis.

1.1.13 Bidder shall maximize scanned images to generate a high-quality point cloud data to ensure availability of precise as built data which shall be used for subsequent facility upgrades and retrofits.

1.1.14 The distinct point clouds amassed from the laser scan shall be registered and stitched to form a single point cloud using the Bidder’s preferred software based on project requirements and scanning strategy. For higher scanner resolutions, the point cloud should be unified at 1mm to ensure good data.

1.1.15 Bidder shall collect data and geo-reference the same in either plant coordinate system or UTM coordinate system as per buyer requirement.

1.1.16 The Bidder shall ensure development of point cloud data with minimal “holes”. The intent here is to scan all the structures, piping (including the pipes that extend between structures), equipment structure elevations and pipe supports including spring, bellows, snubbers, struts, sway braces, etc. contained therein. All the piping connected to equipment nozzles and supporting arrangement shall be covered in scanning.

1.2 HIGH RESOLUTION 360 DEGREE PANORAMIC PHOTOGRAPHS:

1.2.1 The Virtual Tour comprises of capturing 360º high resolution panoramic color photos utilizing high resolution DSLR still Camera.

1.2.2 Bidder shall capture individual photos for each area covering interiors of Sub stations and Control Rooms capturing all tags on the panels, junction boxes, instruments, equipment

1.2.3 etc wherever visible.

1.2.4 It shall be stitched together with navigation aids to make a panoramic view.

1.2.5 Piping, Equipment and Instrument Tags shall be hot spotted and attributed.

1.2.6 The point of reference for Laser scan & panoramic views shall coincide and superimpose with each other, which shall ensure that the viewer need not reorient the position of the view for capturing measurement/ coordinates etc.

1.3 Intelligent 3D model solution

1.3.1 Bidder shall produce detailed, Intelligent As-built 3D Model, which shall be based on Laser Scan Data and Engineering documents.

1.3.2 Bidder shall use the latest version of the Software for execution of this project in respective domain:

a) 3D Model Creation:

b) Point Cloud Software

c) To integrate laser data and 3D Model

1.3.3 All Catalogues and Specs of piping to be compiled and submitted as a deliverable to NTPC with admin username and password for the corresponding project database.

1.3.4 Bidder shall create the detailed Intelligent As-built 3D Model at least with the feature list as per Table1. The generated Intelligent As-built 3D Model shall be to the extent of normal design model but loaded with as-built information.

1.3.5 The Intelligent As-built 3D Model should be true reflection of existing facilities and not a cleaned-up version of the 3D model (generated from Laser Point Cloud Data)

1.3.6 All underground piping should be modelled manually inside 3D modelling application as per data captured through GPR, the underground piping should be intelligent modelled and isometric drawing should also be provided.

1.3.7 The intelligent As-built model should be overlapped in a photographic image in 3d modelling application so as to confirm the integrity of the model with laser data.

1.3.8 User should be able to walk through inside the hyper bubble view

(laser data) in 3D modeling application.

1.3.9 There should be a facility in the 3D modelling application where the selected laser data can be demolished from master laser data.

1.3.10 Should have facility to put the laser data onto drawings for reference dimensions.

1.3.11 Naming convention for the complete model should be followed as per NTPC standard.

1.3.12 Clash free model with report should be submitted.

1.3.13 All the necessary systems such as piping, electrical etc should be defined in the project.

1.3.14 Structure should be modelled from Indian steel catalogue or whatever its specified-on structure at site.

1.3.15 There should not be any inconsistency in piping such as mismatch of bore etc.

1.3.16 The 3D solution should have a facility of undo and redo the changes during live modelling of 3D elements.

1.3.17 Origin in the 3D model should be well defined after consultation with NTPC rep.

1.3.18 Model should be segregated in work break down structure in 3D model area wise after consultation with NTPC rep.

1.3.19 3D model of the pipe should have color coding on the basis of systems after consultation with NTPC rep.

1.3.20 Insulation, tracing and jacketing of pipe should also be modelled.

1.3.21 Flow direction should be correct as per fluid inside the pipe.

1.3.22 Bolt, nut and washer should come in BOM of isometric drawings.

4.3.23 As-built 3D Model shall be detailed enough to enable visualization in software and it should have the capabilities to walkthrough using software module to be supplied by the bidder.

Table-1: The Coverage requirements for Laser Scanning and Intelligent As- built 3D Modelling.

Piping	• All permanent piping (Process and Utilities) 1” & Above • Connection details (flanges, welded and screwed fittings and components) 1” & Above Valves (associated with modelled piping) 1” & Above • Vents 1” & Above Nozzles 1” & Above Drains 1” & Above Piping supports. • Underground piping
Equipment	• All equipment as shown in P&IDs / Scans (as-is / as-built/updated /newly created)
Structural/ Civil	• Structural steel work. • All Pipe racks . • All Pipe supports • Platforms, ladders/ stairs, handrails and access/ walkways .
Electrical	• Conduits 3” and above . As intelligent cable tray in 3D model such that it gives MTO. • Cable trays and Ladder. As intelligent cable tray

	in 3D model such that it gives MTO. • Control panels, boxes, switches. As intelligent electrical equipment • Meters . As intelligent electrical equipment • Fans . As intelligent electrical equipment • Motors . As intelligent electrical equipment.
Instrument	• Instrument Devices. As intelligent equipment. • Level Gauges . As intelligent equipment. • Pressure Gauges . As intelligent equipment. • All Junction Boxes . As intelligent equipment. • Local Panels/Cabinets . As intelligent equipment. • Instrument duct: As intelligent equipment.
Others	• Fire Fighting Equipment . As intelligent equipment. • Fire Alarms/Sounders and Manual Alarm Call Points . As intelligent equipment. • Safety eye baths and showers . As intelligent equipment. • Fire and Gas Detection devices . As intelligent equipment. • Safety Signs . As intelligent equipment. • Wind direction Monitors . As intelligent equipment. • Escape Routes .As volumes • Features to be shown as outline only • Buildings etc As volumes • Access walkways to accommodation modules As Structure element • Any Other As volumes

1.4 Asset Information Management - WEB PORTAL :

1.4.1 Bidder shall develop a new Web Portal for hosting the Laser Data, 3D model, drawing and documents of the NTPC power plant.

1.4.2 Bidder MUST demonstrate the process and capabilities of their AIM solution during the tendering process through a sample project executed by them.

1.4.3 Bidder shall plan to have an alignment workshop session with NTPC after the project award to demonstrate and agree on the methodology/development of the Web Portal including user access control.

1.4.4 Below is the list of few key Items to be available in the Portal-

a) Data shall be split per SITE > Area > individual Units as per Plant Break Down structure (PBS), more than one PBS should be able to configure in the solution, Below are in scope

- Tags by Type,
- Tags by Vendors
- Documents by Type
- Documents by Source
- Documents by Discipline

b) Log report of number of Users assessing the Web Portal shall be available.
c) Each Asset shall open in an individual Tab once it's clicked by the User.
d) The solution shall provide information navigation that is intuitive, simple and fast including:
   - *Object to Object navigation* – e.g. Ability to navigate from one object to another and view / retrieve associated information.
   - *Tag to tag navigation* – e.g. from a system to its constituent components
   - *Tag to document navigation* – e.g. from a tag to its associated documents and drawings
   - Document to tag navigation – e.g. from a P&ID to its associated equipment, instruments and lines
   - Document to document navigation – e.g. from a purchase order to any technical specifications it refers to
   - Ability to access / retrieve / open the links to a given file including links to external systems (but not limited to) such as SAP/Maximo/ Meridium
e) The Solution shall provide the ability to execute basic searches from the user interface, including the following:
   - Ability to search for information based on a tag number.
   - Ability to search for structured data (e.g. tag attributes) and unstructured data (e.g. documents, drawings and models (2D / 3D)).
   - Ability to search within the document in office or searchable pdf formats
f) The Solution shall enable users to create customized / advanced searches based on specific criteria.
g) The point of reference for scan & panoramic views shall coincide, option to switch ON/OFF the photographs for measurement & coordinates functionality.
h) Piping, Equipment, and Instrument Tags shall be hot spotted and attributed.
i) Capability to visualize linked 3D model with the functionality of zoom in and zoom out, Pan, rotate, support sectioning in horizontal and vertical planes with spherical rotation of sectional planes.
j) The portal should facilitate precise measurement of 3D elements within integrated 3D model.
k) The 3D visualization frame of the portal shall adopt the hierarchies and grouping defined in parent 3D Model and shall have functionality of isolating and toggle 'view on/view off' for selected group.
l) The 3D visualization frame shall respond to the tag search carried out on virtual portal and shall highlight the searched tag element with a close view of the tag element.
m) The model frame of the portal shall display the customized properties/attributes of the tagged element inherited from the meta data.
n) The 3D visualization frame shall be integral part of portal solutions and visualization of 3D models should not require any software to be installed separately.

1.4.5 The list of attributes for Piping, Equipment and Instrument which will be populated will be agreed with NTPC after the award of project.

1.4.6 Feature enabling Point cloud model data to be aligned & oriented with intelligent/non intelligent 3D model.

1.4.7 Bidder shall ensure that each location of the PBS within the asset/drawings are captured enabling the portal to facilitate 360º Viewing.

1.4.8 Bidder shall be responsible for the complete deployment of the Web Portal within NTPC's environment considering complying with NTPC's IT compliance and requirements.

1.4.9 Bidder shall enhance the Web portal to facilitate of having an integration with NTPC's SAP, PI, DREAMS to facilitate the linking of the Tag object with its respective document/drawing/data.

1.4.10 Bidder shall comply to NTPC's Information Technology (IT) requirements (such as IT Security Compliance, preparation of all documentation as per IT requirements)

1.4.11 Bidder shall provide details related to Server Hardware requirements to be made available in NTPC's environment.

1.4.12 Bidder shall provide annual maintenance and support for AIM with updates.

1.4.13 The solution shall provide support for bulk data loading and also validation such as.

- Attribute Completeness: The solution shall check for missing/empty values against user defined parameters.
- Attribute Inconsistencies: The solution shall check for discrepancies/differences between values for the same attributes from different data sources.
- Attribute Inaccuracies: The solution shall check for inaccuracies in the values of attributes against pre-defined rules.

Annexure-B to Section-I

A. APPLICANTS responding to Part-I requirements as mentioned in Clause 5.0 of Section-I

Sl. No.	Query	Vendor Response
1	Does the APPLICANT own the Laser scanners or they outsource the same?	
2	In case of outsourcing the Laser Scanners, please mention the sub vendor name and address	
3	Share the technical details of the Laser Scanners, which are intended to be used by the APPLICANT for industrial 3D scanning application	
4	Typically, what is the per day scanning rate (area covered in m^2 unit) of the APPLICANT in large scale industries like Power plant, refinery etc.	
5	Does the APPLICANT have any experience of modelling the existing underground facilities (like foundations, pipeline details etc.)?	
6	If Answer to Sl. No. 5 is YES, kindly share the capability and limitations of the APPLICANT to carry out such work	
7	What are the data format options of the non-intelligent model delivered available with the APPLICANT?	
8	Whether the data formats are ISO 15926 compliant?	
9	Experience of the offered solution in a large industrial setup such as power station, fertilizer, refinery, steel, cement etc. along with no. of years of operation and end user certificate	

B. APPLICANTS responding to Part-II requirements as mentioned in Clause 6.0 of Section-I

Sl. No.	Query	Vendor Response
1	Product Details (Name & Version/series/sub-module details as applicable)	
2	Please mention the name of OEM of the product	
3	What is the relationship between product OEM and the vendor	
4	Is the solution cloud based or on-premise based or both	
5	In case of such a requirement in a NTPC tender, will the vendor be interested in participating:	
i)	as Main Bidder (in such a case please indicate if the vendor will be interested to	

	take other vendors as collaborator/associate)	
ii)	by being Collaborative/Associate with other vendor acting as main Bidder	
iii)	through their channel partner(s) or other route (as applicable)	
6	Please mention 3D modelling technology that shall be used in such a system.	
7	Will it be possible to interlink 3D model developed here with the intelligent P&IDs and 2-D drawings in a document management system. If yes, then please mention the name of all such document management system which can be interfaced with mentioned 3D modelling software.	
8	Can 2-D drawings be generated from the built 3-D model?	
9	Experience of the offered solution in a large industrial setup such as power station, fertilizer, refinery, steel, cement etc. along with no. of years of operation and end user certificate	

APPLICANTS responding to both Part-I and Part-II requirements as mentioned in Clause 5.0 and 6.0 of Section-I , shall fill both the above tables

C. In case APPLICANTS want to share any additional information, observations on the EOI, the same may be mentioned below:

Additional Information if any

Sl. No.	Observation / information
1	
2	
3	