BIHAR COUNCIL ON SCIENCE & TECHNOLOGY
INDIRA GANDHI SCIENCE COMPLEX PLANETARIUM,
ADALATGANJ, BAILEY ROAD,
PATNA-800001

TENDER NO. :- PS 01/2019 **DATED : 28-02-2019**

NOTICE INVITING e- TENDER

For Design, Supply , Installation and Commissioning of an Integrated Functional Full Dome Digital 8K-2D and 3D Immersive Projection System at Indira Gandhi Science Complex Planetarium, Patna

On-line Digitally signed e-tenders are invited in two Bid System from the manufacturers or their authorized registered Indian agents for Supply, Installation, Integration, Testing and Commissioning of hardware and software packages, interfaces, tools and / or drivers, providing operational training , offering onsite warranty support of 5 (Five) years, post warranty maintenance for 2 (Two) years and operation for a period for 7 (Seven) years of the complete and fully integrated functional full dome digital 8K- 2D and 3D Immersive Projection System for a 16 meter diameter perforated aluminum dome screen with geometrical correction, image stitching and blending etc. for seamless projection of high resolution 2D and 3D digital full dome film shows and digital planetarium show by replacing existing Dome Screen, 35mm Astrovision fish eye lens Projection System and GM-II of GOTO Inc. Japan installed at Indira Gandhi Science Complex Planetarium, Patna. Interested bidder may download the tender documents from the Procurement Portal www.eproc.bihar.gov.in or from the Council's website www.bcst.org.in and submit before 06 P.M. on 02-04-2019.

BCST reserves the right to accept or reject any or all tenders in full or part without assigning any reason whatsoever.

28/2/19

Project Director
Bihar Council On Science & Technology
Indira Gandhi Science Complex Planetarium,
Adalatganj, Bailey Road,
Patna

BIHAR COUNCIL ON SCIENCE AND TECHNOLOGY
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Event	Target Date
Tender Processing Fee (TPF) (Non-Refundable)	Rs. 1180/- (Inclusive of GST(Goods and Service Tax) @ 18%) to be paid through e-Payment mode (i.e. Net Banking, NEFT / RTGS & Credit / Debit Card) only.
Tender Fee / Cost of BOQ (Non-Refundable)	Rs. 10,000 to be paid through e-Payment mode (i.e. Net Banking, NEFT / RTGS & Credit / Debit Card) only.
Earnest Money Deposit (EMD)	Rs.10,00,000/-. Rupees Ten lakh only to be paid through e-Payment mode (i.e. Net Banking, NEFT / RTGS & Credit / Debit Card) or manual mode (BG, DD etc). In case of Manual mode Original hardcopy of the EMD which may be a DD / BG should be submitted to the tendering authority office within the next working day after tender closing date."
Request & Sale of Tender Document Date and Time	01-03-2019 to 30-03-2019 up to 05:00 PM
Last date to submit queries for clarifications on the Tender	08-03-2019 up to 06:00 PM

Document	
Date and Time for Pre- Bid Conference	11-03-2019 at 11:30 AM
Last Date and Time of Submission of Tender	01-04-2019 up to 06:00 PM
General cum Technical Bid Opening Date and Time	02-04-2019 at 11.00 AM
Financial Bid Opening Date and Time	To be intimated later

The online bid both Technical (Techno-Commercial) Bid and Financial bid should be uploaded by the due date and time as per the above mentioned schedule. The responsibility to ensure the same lies with the bidders. Off-line tenders shall not be accepted and no request in this regard will be entertained whatsoever. **Online Technical Bid will be opened at the first instance in this office at 11.00 a.m. on 02-04-2019 for technical evaluation as well as selection of technically acceptable offers** and at the second stage, the Financial Bids of only the selected technically acceptable offers will be opened. Decision of the Council regarding selection of eligible and qualified vendors/firms and or equipment in particular for opening the Financial Bid shall be final and binding on the bidders. Bidders may be present during opening of tenders.

It is intended to purchase the above equipment directly from the manufacturer without involving any agent or payment of any bidder commission. Authorized Registered Indian Agents of foreign manufacturers who are capable to render after Sales Service (in case where foreign manufacturers do not quote any rate to the actual users), shall submit copy of Bidder Agreement with foreign manufacturer along with the tender and in such case no bidder commission shall be paid by the Council.

BCST reserves the right to accept or reject any or all tenders in full or part without assigning any reason whatsoever. BCST shall also not be bound to accept merely the lowest tender but the technical suitability, capability and superiority of the equipment/system as well as after sales service including infrastructure to render such service etc. shall be of prime consideration for selection of the equipment/system.

General Information and Instructions

i. The instructions given herein will be strictly binding on the bidders and deviation, if any will make the tender or tenders liable to be considered invalid. Tenders incorporating additional conditions by the bidder are liable for rejection.

ii. Bids shall be submitted online only at website: www.eproc.bihar.gov.in Manual bids shall not be accepted. However two hard copies of the Technical (Techno- Commercial) bid uploaded on the portal online must be submitted (By hand or by Courier) to the office of Project Director, BCST, IGSC Planetarium, Baily Road, Patna within next day of last date of submission of Bids. But for Technical evaluation purpose, documents uploaded on the e-Proc portal, only will be considered.

iii. **e-Procurement related instructions at Annexure A** should be strictly followed during submission of the Bid.

iv. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

v. An agent of foreign OEM, for submitting the offer on behalf of OEM, would be required to produce a copy of their legal bidder agreement with their principal.

vi. Bid should be submitted along with the **Earnest Money of INR 1.00 Million (Rupees Ten lakh only)** through e-Payment mode (i.e. Net Banking, NEFT / RTGS & Credit / Debit Card) or manual mode (BG, DD). In case of Manual mode Original hardcopy of the EMD which may be a DD / BG crossed Demand Draft / BG on any nationalized bank of India payable in favour of "I.G.S.C.PLANETARIUM, PATNA". Earnest Money deposits in respect of such offers which are not accepted will be returned to the bidders within 30 working days from the date on which the final decision is taken about the source from which the items under tender are to be procured. No interest will be paid on the Earnest Money deposited with the Council. Earnest Money deposit in respect of the successful bidders will be retained with the Council until entire execution of the order as per terms of the tender. If the successful bidder fails to execute the order strictly as per the Council's approved drawing & specification in full or part within the stipulated delivery period of the purchase order, the Earnest Money deposit retained with the Council shall be forfeited forthwith after cancellation of the concerned order.

vii. **Validity of Bids**: **The Bids should remain valid for 180 days from the date of opening of bid.**

viii. **Rejection of Bids:** Canvassing by the Bidder(s) in any form, unsolicited letter and post-tender correction may invoke summary rejection. Conditional tenders will be rejected. Non-compliance of applicable General Information and Instructions will disqualify the Bid.

ix. The Bidders should have Digital Signature Certificate (DSC) for filling up the Bids. The person signing the tender documents should be authorized for submitting the on line e-tender.

x. The Bidders shall fill up the Prescribed Format for submission of **Technical (Techno-commercial) Bid as per "Annexure-B"** format duly signed by the authorized signatory. The person signing the tender document should be authorised for submitting the online e-tender.

xi. The Financial Bid shall be filled in and signed by the authorized signatory online as per Performa **"Annexure-C"** available at e-tender system website www.eproc.bihar.gov.in. Off line Financial Bid shall not be accepted.

1. Tender must be uploaded in two separate covers marked **Cover-1** (Technical Bid) and **Cover-2** (Financial Bid/BOQ).The contents of Cover-1 and Cover-2 shall be as follows:-

Cover-1

i) "Technical (Techno-Commercial) Bid" (as per **Annexure-B** format) duly filled in and digitally signed with official stamp.

ii) All relevant documents related to "Technical (Techno-commercial) Bid" as per **"Annexure-B"**.

iii) Prescribed Undertaking by the "Original System Integrator" as per **"Annexure-D"** format, if applicable, duly signed by the Authorized Signatory with office stamp.

iv) The Technical Brochures of each equipment with technical explanation for every feature of the product offered by the bidders.

v) The scanned copy of the Demand Draft for INR 1.00 Million (Rupees One Million only) or in equivalent foreign currency as Earnest Money Deposit.

vi) The scanned copy of "General Terms & Conditions" **(Annexure-E)** duly signed by the Authorized Signatory with official stamp as a token of acceptance of the bidders.

vii) The scanned copy of "Technical specifications and Scope of Work" **(Annexure-F)** duly signed by the Authorized Signatory with official stamp as a token of acceptance of the bidders.

viii) "Technical Compliance Tables" (as per **Annexure-G** format) duly filled in and digitally signed with official stamp.

Cover-2

i) The "Financial Bid (BOQ)" (as per **Annexure-C** format) i.e. Schedule of Price Bid in the form of attached Performa duly filled in and digitally signed

The Cover-1, i.e. Technical (Techno-commercial) Bid shall be opened by the BCST at the first instance and evaluated by the competent authority of the BCST. At the second stage, the Cover-2 containing Financial Bid of only techno-commercially acceptable offers shall be opened for further evaluation and ranking before awarding the contract.

2. Authorities of Bihar Council On Science & Technology do not bind themselves to accept mere lowest tender and reserves the right to reject or accept any or all tenders wholly or partially without assigning any reason whatsoever:-

ANNEXURE A

e-Procurement Process Related Instructions

- **Submission of Proposals Through electronic online mode only.**

1. The bidder shall submit his bid / tender on e-Procurement platform at www.eproc.bihar.gov.in.

2. The bidder must have the Class II / III Digital Signature Certificate (DSC) and User-id of the e-Procurement website before participating in the e-Tendering process. The bidder may use their DSC if they already have. They can also take DSC from any of the authorized agencies. For user-id they have to get registered themselves on e-procurement website www.eproc.bihar.gov.in and submit their bids online on the same. Offline bids shall not be entertained by the Tender Inviting Authority for the tenders published in e-procurement platform.

3. The bidders shall submit their eligibility and qualification details, Technical bid, Financial bid etc., in the online standard formats given in e-Procurement web site at the respective stage only. The bidders shall upload the scanned copies of all the relevant certificates, documents etc., in support of their eligibility criteria / technical bids and other certificate / documents in the e-Procurement web site. The bidder shall digitally sign on the supporting statements, documents, certificates, uploaded by him, owning responsibility for their correctness / authenticity. The bidder shall attach all the required documents for the specific tender after uploading the same during the bid submission as per the tender notice and bid document.

4. All the required documents should be attached at the proper place as mentioned in the e-forms otherwise the tender of the bidder may be rejected.

5. Tender Processing Fee (TPF) is to be paid through e-Payment mode (i.e. NEFT / RTGS, Credit / Debit Card and Net Banking) only.

6. Cost of BOQ / Form Fee is to be paid through e-Payment mode (i.e. NEFT / RTGS, Credit / Debit Card and Net Banking) only.

7. “Earnest Money Deposit (EMD) can be paid either through online mode or manual mode (BG/DD). original hardcopy of the EMD which may be a DD / BG should be submitted to the tendering authority office within the next working days after tender closing date.”

Note: "Bids along with necessary online payments must be submitted through e-Procurement portal www.eproc.bihar.gov.in before the date and time specified in the NIT / RFP. The department / Tendering Authority doesn't take any responsibility for the delay / Non Submission of Tender / Non Reconciliation of online Payment caused due to Non-availability of Internet Connection, Network Traffic / Holidays or any other reason."

8. The tender opening will be done online only.

9. Any corrigendum or date extension notice will be given on the e-Procurement website only.

10. For support related to e-tendering process, bidders may contact at following address "e-Procurement HELP DESK First Floor, M/22, Bank of India Building, Road No-25, Sri Krishna Nagar, Patna-800001 Ph. No: 0612-2523006, Mob- 7542028164" or may visit the link "Vendor Info" at www.eproc.bihar.gov.in.

SEARCHING FOR TENDER DOCUMENTS

i. There are various search options built in the E PROCUREMENT Portal to facilitate bidders to search active tenders by several parameters. These parameters could include Tender No, Department Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Description of work, Other keywords etc. to search for a tender published on the E PROCUREMENT Portal.

ii Once the bidder have selected the tender he is interested in, he may download the required documents / tender schedules. These tenders can be moved to the respective 'Inprogress' button. This would enable the E PROCUREMENT Portal to intimate the bidders through e-mail in case there is any corrigendum issued to the tender document.

iii. The bidders should make a note of the Tender number assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

i. Bidders should take into account any corrigendum published on the tender document before submitting their bids.

ii. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

iii. Bidders, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

iv. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "General Documents" area available to them to upload such documents. These documents may be directly submitted from the "General Document" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

i. Bidders should log-into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidders will be responsible for any delay due to other issues.

ii. The bidders have to digitally sign and upload the required bid documents one by one as indicated in the tender document.

iii. "Earnest Money Deposit (EMD) can be paid either through online mode or manual mode (BG, DD). In case of manual mode of payment of EMD, the original hardcopy of the EMD which may be a DD / BG that should be submitted in the tendering authority office within the next working day after tender closing date."

iv. Bidders should submit the EMD as per the instructions specified in the tender document. In case of Manual mode original instrument should be posted / couriered / given in person to the Tender Processing Section, latest by next working day of the last date of bid submission. The detail of the DD / any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.

v. A standard Price Schedule format (BOQ) has been provided with the tender document (Annexure C) to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidders). No other cells should be changed. **In case no rate value is required to be quoted in any particular cell , that cell may be kept blank , figure '0' (zero) shall not be entered in such cell(s)** .Once the details have been completed, the bidders should save it and submit it online, without changing the filename. If the BOQ file is found to be modified by the bidders, the bid will be rejected.

vi. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

vii. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

viii. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

ix. Upon the successful and timely submission of bids (i.e. after Clicking "Submit Tender Form" in the portal), the portal will give a successful bid submission message and a bid summary along with Acknowledgment Copy will be displayed with the bid control number and the date & time of submission of the bid with all other relevant details.

x. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid.

ASSISTANCE TO BIDDERS

i. Any enquiries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

ii. Any queries relating to the process of online bid submission or queries relating to E PROCUREMENT Portal in general may be directed to the 24x7 E PROCUREMENT Portal helpdesk. The contact number for the helpdesk is 0612-2523006, +91 75420 28164

ANNEXURE-B

BIHAR COUNCIL ON SCIENCE AND TECHNOLOGY
INDIRA GANDHI SCIENCE COMPLEX PLANETARIUM,
ADALATGANJ, BAILEY ROAD,
PATNA- 800001
E-TENDER No.: PS-01 / 2019 dated 28-02-2019
TECHNICAL (Techno-Commercial) BID

Notes**: ALL PARTICULARS / INFORMATIONS SHOULD BE GIVEN IN THE FOLLOWING FORMAT WITH COMPLETE DETAILS.**

i	Name of the Bidder	**:**	
ii	Mailing address of the Bidder with PIN/ZIP Code	**:**	
iii.	Contact details	**:**	
	Telephone numbers(s) Mobile	**:** **:**	
	Fax number(s)	**:**	
	E-mail address	**:**	
	Website	**:**	
iv.	a.Background details of the Bidder (State whether original manufacturer / authorised Registered Indian Agent of the manufacturer).	**:**	
	b.In case of authorised Registered Indian Agent, submit notary certified copy of the Bidder Agreement with the manufacturer.	**:**	
	c.Name and Address of the Vendor to whom the order will be placed(BCST will procure the entire system from a single source)	**:**	
v.	Whether capable to supply and install the Full dome System as per minimum requirement/and Technical Specification given in Annexure-E (Please mention "YES" or "NO" in Annexure F)	**:**	
	a) If it is mentioned "NO" above, submit detailed deviation to be made from enclosed Technical Specification.(Attach extra sheet, if required)	**:**	
	b) submit the detail specifications of the offered product including copies of Product brochure	**:**	

vi.	Mention recommended sitting arrangement for the theatre where the equipment(s) offered shall be housed (Submit detailed design and drawing of sitting layout)	:	
vii.	Single point contact details for all post-installations service related issues with hierarchy levels (if any)	:	
viii.	Please provide detailed address and set up link from where support for maintenance during post warranty shall be offered by the firm at Patna, India.	:	
ix.	Shelf-life time of the Digital immersive full dome 2D and 3D projection system (i.e. up to which period technical support as well as spare parts including consumables shall be available with the firm).	:	
x.	Submit technical brochures indicating the detailed technical specifications of the system as given in the table below:-.	:	Detailed Information to be submitted by the Bidders as per following table

S. No	**Details of Information Required**	**Qty**
i.	Details of Civil and electrical work including air-conditioning for the projectors and servers enclosures to be taken up by the bidder.	1 Set
ii.	Details of Projector Array with special mountings. This set should contain number of projectors proposed, its make, complete specifications, its weight, dimensions, details about lenses, heat load, noise generated etc.	1 Set
iii.	Edge blending and geometric correction details	1 Set
iv.	Image Generator Server, Interactive planetarium software and playback system details including specifications and product catalogues. Software for conversion of large format shows into full dome and digital library and software for playback and creation of planetarium shows.	1 set
v.	Display management ,calibration and alignment system details	1 Set
vi.	Show control System details	1 Set
vii.	Networking and data cabling schematic layout	1 Set
viii.	7.1 surround sound system details including product catalogues, location of speakers etc	1 Set
ix.	IR emitters, active 3D spectacles and storage, sterilization & charging details.	1 Set
x.	LED cove lighting, Foot light, Exit and Emergency Exit signage	1 Set
xi.	Complete details of U.P.S with 30 minutes back up (with parallel redundant system) including technical catalogues/brochures	1 Set
xii.	Seating layout and design details of reclining chairs along with line of sight diagrams **(locally available materials may be considered)**.	1 Set
xiii.	Details of Sound proofing and Acoustic treatment required, if any to be executed at site may be submitted along with specifications of materials **(locally available materials may be considered),** schematic drawings with expected outcome.	1 Set
xiv.	Indicative list of documents/manuals/drawings that shall be provided to BCST while	1 Set

	handing over. Suggested training scheme, topics may also be included in this set.	
xv.	Timeline for execution of the entire work from the date of placement of order indicating therein parallel activities and critical path to establish completion of the entire work within the stipulated time schedule	1 Set
xvi.	List and quantity of each spare that shall be provided by the bidder initially to fulfil onsite comprehensive warranty of five years. This shall also include quantity of spare lamps with housing that will be supplied along with the projectors initially. All the tools, tackles, gadgets, devices that shall be required for measuring, operation, maintenance, testing etc shall be included in this list and shall form part of the initial supply.	1 Set
xvii.	A detailed video (in CD drives or hard drives) demonstrating system operation and other technicalities shall be provided with the product for training purpose and technical support along with the product / system	1 set
viii.	Information/Details regarding any other items not included above may be submitted in this set.	1 Set

Note: Bidders shall provide detailed bill of quantities of each item as mentioned in the above table and proposed for this offer along with schematic system architecture and product catalogues for all hardware items.

I / We hereby declare that the above statements are true. I / We also declare that the decision of Bihar Council On Science & Technology regarding selection of eligible firm(s) / type of equipment or system / multimedia show contents scheme for opening of Financial Bid (Part-II) shall be final and binding on me / us.

Dated Official Seal & Signature of the Bidder/Constituted Attorney

Annexure-E

BIHAR COUNCIL ON SCIENCE AND TECHNOLOGY
INDIRA GANDHI SCIENCE COMPLEX PLANETARIUM,
ADALATGANJ, BAILEY ROAD,
PATNA- 800001

GENERAL TERMS AND CONDITIONS

GENERAL TERMS AND CONDITIONS FOR SUBMISSION of Tender for supply, installation, integration, testing and commissioning of hardware and software packages, interfaces, tools and/or drivers; providing operational training, offering onsite warranty support of five years, post warranty maintenance for two years and operation for a period of seven years of the complete and fully integrated functional full dome digital 8K-2D and 3D immersive projection system for a 16 meter diameter perforated aluminium dome screen with geometrical correction, image stitching and blending etc. for seamless projection of high resolution 8K-2D and 3Ddigital full dome film shows and digital planetarium shows by replacing existing 35mmAstrovision fish eye lens projection system and GM-II of GOTO Inc., Japan installed at Indira Gandhi Science Complex Planetarium, Patna on Turn Key basis.

1.0 **DEFINITIONS:**

1.1 In this Contract, the following terms will be interpreted as indicated:

i) **"The Contract"** means the agreement entered into between the Purchaser and the Supplier, as recorded in the contract Form signed by the Parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

ii) **"The Contract Price"** means the price payable to the Supplier under the Contract for the full and proper performance of its contractual obligations.

iii) **"The Materials/equipment"** means all of the equipment, machinery, and/or other materials which the Supplier is required to supply to the Purchaser under the Contract.

iv) **"The Services"** means those services ancillary to the supply of the Materials/equipment, such as transportation and insurance, and any other incidental Services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Supplier covered under the Contract.

v) **"GCC"** means the General Terms and Conditions of Contract contained in the section.

vi) **"The Purchaser"** means the organization purchasing the Materials/ equipment.

vii) **"Bidder"** is a supplier who has registered with the purchaser for supply of materials/equipment.

viii) "**The Supplier**" means the firm supplying the Materials / equipment and Services under this Contract.

ix) **"Day"** means calendar day.

2.0 **APPLICABILITY:**

These General Conditions of contract will apply to the extent that they are not superseded by provisions of salient features of the Bid.

2.1 **a) STANDARDS:**

The Materials/equipment supplied under this Contract will conform to the Standards mentioned in the Technical specifications, and, when no applicable standard is mentioned, the authoritative standards appropriate to the Materials / equipment' i.e., BIS, such standards will be the latest. All material will be of the best class and will be capable of satisfactory operation under tropical conditions without distortion or deterioration.

b) INTERCHANGEABILITY:

All similar materials and removable/replaceable parts of similar equipment will be interchangeable with each other. A specific confirmation of this should be furnished in the bid.

2.2 Bidders are required to submit with the tender in **Cover-1** envelope, all the documents as per eligibility criterion mentioned in clause 3 along with s**chematic design, schematic drawings of proposed control room/console, mechanisms with complete technical specifications, procurement strategy, flow chart of the work, fabrication strategy on how the work shall be completed** within the stipulated time as per **Clause 5** of the General terms and conditions.

2.3 The successful Bidder shall submit within 7 (seven) days from the date of placement of the work order the duplicate copy of the work order duly signed and official stamp on all the pages as a token of acceptance of the order.

2.4 Earnest Money Deposit (EMD) of Indian **Rs.10,00,000/- (Rupees Ten lakh only)** submitted by way of either through e-Payment mode (i.e. NEFT / RTGS, Credit / Debit Card and Net Banking) Or through Demand Draft / Pay Order drawn on **I.G.S.C. Planetarium payable at Patna**. Earnest Money deposits of unsuccessful bidders will be returned within 30 working days from the date on which the final decision is taken about the successful bidder. Earnest Money Deposit in respect of the successful bidder will be retained with the Council until the completion of entire execution of the order as per terms and conditions of the tender. In case, the successful bidder refuses to accept the offer after finalization and placement of the order as per the finalized and accepted terms and conditions, the order shall be cancelled forthwith without any further reference and the EMD deposited for this tender shall be forfeited.

3. ELIGIBLE BIDDERS:

The following are the Qualifying Eligibility Criterion for bidder.

The bidders can only be considered for technical evaluation if he has the minimum qualification criteria as given below:

i. The Bidder/manufacturer must be an original manufacturer of the Digital Planetarium system software and the planetarium shows or authorized agent of the manufacturer and the content of show generator. In case the bidder is an authorized agent of the manufacturer and the show producers, then the authority letters should be furnished with all the details.

ii. The Bidder/manufacturer must have previous experience of having supplied and installed Digital Planetarium equipment for fixed dome and full dome shows worldwide especially including India. **The bidder must have installed/under installation (work order must be attached) at least 1(one) Digital Planetarium System (of 10 meter diameter or higher) in India and at least 1(one) Active 3D-8K or 2 (two) Active 3D-4K Planetarium installation of**

14 meter diameter or higher worldwide which are currently operational (supporting document must be furnished).

iii. The Bidder/manufacturer must have trained staff in service and maintenance of digital planetarium projectors. The service and support infrastructure for digital planetarium system available with Indian counterpart to be provided. Bidder/manufacturer must attach copy of certificates showing factory trained staff.

iv. The Bidder/manufacturer must furnish information regarding experience particularly on the following points:-

a. Name of the Manufacturer of digital planetarium system.

b. Standing of the firm and manufacture of equipment quoted.

c. Description of equipment similar to the quoted, supplied, installed & commissioned during the last 5 (five) years with the name (s) of the party (s) to whom supplies were made with performance certificate from them.

d. If the manufacturer or their authorized agent is having collaboration with another production house (s) or firm (s) details regarding the same.

e. A list of Purchase orders executed during the last 5 (five) years along with user's certificate and orders in hand.

f. Equipment manufacturing capability and up to date testing facilities. Bids may not be considered if the past manufacturing experience in the field of digital planetarium is found to be un-satisfactory or is of less than 5 (five) years.

g. Balance sheet and profit and loss account of the bidder duly certified by the Chartered Accountant for the immediately 3(three) preceding years should be enclosed to assess the financial soundness.

h. No bankruptcy letter issued by appropriate Government authority of the respective country

i. Certificate of the existence issued by Department of the commerce/ Government accredited agencies of the respective country.

j. Letter of Good Standing (tax clearance) issued by Tax Commission of the respective country.

k. Certificate of incorporation / Business License issued by Government authority of the respective state.

l. Satisfactorily completed at least a similar work of value not less than Rs. 60 Million (Rupees Sixty Million only).

m. List of institutions in India, along with their contact information where installations were done by the bidder.

Note:

1. Not with-standing anything stated above the purchaser reserves the right to assess bidder's capability and capacity to perform the contract should circumstances warrant such an assessment in the overall interest of the purchaser.

2. Uploading unnecessary documents may lead to disqualification of bidders.

3. All the documents shall be notarized

4. Price:

The price and rates indicated shall include all incidental charges like packing, forwarding, freight, insurance, and delivery etc. as may be applicable to this tender for supply, installation, commissioning, testing and training along with warranty (5 Years), post warranty (2 Years) maintenance and operation for a period of seven years of the complete and integrated functional full dome digital 8K-2D and 3D immersive projection system at IGSC Planetarium, Patna. The price should include the cost of providing training for the operation of the system to the representatives of Bihar Council On Science & Technology /I.G.S. Planetarium, Patna in detail.

The selected bidder shall be responsible for proper co-ordination with BCST and continuous supervision of these works at site to ensure the desired quality of workmanship and use of specified materials and the end result.

Bidders may submit the rates in INR/US$/Euro/British £ etc. as may be applicable. BCST shall provide custom duty exemption certificate as per norms. However BCST shall accept offers on Delivery on site basis only. Offer(s) on High Sea Sales or through Bond to Bond transfer (Warehousing Bond under Section 59 of Indian Customs Act 1962) shall not be accepted since BCST desires to acquire Propriety of the goods neither in transit nor in any Bonded Warehouse but after possessing the goods directly in their custody at Airport Terminal from the Airport Authority after due customs clearance. In case of overseas consignment on Delivery on site basis, transport cost from the nearest Airport / Seaport to the site shall be borne by bidder.

Goods and Service Tax and other taxes / levies to be imposed on the quoted rates shall be clearly mentioned in the offer form with proper break-up**.** No GST exemption (Form C/E/D) will be issued. Prices and rates quoted shall be firm and fixed for the entire period of execution of the order and no escalation of rates on any ground whatsoever shall be accepted.

Applicable Custom Duty and CST will be paid by BCST on providing demand note for the same. All other expenses on account of importing the equipments such as custom clearing charges / Transportation / Loading / Un loading charges etc. will be born by the successful bidder. Shipment will be on DDU basis i.e. door delivery custom duty unpaid basis.

5. Time of Completion:

Time is the essence of the work. The entire work comprising dismantling and removal of existing projection equipment, other existing installations etc. and supply, installation, commissioning, testing and training for the complete **integrated functional full dome digital 8K-2D and 3D immersive projection system** for a 16 meter diameter perforated aluminium dome screen with geometrical correction, image stitching and blending etc. for seamless projection of high resolution 2D and 3D digital full dome film shows and digital planetarium shows by replacing the existing 35mmAstrovision fish eye lens projection system and GM-II of GOTO Inc., Japan installed at I.G.S.C. Planetarium, Patna shall be completed within **8 (Eight) months from the date of placement of confirmed order or opening of Letter of Credit. However downtime of existing Planetarium should not exceed 06 (Six) months.**

6. Every effort should be made to complete the entire work by the successful bidder within the specified time. **In case the successful bidder fails to comply with the specified time schedule as per the approved bar chart and accepted terms and conditions, and where the progress of work is not found satisfactory, and commensurate with the expected progress as per the bar chart, Bihar Council on Science &Technology reserves the right to cancel the order.** The decision of the Bihar Council On Science & Technology in this regard shall be final and binding on the successful bidder. The successful bidder cannot claim any compensation for such cancellation or determination of contract.

7. Inspection:

The successful bidder shall also mandatorily arrange for inspection of the equipment including its accessories at the site on completion of supply, whenever desired by the authorized officials of Bihar Council On Science & Technology. Any /all defect(s) pointed out to the successful bidder by the competent representative of Bihar Council On Science & Technology during such inspection shall be promptly rectified at the cost (including material cost) of the successful bidder to meet the desired quality, and specification as per requirement of Bihar Council On Science & Technology failing which penal action shall be taken as deemed fit by Bihar Council On Science & Technology. The decision of Bihar Council On Science & Technology in this regard shall be final and binding on the successful bidder.

8. General Terms of payment

An irrevocable and confirmed Letter of Credit shall be opened for 100% value of the imported items quoted in foreign currency immediately upon receipt of the order confirmation. The mode of payment shall be as follows: -

i. **60% (Sixty percent)** of the total sum of the imported items on shipment of the entire materials/consignment and presentation of the dispatch documents.

ii. **30% (Thirty percent)** of the total sum of the imported items after successful installation and commissioning of the fully integrated high resolution immersive Full dome digital 8K-2D and 3D immersive projection system at site and successful running of Full dome 2D and 3D film shows and planetarium shows".

iii. **Balance 10% (Ten percent)** of the total sum of the imported items on successful operational training and handing over the equipment to our authorized representative and satisfactory running of the entire Full dome digital 2D and 3D immersive projection system for a minimum period of 10 (ten) consecutive days and on submission of a certificate issued by Bihar Council On Science & Technology stating that installation of the ordered system has been done satisfactorily and also on submission of warranty certificate as detailed in clause No.10.

For items quoted in INR, the payment terms shall be as follows:

i. **60% (Sixty percent)** of the total sum of the items quoted in INR on delivery of the entire materials/consignment and submission of bill of quantities.

ii. **30% (Thirty percent)** of the total sum of the items quoted in INR after successful installation and commissioning of the fully integrated high resolution immersive Full dome digital 2D and 3D immersive projection system at site.

iii. **Balance 10% (Ten percent)** of the total sum of the items quoted in INR on successful operational training and handing over the equipment to our authorized representative and satisfactory running of the entire Full dome digital 2D and 3D immersive projection system for a minimum period of 10(ten) consecutive days and on submission of a certificate issued by Bihar Council On Science &

Technologystating that installation of the ordered system has been done satisfactorily and also on submission of warranty certificate as detailed in clause No.10.

Prior to release of balance 10% (ten percent) payment of the total value of the items quoted the successful bidder shall arrange for an irrevocable Bank Guarantee acceptable to BCST equal to 10% (ten percent) of the total value of the order valid for the period of five years as security for fulfilment of warranty/ defect liability obligations. Training of BCST personnel in operation and maintenance of the entire ordered system shall be organized by the successful bidder at every stage of installation and also after satisfactory commissioning of the equipment at site and before the final 10 % (ten percent) payment is released as per terms stated above.

For annual operations (for a period of seven years) and maintenance contract for two years(beyond the warranty period of five years), the payment shall be made half-yearly on satisfactory completion of the work and this payment schedule shall continue for the entire duration of the contract.

9. Penalty Clause

In case of non-completion of the entire work within the stipulated time, and the delay is not attributable to site requirements, **Liquidated Damage (L.D.) @ 0.5% of the tendered value per week** shall be recovered from the bill of the successful bidder subject to a maximum of 10% of the tendered value.

10.Defect Liability period / WARRANTY PERIOD:

The Defect Liability /Warranty period shall be **five years** from the date of certification of the completion of satisfactory installation and commissioning of the system. The successful bidder shall be responsible for all defects of the installed equipment, manufacturing or other defects of components, playback and associated software etc. for a period of five years from the date of satisfactory completion of the installation and commissioning of the system. The successful bidder, shall at their own cost, rectify the defects and or replace the defective parts/equipment, up to the complete satisfaction of the competent authority of the Bihar Council On Science & Technology /I.G.S.C. Planetarium, Patna within reasonable time. **The successful bidder shall maintain an inventory of all necessary components to reduce downtime.**

11. Specifications of the items under tender are enclosed for guidance. However, if any ambiguity in the specification is detected, it shall be promptly brought to the notice of the Bihar Council On Science & Technology for clarification. The successful bidder should obtain written approval of Bihar Council On Science & Technology for any deviation from the approved specifications, if required due to site conditions or for betterment and safety of visitors and installations.

12. The authorities of the Bihar Council On Science & Technology reserve the right to amend, alter or modify the terms and conditions, specifications of the items if necessary for betterment and safety of visitors. No additional cost shall be borne by Bihar Council On Science & Technology for such amendments.

13. In case the successful bidder refuse to accept the offer after finalisation or does not compile with clause 2.3 of General Terms & Conditions within 07 (seven) days from the date of placement of the order as per the finalised and accepted terms & conditions, earnest money deposit would be automatically forfeited and the order shall be cancelled forthwith.

14. The authorities of Bihar Council On Science & Technology do not bind themselves to accept the lowest tender and reserves the right to accept or reject any or all tenders wholly or partially without assigning any reason whatsoever.

15. The successful bidder shall obtain necessary trade and other licenses/permissions as may be required to carry out the tendered job at I.G.S.C. Planetarium, Patna and shall also be responsible for compliance of all statutory rules and regulations which may be in force time to time from the appropriate authorities at their own cost.

16 Bihar Council On Science &Technology, Patna shall not be liable for any injury or death of an employee who is deployed by the successful bidder within/outside the work site during the time of execution of the work order.

17. Security Deposit:

The Security Deposit shall be 10% of the gross value of the work executed and shall be submitted by the successful bidder in the form of Bank Guarantee before release of the final payment. The Security Deposit shall be released after expiry of the defect liability period of 5 (five) years from the date of satisfactory completion of the installation and commissioning of the system.

18. The successful bidder shall not transfer wholly or partially the order of supply, installation, testing and commissioning of the equipment to any other person(s) / firm / company for any reason whatsoever and in which case the order shall automatically stand cancelled.

19. All disputes and differences between the successful bidder and Bihar Council On Science & Technology of any kind whatever arising out of or in connection with the order on carrying out supply, installation, testing and satisfactory commissioning of the system and during the period of five years (onsite warranty and operation) and further during the subsequent period of two years of operation and maintenance beyond the warranty period (whether during the progress of the work or after the completion of work and whether before or after the determination, abandonment or breach of the terms and conditions of the order) shall be referred to the sole arbitration of a person nominated by the Bihar Council On Science & Technology, Patna whose decision in this regard will be final and binding on both the successful bidder and the Bihar Council On Science & Technology. The provisions of the Arbitration and Conciliation Act 1996 or any statutory modification or re-enactment thereof and of the rules made there under for the time being in force shall apply to arbitration's proceedings under this Clause.

20. All other conditions given in the tender document under various sections shall stand valid and the successful bidder shall abide by them.

ANNEXURE-F

Section I

Technical Specifications and Scope of work

This is a two part bid (**Cover:1 -** Technical &Commercial bid without Price and **Cover:2 -** Price bid).

This is a Tender document for an integrated system with High-end heavy-duty **DLP front projectors with multiple NSH lamps** to be deployed with a 16 meter diameter perforated aluminium dome screen non tilted with geometrical correction, image stitching and blending etc. for seamless projection of high resolution 2D and 3D digital full dome film shows and digital planetarium shows by replacing existing Astrovision projection system and GM-II of GOTO Inc., Japan installed at IGSC Planetarium, Patna

The scope of work includes

A) Dismantling of existing Projection equipment & Dome Screen

i). Dismantling of the existing GM-II planetarium system including installation and dismantling of required scaffolding, removing from the theatre dismantling of dog house only of the Astrovision 35 projection system and dismantling of all other accessories and storing/ stacking in designated places (lead space of 500 meters), including submission of bill of materials so dismantled.

ii) Dismantling and stacking of chairs (lead space of 500 meters)and carpet (lead space of 500 meters)of the existing theatre including submission of bill of materials so dismantled

iii) Site Preparation along with levelling and making of robust floor in the space created due to removal of existing equipments. This newly prepared floor will house additional chairs.

iv) Dismantling of the existing 16 meter Aluminium perforated Projection dome at IGSC Planetarium, Patna, with appropriate paint.

v) All necessary civil work for complete installation of all equipments including projectors & dome screen will be done by bidder. Successful bidder will also be required to paint the interior portion of the theater including acoustic panels as per requirement, with mat finish deep colour, after completion of civil work.

vi) **Separate enclosure as per heat load of the projector and servers will be provided by the bidder. The bidder should make enclosure with 19 mm thick plywood (IS-710) both side laminate finish of shade black (Mat finish) and provide separate channel from the existing AC duct extension / AHU with adequate capacity of de – humidifier in each enclosure. The bidder should coordinate with the concerned agency engaged in operation & maintenance of AC Plant at IGSC Planetarium, Patna for details.Enclosure will be of required size for each projectors and servers.**

All the prospective bidders are required to mandatorily visit the site to assess the scope of work.

B) Supply, installation, integration, training, and commissioning along with onsite warranty support of five years with operation for seven years & post warranty maintenance for further two years of following sub systems. All of these provisions will be considered for evaluation of comparative statements of bids:

1. Supply and installation of Dome Screen of Astro-Tec or Spitz make as per the specifications laid down in Section II 1.1.1.
2. High resolution 2D and 3D visualization system with minimum 53 Million Pixel on the 16 meter

perforated dome screen .

3. 3 Chip DLP projectors with **combined** ANSI lumens of minimum 174,000, minimum individual contrast ratio of 1800:1 and minimum individual native resolution of 4096 pixel x 2160 pixel with signal processing at 120 Hz, shall be used for full dome projection system with effective screen resolution of minimum 28 Million Pixel after seamless blending on the dome screen mentioned below.
4. Each 3 chip DLP projector shall have lamp life of minimum 2000 hrs.

5. Edge blending and geometric correction for seamless display and accurate mapping to screen geometry shall have to be executed.

6. A high performance multi-channel media creation, image generator and playback system which can create as well as play high resolution 2D and 3D full dome shows, 2D and 3D large format films and 2D and 3D digital planetarium shows. It should provide a user friendly Graphical User Interface to control system configuration, content creation, distortion correction and blending configuration.

7. Display management system shall control the display configuration like tiling, positioning, alignment etc.

8. Data cabling to carry lossless video signals from sources viz. Media Servers and playback system, projectors and/or video players and high speed data path network (if any) among computing and storage elements through fibre optic cables.

9. Properly dressed power and data cabling for all systems and devices so as not to cause interference with video signals and data networks.

10. Estimation of power required for the complete integrated system and providing suitable UPS system having **parallel redundancy** with suitable rack mounted battery backup for at least 30 minutes for the complete display and illumination system shall be provided. The bidder must clearly specify the number and type of batteries that will be used for providing 30 minutes backup. All batteries supplied must be from same batch of production.

11. For distribution of power to the UPS BCST shall only provide a 3 phase supply as per requirement which shall be terminated inside the control room. All electrical panels for power distribution conforming to prevailing Indian Electricity Rules shall be supplied, installed and arranged by the bidder as part of their scope of work. All safety devices comprising circuit breakers, bus bars, etc. shall be suitably designed. A detailed drawing with full specifications of the proposed power distribution panel shall be submitted to BCST for approval before initiating the work.

12. Design of new seating arrangement with enhanced space between two rows and to utilize the existing space used by GM-II and Astrovision Projector Doghouse. The new chairs should have reclining arrangement as per required field of view of the visitors seated in different positions from the dome screen with sufficient leg space. The optimum capacity may vary from 300-325 seats as per the design provided by the bidder and approved by BCST .

13. A 7.1 surround audio system with **minimum 7 speakers** and one subwoofer for 16 metre dome theater complete with amplifier, mixer and high quality speakers etc. giving appropriate audio

power output shall be provided for the Full dome Digital Immersive 2D and 3D theatre of the BCST, Patna.

14. LED cove lighting of the full dome theatre and its integration with show control system.It is mandatory to have brightness of minimum 7 Lumens per unit for a Dome of 16m and sufficient number of fixtures to avoid any dark zone in the Dome. Separate additional white LED light is required to be installed for theatre maintenance purpose, controllable from single switch.
15. Good quality active 3D glasses and design of space for distribution of special glasses for 3D films, including its storage, sanitization, collection etc. Contactless charging cabinet for charging minimum 300 active 3D glasses, simultaneously from single switch must be provided.

16. Emergency LED based exit signage inside the theatre.

17. Public address system inside the theatre for making announcements and or for conducting the live show.

18. Sound proofing and acoustic treatment of the Full dome theatre shall be under the scope of the bidder. The bidder executing the project must submit a detailed design and specifications in Cover-1 of the tender towards acoustic treatment that will be undertaken for the Full dome theatre. The expected outcome of this sound and acoustic treatment shall be provided by the bidder and shall be measured on completion of the work. The bidder shall arrange to execute this work based on the design, drawings and specifications submitted by the selected bidder and duly approved by BCST authorities. The Bidder shall be responsible for closely supervising the work at site and shall co-ordinate with BCST to ensure desired results.

19. The bidder shall submit detailed layout design, capacity, load calculation, requirement of cooling of projectors etc. for Full dome Theatre including area of placement of projectors, U.P.S system, Image Generators . This work will be taken up by the bidder after approval of BCST.

20. The bidder shall submit detailed layout design, capacity, load calculation, requirement of special ducts for cooling of projectors etc. for HVAC system and requirement of HVAC system for Full dome Theatre including area of placement of projectors, U.P.S system, Image Generators and seating area of the visitors. BCST shall arrange to execute this work based on the design, drawings and specifications submitted by the selected bidder. The Bidder shall be responsible for closely supervising the work and to interact with the HVAC vendors/consultants, if required and also verify compliance of desired requirements at site and shall also co-ordinate with BCST to ensure fulfillment of all results**.**

21. Touch panel based control systems shall be provided for general illumination, dome lighting control, exit signage control and emergency exit signage control, audio, projectors, device control units, colour correction, colour matching, mount alignments, lens adjustments etc.

22. Touch panel based show control system shall be located in the viewer platform with wireless ipad/Tablet for operation of the show.

23. The system should be designed keeping in view that it must be manageable from a single control unit. All accessories needed for easy accessibility of devices for maintenance must be considered under the scope of the work.

24. The bidder may provide the requirement of fire extinguishers (type and quantity) to be placed in different areas of full dome theatre. Supply and installation will however be under the scope of BCST.

25. Need based Analysis, Space Planning, Concept Design, Schematic Design, Detailed Design, Content Design, Procurement Management, Site Supervision, Content Production, Special or General Programming, Set Up, Testing and Commissioning, Training, Planned Maintenance Services, Operational Services, Audio Visual System Management, Illumination Management etc. shall all be under the scope of the work of the bidder.

26. Special mountings for the projectors and all required alignments for final adjustments etc. shall remain within the scope of the selected bidder. The selected bidder must consider cost effective non rusting materials and anti-corrosive treatment for all metallic structures of projectors. All safety measures shall be considered while designing for safety of people and equipment. The selected bidder shall remain responsible for closely monitoring the work at site to ensure that desired quality of work is executed.

27. The design for all systems should be forward looking and should allow for future upgradation and development within the systems currently proposed and provided. The proposed designs should be of architecture to allow for future upgradation. The upgradation path should be identified for all major systems and proposed upgradation plan may also be submitted separately.

28. The system is to be designed with very high up-time commitment (99% over 364 days a year or 365 days in case of a leap year). The selected bidder shall maintain inventory of spares for the designated up-time commitment for on-site warranty.

29. Preventative maintenance shall be carried out by the bidder at regular intervals during the Warranty period of five years and post warranty period of two years and a logbook to this effect shall be maintained at site. Suggested schedule for preventive maintenance shall be clearly defined and submitted in Cover 1.

30. If any disparity in terms of projector intensity, colour, alignment or otherwise is noticed and reported during the warranty period, immediate redressal of the issue through repair or replacement shall be within the scope of the successful bidder.

31. Integration of all subsystems as indicated above to configure the **"Full dome digital 2D and 3D immersive projection system"** shall be the responsibility of the bidder.

32. The bidders shall also quote for annual charges for operation of the installed facility during warranty period (5 Years) and post warranty period (2 Years) on year to year basis for the visitors of BCST from 11:00 a.m. to 7:00 p.m. This timing may vary during the peak season. The show shall remain operational for 364 days in a year (and 365 days in a leap year).

33. For Technical & Commercial (Cover -1) bid evaluation, the bidders shall provide detailed bill of quantities (without cost) of each item proposed for their offer along with schematic system architecture and product catalogues for all hardware/software items.

34. BCST shall provide incoming power cable of required capacity which the bidder shall connect to their main distribution panel.

Note:

All civil works relating to the installation of the system/show, acoustic panelling, scaffolding for installation of dome screen, fabrication/installation of base steel structure for mounting of projectors array are to be taken up by the selected bidder, and all necessary materials, machines and any other machine tools required for the fabrication and installation are to be arranged by the selected bidder at their own cost. The selected bidder will provide design, drawings, details and complete specifications for acoustic treatment/dome structure /panelling and steel structure for installation of projectors array as described earlier.

BCST shall provide power against payment through metered system for installation and minor fabrication works at site.

All safety precautions and compliance of statutory obligations shall be taken care of by the selected bidder during execution of the entire project at site.

Client's responsibilities:

1. BCST shall provide electrical power for execution of the work.
2. BCST shall provide lockable space for storage of materials to the selected vendor.

Section II

Technical Specifications of integrated High Resolution Full dome Digital 2D and 3D Immersive Projection System for a 16 meter diameter perforated aluminium dome screen nontilted with geometrical correction, image stitching and blending etc. for seamless projection of high resolution 2D and 3D digital full dome film shows and digital planetarium shows.

1.1 Fully High Resolution Full dome digital 2D and 3D immersive projection system

The integrated High Resolution Full dome Digital 2D and 3D Immersive Projection System consists of Projectors array, perforated dome screen, Blending & Geometric Correction units, Image Generator Servers & GUI server for playback, show control, Server for dome slicing and content creation for full dome planetarium shows, Display Management, Alignment & Calibration System, UPS system, 7.1 surround sound system, LED Cove lighting and Exit signage, emergency exit signage, active 3D spectacles with storage & sterilization system etc. This system is a multi channel display system with combined resolution of **53 Million Pixels without blending.** The specifications of the complete system are provided in section 1.1.1 to 1.9B.

1.1.1 Supply & Installation of Projection Screen

Acceptable OEMs: Astro-Tec, Spitz

Design parameters for Dome Screen

1. The projection dome shall be self-supporting and capable of maintaining its circular characteristics when supported by its tension ring as required by the design of the theatre.

2. The shell shall consist, in parts, an aluminum structural rib network system of evenly spaced ribs, with a calculated depth and sufficient number of cross-members to maintain its correct shape. The inside diameter of the dome screen is 16meter. The total load of the Dome should not be more than 5 Tones.

3. The ribs shall be accurately formed and reinforced in accordance with the manufacturer's drawings. The ribs shall be fabricated from aluminum alloy 6061-T6 and 6063-T5, or their suitable material to be specified. Framework must be at least 250 mm wide and allow people to climb ladders without their foot hitting the dome panels and climbing on the back of the dome for maintenance.

4. A girt system shall be incorporated to maintain proper rib spacing, and complete X-bracing shall be provide to maintain proper rib alignment of the dome screen. Sizing and spacing shall be as indicated on manufacturer's drawings as approved by the owner.

5. The structural gauge of the dome shall be sufficiently stiff so that deflection and settlement of the structure will not lead to deformation of the screen panels, based on the stiffness of the support system provided by the owner.

6. A circular compression ring shall be provided and located at the zenith or apex of the dome, to accommodate the terminal points for the main ribs and the perforated top circle. The compression ring shall be fabricated from aluminum alloy 6061-T6, or other suitable material acceptable to the owner.

7. An aluminum base tension rings shall be provided at the base of the hemisphere, which shall be so constructed that the ring will support the dome and provide the necessary connection points around its periphery. The base tension ring shall be aluminum alloy 6061-T6 or other suitable material, sized and reinforced in accordance with the manufacturer's drawings.

8. The projection surface shall consist of minimum number of panels and minimum joining areas as well as the use of painted panels which shall be minimum 0.040 (1mm) gauge aluminum alloy type 5052-H32 containing 0.062 in. (1.6mm) diameter holes. To provide approximately 25% void area with a minimum of a 23% void. Final painting shall be executed at site.

9. 360 ºAluminum Cove Trough should be provided and be fixed at the Horizon level of the Projection Dome without compromising projection Horizon. Cove Facia should not be more than 100 mm in height.

10. One Fixed Ladder should be provided in North-South direction for the purpose of human access & maintenance.

SEAMS AND JOINTS

1. Seams between adjacent panels will be overlapped jointed flushed in all sides. All seams should be invisible against projection.

2. Provide a small finished sample section demonstrating joint construction in an area where four (4) adjacent panels meet for inspection

Scopes Included:

1. Necessary scaffolding, man power and all installation related equipment and resources shall be provided by the bidder.

2. All necessary drawings for modification of the Civil structure shall be submitted by the manufacturer and will be evaluated and executed by BCST.

Table 1.1.1

Specifications	Detailed description
Screen type and dimensions	• The 16 meter diameter dome should be made of good quality aluminum perforated sheets with necessary ribs and support structures. • The perforation should be 1.6 mm in diameter. • The panels should be painted seamless joints, with single line of rivets with seamless overlaps. • The opening of the Dome might be less than 180 °based on Planetarium manufacturer's recommendation. • The final reflectivity of the panels will also be recommended by the Planetarium manufacturer before finalization of the contract.

S.No.	Item
1.	Resin bonded mineral fibre 48 kg density, 50mm thick with one side fsk (aluminium foil) size -900 x 600mm (slab**)**
2.	Rockwool (slack fibre based) resin bonded size-1m x 1/2m,48 density,**50mm** thick
3.	Acoustic tissue paper
4.	Solution for fixing tissue paper

5.	Synthetic fibre netting mesh
6.	Nuts and bolts with rawal plug and wire 18 gauge, screws with fasteners set of at least 10 per meter square

Acoustic panelling below the dome screen:

- Wall panelling system to provide excellent acoustical performance in the Full dome theatre by attaining at least 0.7 NRC. Modular Panels should be of formaldehyde-free Fibre glass material or Perforated Aluminium Panels with Acoustical Mineral Wool backing with integrated mounting system to be fabricated all along the peripheral wall of the Dome theatre below the Dome Horizon from stepped floor to Cove Bottom. Panels should come in modular sizes and should meet ASTM standards of Surface Burning (Fire), Moisture & Fungus. All panels should be butt joint with good aesthetical finish. Colour should be carefully chosen to reduce cross-reflectance from Projection and should be approved before application.
- Total area should be measured before fabrication and prior approval should be obtained.
- Preferred Manufacturers: Hunter Douglas, Armstrong, Anutone.

1.1.2 Projector Array

Immersive Projection System: An array of projectors and allied systems with the requisite overlap and edge blending is to be provided along with suitable geometry correction for the dome screen as specified, to provide a seamless display of at least **28 MP arranged in a front projection configuration (after blending)** with the specifications as per table 1.1.2. The projectors are to be mounted on a suitable structure. Selected bidder will fabricate and install the projector mounting structure at site as per the design, details, drawings and specifications provided by the bidder. The bidder must visit the site before submission of tender and identify the most suitable place in the building for keeping the Image Generator Server, projectors, Audio racks, UPS and other necessary units and routing of the cables needed to connect all constituent components of the system.

Table 1.1.2

Specifications	Detailed description
Number of Projectors	Please specify the total number of projectors and their make proposed to be used in the projector array. NB: All Projectors must be of same specifications and from OEM and shall directly project contents on the dome screen.
Type of projector	3 Chip DLP Projectors with multiple NSH Lamp, with ANSI Lumens of 29000 or more and contrast ratio of 1800:1 or better
Projector array comprising multiple projectors	To cover 16 meter dome screen non tilted
Total Resolution before and after blending	**53 MP** or higher (before blending) and **28 MP** or higher (after blending)
	➢ Anaglyph and linear polarization methods for 3D projection are not accepted. Color purity and clarity need to be given more importance. ➢ Active optics for 3D is essential.

	➢ The 3D aspect of projection should be uniform over the entire dome including when using real-time graphics.
Mounting	Projectors are to be mounted on the specially designed structure around the dome periphery. Each mount/cradle shall provide full optical alignment and calibration support along each of the X, Y and Z axes as well as rotation about the horizontal axis.

1.1.3 Projector

The specifications of individual projector are provided at table 1.1.3: The projector model quoted by the bidder must be capable of running continuously for at least 12 hours a day and 364 days a year. All projectors must be of same specifications andmanufactured by the same OEM in their own factory. Minimum 6 projectors must be proposed by bidder.

Acceptable OEMs: BARCO/Christie/ JVC/NEC /Panasonic/Sony

Table 1.1.3

Specifications	Detailed description
Display Technology	Three chip DLP
	Source : multiple NSH Lamp
Minimum native Resolution	4096 pixel x 2160, 120 Hz, at minimum 1800: 1 contrast ratio.
Internal Input / Output ports	DVI/HDMI/Display port
Input / Output control and networking	RS232, TCP/IP.
Lens Options	Standard Zoom to Wide Angle Zoom to cover the entire screen area as specified (please specify further technical details along with type and OEM of lenses to be used).
Calibration	Support for controlling individual colour and intensity on each colour channel.
Source Life	Minimum 2000 hrs
Operating Hours	The System shall be capable of being used for twelve hours per day 364 days in a year.
Monitoring Parameters	Source life, Fan status, Temperature status, etc.
Noise	< 55 db at 25 ℃ per projector
Accessories	All standard accessories including IR remote, Line cord etc.
Warranty	Manufacturer's standard warranty of not less than five years on projectors.

1.1.4 Blending and Geometry Correction (BG) unit: The solution shall be provided using projectors with physical mask and extra hardware or using projectors with embedded hardware. The specifications and functionalities of this unit are as below:

Table 1.1.4

Specifications	Detailed description
Input / Output	DVI in/out
Image Operations	Geometry Correction
	Edge Blending
	Colour Correction and Matching
	Uniformity Correction and Matching
	Software for geometric correction shall be incorporated in the system.
Software Presets	Software Presets should be available for Switching Brightness of Projectors for 2D & 3D Projection Modes.
	The system must have software and hardware to adjust and calibre the geometric **auto** alignment, **auto** brightness uniformity and **auto** edge blending of the digital projection system automatically and must be integrated into the show manager software.

1.2 Image Generator Server and Playback System with full dome and planetarium show software (24+2+2 standby)

A suitable solution shall be ensured to drive the required projector array with the specifications given below. Image GUI server shall drive projector array with four image render servers for each projector for full dome films and planetarium shows to be displayed in real time onto digital immersive dome projection screen. The Image GUI server shall provide synchronization between images projected onto the dome through various image generator servers for a seamless image without any tearing. The server shall also provide synchronization of multilingual audio tracks with the projected film shows.

Acceptable OEMs: Dell, HP

Table 1.2

Specifications	Detailed description
Image Generators	• NvidiaQuadro M5000 graphic cards latest • Nvidia Gsync fully utilized (frame and swap sync) in hardware and software • Quad Core Intel Xeon processor per computer • 32GB 2133MHz DDR4 RDIMM ECC • Solid state Hard drives • 256GB system hard drives, 2TB storage hard drives (to store high quality almost lossless Video • Windows 10 or higher robust operating system

Media Server Architecture	• Fully Genlocked hardware & software • Choice of video codecs from loss less compression to uncompressed • Full control of distortion correction-warp & blend & channel management
Pre process Data transfer Rate*	• No jerks, flicker or image tearing should appear on screen. • Frame rates up to 60fps per eye in 3D stereo.

***** *Additional SSD and RAMs may be configured to meet the overall specifications, if necessary.*

1.3 Content creation Server /Player

One separate workstation/server for creation of planetarium shows as well as for conversion of large format shows into full dome shows shall be provided by the bidder with specification as mentioned in **Table 1.2.** The Workstation server should be connected to the Master GUI Server of the main cluster for seamless transfer & access of data/resource.

Software:

- **Latest version of user friendly OEM software with perpetual license for playback of full dome shows and planetarium shows and with facility to convert large format shows into full dome shows as well as content creation integrated with full astronomy solution.**
- **Digital library/cloud access of the planetarium datasets for development of in-house planetarium shows.**
- **Interactive Astronomy Simulation tool & Datasets:**

Interactive Planetarium Software	The interactive Planetarium software should consist of following standard & special features (More features are preferable): 1. The planetarium software must support JavaScript ECMA scripting language. 2. The planetarium software must allow KML Support –Keyhole Markup Language files to be downloaded from the Internet and used to demonstrate a wide range of scientific concepts. 3. The system should allow full Python and Javascript integration for advanced real-time capabilities. 4. Earth & Moon System Features: High Resolution Earth & Moon Map, moons of Planets as per selected options. 5. Shadow to represent eclipses, Earth orbiting Satellites for Navigation and mapping, etc. 6. Constellations & Grids : 88 constellations, Stick figures, possibility to add arbitrary art overlays, IAU boundaries for J2000, Co-ordinate spheres for celestial, ecliptic and galactic systems, Meridian, Equator, Cardinal Points. 7. Solar System: Sun, Planets including their Moons, Minor Orbital Objects including Asteroids, Outer Solar System Objects, comets, OortCloud, Kuiper belt etc. 8. Space Missions: Cassini, Voyager & Voyager2, latest Mars missions, Pioneer, International Space Stations, important Indian Spacecraft and space missions including 3D simulations are also to be added. 9. Milky way Galaxy: Hipparchus Star Catalog, Extra solar Planets, Open Star Clusters, Globular Star Clusters, Pulsars, Quasars, Planetary Nebulae, H II Regions, Supernova Remnants etc.

	10. Extragalactic Space: Tully Galaxies (NGC, JC, 30,000 objects), 110 Messier Objects, Abell Galaxy Cluster, Deep Field Survey Objects, Sloan Digital Sky survey (SDSS). 11. Provision for viewing the Earth, Solar system &Milkyway galaxy from far away points. 12. More such features like simulations of the milkyway, the cosmic web... etc., as seen from different locations in space. 13. The supplier has to furnish the list of software systems that will be supplied. 14. Digital planetarium system software should be owned, developed and fully maintained by the digital planetarium system supplier.
Provision of multiple usages of show	The show manager should be capable of using full dome 2D and 3Ddigital shows by different developers around the world in 8K ( ). ➢ The system should be compatible (video & audio) for the full dome shows either converted from large format films into digital or the digitally created with live shoots (not animation). All details in this regard are to be provided.
All System Navigation System	Supported navigation devices: Mouse/Ipad, Wireless Xbox, Keyboard, and Voice Control with the following or more features. 1. Scale Graph 2. Flight Assist for smooth acceleration & inertia 3. HALO Surface Feature 4. Volumetric Software 5. Show Modules 6. Resource material to teach basic Astronomy 7. Point Cloud Renderer 8. Mesh Renderer 9. Implemented Object Positions 10. Laser pointer and more features
Show Elements	The following minimum elements need to be provided for creating in house shows. Also wrap up software need to be supplied for creating **full dome shows** in **8K in 2D / 3D.** 1. System must include the American Museum of Natural History Digital Universe. 2. The System must be able to display a volumetric Milky Way Galaxy in real-time. 3. Full dome videos 4. Full dome Clips 5. Audio clips 6. Real movie strips 7. Text Labels and Text Boxes which can be added in live shows in both English and Hindi. 8. Self-defined lines, grids, scales 9. Stars and sky motions 10. Sun, Moon & Planets 11. The system must allow the user to view the sky at any date/time from the surface of any solar system body, with correct local diurnal motion, where data is available. 12. Astronomy Picture of the Day by NASA should be capable of following full integration into the system through one single click download during the live shows. a. Imparting images and videos into the system integrated with

	Astronomy solutions in local, equatorial and galactic coordinates. b. Imparting online available content like Astronomy Picture of the Day from Data to Dome and other Astronomy content into the system. c. Incorporating newly discovered solar system objects through their Keplerian elements. d. Incorporating any new Astronomy data bases into the system software by the user. 13. Library of images, clippings, visuals, animation on space and astronomy related objects and events. Images of ancient astronomers and their works and contributions. 14. Software compatible to the supplied system to create shows should be licensed. 15. There should be provision for on line updating. 16. The text editor to create show elements should be capable of handling English and Hindi. 17. Still images (regular images, panoramas, all-skies)
Show Manager	Should be capable of integrating user created artwork, videos, photos, sounds etc. With the aid of a time line, any number of levels, tracks, layers. Chapters and animation parameters, still images, the system should be compatible of rendering images on the full dome. All elements should be loaded form the centralized data server into the resources window and previewed without any heavy rendering process, stitching, slicing etc. All required software with license are to be supplied. Provision for projecting 4K and 8K shows in 2D / 3D. ➢ Show Manager must include a live real-time view of the dome on the computer monitor. ➢ The show manager software should ideally be able to control audio, lights etc inside the theater to create special effects for custom shows and live shows. ➢ The pre-rendered video and real-time graphics inputs must be playable simultaneously and not mutually exclusive. ➢ They must be played through the same astronomy software. ➢ The System must be capable of using the drag and drop facility to include images, 3D models, videos or audio files into the Show Manager, without need to write any programming scripts. Dome View should immediately display these actions. ➢ The show Manager must provide the ability to obtain content from an Internet library that is available to other sites. ➢ The show manager must be translatable to local languages without the need for recreating it. The translation includes all system errors, warnings, messages, etc. Changing languages should be possible within the user interface.
Show Player	The tool for reproduction and control of shows, image distribution to the various channels, distortion correction, brightness and gamma adaptation as well as diaphragm calculations should be effective in real time, without prior slicing of raw images/customized ones in the software.

	➢ Interference with a running show through the familiar control commands (Play, Pause, stop etc) should be available in the User Interface, Jump to predefined bookmarks chapters or layers should be made available in the Player or Show Editor. By means of a time pointer, moving to any point of time within a show and enable projection. ➢ Player must support general commands, such as controlling the dome illumination cove lights and configuring the projector. ➢ All the Player functions should be loaded onto a PDA/I PAD or other new technology devices, which can then be used to wireless remote control pre compiled shows as an alternative to the computer control. And MPEG encoder must be supplied with the system to enable the user to recode raw images or customised ones in the software to be converted in to full dome videos compatible to the system. Capable of projecting shows of 4K and 8K both in 2D / 3D.
Flexibility to accept different shows made in different softwares**.**	The system should be capable of playing all types of shows – full dome video shows including large format film digitally converted shows and 2D or 3D movies in the dome. ➢ The system software must support generic real-time volume rendering and include astronomical and non-astronomical volume sample data.
Library of Images/ Full dome Clips.	A library of Full dome Clips and images in 4K and 8K both in 2D / 3D, mainly related to major astronomical events and objects along with their resolution, future up gradation option should be provided. Details of the Library have to be provided with offer for evaluation.
Library for Audio Clippings	A list of audio clippings, 5.1/7.1 along with duration and format need to be furnished. The above clippings are required for adding background music when in house shows are produced.

1.4 Show Control System

The display environment should include an integrated Show Control System, capable of controlling all hardware, other equipment, including the display system, audio, media, cove, lighting system, exit and emergency exit signage lighting. The Show Control System should provide following features:

Table 1.4

Detailed description
• Table top control panel with Communication protocols: RS 232, TCP/IP, IR. On/Off Control: Projectors, Illumination, Audio and Dimmer control for COVE lighting
• Interactive screen for controlling DIGITAL IMMERSIVE FULL DOME PROJECTION SYSTEM
• The screen should have following: Display size: 32 inch (diagonal), Display Resolution: Upto 1920X1080 or better

1.5 Calibration and Alignment

For Full dome Projection System with multiple projectors, manual adjustments for calibration and alignment are not feasible and hence automatic features are required to maintain calibration and alignment as per table 1.5.1 & 1.5.2.

Table 1.5.1

Specifications	Detailed description
Auto alignmentand calibration	Software, hardware and multi-camera based mechanisms to be included in order to ensure error free edge blending / geometric correction on screen as well as to maintain uniform colour, brightness and contrast on projectors and dome screen.
	Auto alignment, **auto** edge blending and correction system shall be available in the system through GUI.
	Software Preset to manage optimum brightness levels of Projectors in 2D & 3D modes.

Table 1.5.2

Specifications	Detailed description
Tools for Verification of calibration and alignment	Set of Instruments and software for verification of calibration and alignment parameters at site as per table 1.5.1.

1.6. Integrated Audio System

A 7.1 surround audio system of JBL, BOSE, Sony, AKG or Yamaha brand shall be an integrated part of the overall system. It shall be fully controlled under the **Show Control System** as per table 1.6 and needs to be supplied and installed and it shall address the requirements of full dome projection environment to ensure maximum immersive experience. The system shall also provide public address system inside the theatre.

Table 1.6

Specification	Detailed description
7.1 channel surround audio system	The audio system shall be fully integrated with the show control system. Audio system shall consist of 7 speakers with dual subwoofer system mounted suitably above the viewing platform or else at suitable locations as may be required. Amplifiers are to be solid state and network controlled
Front Left/Front Right/Centre Speakers	Large Format 12" High Power Cinema Surround. Power Rating1: 400 Watts continuous pink noise, 1600 Watts peak Sensitivity (1W/1m)2: 98 dB-SPL half space/ wall mounted Maximum Peak SPL3: 124 dB/1m Nominal Impedance: 8 ohms

Surround **Speakers with)** wall Mount U-Brackets for all Speakers.	Very High Power Cinema Surround Speaker for Digital Applications Frequency Range (-10 dB): 60 Hz - 19 kHz Frequency Response (±3 dB): 75 Hz - 17 kHz Power Rating1: 350 watts continuous pink noise, 1400 watts peak Nominal Impedance: 8 ohms
Subwoofer :	Dual 460 mm (18 in) Subwoofer System Rated Impedance: 4 ohms Minimum Impedance: 3.2 ohms POWER HANDLING CAPABILITY: Continuous Pink Noise1: 1200 Watts Continuous Program2: 2400 Watts Peak Power3: 4800 Watts
Power Amplifiers for Speakers: **Centre/Front/Surround**	Minimum Guaranteed Power, 1 kHz:- 650Watts.Streo,8 ohms(per ch.) Frequency Response (At 1 watt into 4 ohms, 20Hz - 20 kHz) Crosstalk (below rated power, A-weighted) 20 Hz to 1 kHz >70 dB
Power Amplifiers for Subwoofer	Minimum Guaranteed Power, 1 kHz:- 1600 Watts.Bridge-Mono.8 Ohms Frequency Response (At 1 watt into 4 ohms, 20Hz - 20 kHz) Crosstalk (below rated power, A-weighted) 20 Hz to 1 kHz >70 dB Input Impedance (nominal) 20 kilohms balanced, 10 kilohms unbalanced
Audio Mixer	16-input channel 25-bus digital mixing 8 XLR outputs plus 6 additional line in/outputs 16 x 16 channel USB 2.0 audio interface Motorised Faders
Microphones	The audio system should be integrated with microphones (2 numbers or more). It is to be mounted in the console area and 2 or more numbers wireless collar microphones are to be integrated.

1.7 U.P.S system with parallel redundancy

A minimum 75 KVA online UPS system with parallel redundancy of reputed make and having backup time of **30 minutes** to be provided by the bidder for digital immersive full dome 2D and 3D projection system as per table 1.7 given below**.**

Table 1.7

Specification	Detailed description
U.P.S system (True IGBT with parallel redundancy) with 30 minutes backup time of reputed brand :APC, Emersion or Numeric	Please provide specifications of the U.P.S system including make and model.
Battery bank with suitable rack	Please specify number of SMF batteries with detailed specifications. All batteries supplied must be from same batch of production.

1.8 Seating Arrangement (250 chairs)

The bidder shall submit scheme including sight line drawings for layout of seats, and detailed engineering drawings for change of existing layout if required. Specification of the chairs is given in table below.

Table 1.8

Specification	Detailed description
Reclining chair	1. Tip-up and back push reclined chair 2. Center to center 20". 3. ABS molded housing for seat & back cushions 4. All sheet metal parts with powder coated 5. Arm rest in Polyurethane injection moulded. 6. Seat numbering on inner both the side of the chair stands with silicon fluorescent thin stickers. 7. Row number for seat along the aisles. 8. Provision for LED lights on sides along with aisles with the row and the seat numbers display. 9. For Noise Reduction Nylon 66 components on moving parts
Frames	15 mm thick high pressure steam pressed hard ply wood for seat and the back out of which the back is of 12mm the bent ply.
Fabric	Colour to be approved by BCST authorities. All fabric that shall be used shall be fire retardant. Test certificates shall be submitted
Spring	Spring for tip-up and back push mechanism torsion spring/spring steel IS:44541981 grade III
Sheet-metalcomponents	HRCA/CRCA Sheet metal IS:1079 1994 a) Side stand 3mm (+/- 0.2 mm) thick size: 415 mm(+/-5 mm) x345 mm (+/-5mm) both side bottom circular cutting with 140 mmradius. b) 75 mmx25 mm 16g 190 mm length tubular pipe for the leg wielded to the 3 mm plate. c) Flat for base of the stands 280 mm (+/-2 mm) length 50 mm (+/-2 mm) x 5 mm (+/-0.2mm). d) Mechanism components 2 mm HRCA Back push box 180 mm(+/-2 mm) x 70 mm (+/-2 mm) & height of the box 15 mm(+/-2 mm), ear "L" bracket attached to the box 190 mm (+/-2 mm) x 135 mm (+/-2 mm). With two slot holes for fixingthe back. Tip-up box 180 mm (+/-2 mm) x 70 mm (+/-2 mm) & height of the box 15mm (+/-2mm), ear "L" bracket attached to the box 95mm (+/-2mm) x 125 mm (+/-2mm). With two slot holes to fix the seat.
Seat and Backcushionhousing	ABS moulded vacuum forming out of 2mm sheet
Vinyl Flooring	Dark coloured vinyl flooring with minimum 2mm thickness

1.9 A. LED Cove light of Philips / Chroma Cove

Cove lighting to be integrated with show control system.

Specification	Detailed description
Cove Light	Beam Angle 120 ° x 120 ° Lumens : As per BIS norms LED Channels Red / Green / Blue Mixing Distance 2 in (51 mm) to uniform light Lumen Maintenance† 50,000 hours L50 @ 50° C (full output)
Design	360 ° Layout in Aluminium Cove Trough in aesthetical indirect lighting arrangement. Ample amount of LED Modules to be provided to avoid dark zones. Provision for software programmability of different modes and colour effects along with programmable hardware presets.
Foot lighting, Exit signage and Emergency Exit signage	• **Foot Lighting**: The lighting effect should be created using a fibre optic rod that is end-illuminated with high intensity LEDs with 50,000 hour life expectancy. • The unit should flush with 6mm Carpet • **Entry & Exit Ramps Lighting:** LED wall light should provide 2.2 lux at 1.9m distance when mounted 300mm above floor. • **Seat Row Indicators:** Seat row indicators should be installed to identify the location of seating rows, to provide illumination for guidance (e.g. by emergency exits) or to illuminate the floor for safe movement in full dome theatre when the main lighting is dimmed.

1.9 B. Active 3D spectacles with storage and sterilization (700 active 3D spectacles Eyes-3D-Shut/Expand 3D/Ultimate 3D)

Specification	Detailed description
Active 3D spectacles	For high-quality images preserved at all seating positions Automatic power-off function saves energy Bright images and natural colours Automatic IR synchronization, wide reception angle
Sterilization	Machine suitable for sterilization of 3D spectacles working with AC 230 V.Good quality active 3D glasses and design of space for distribution of special glasses for 3D films, including its storage, sanitization, collection etc. Contactless charging cabinet for charging minimum 300 active 3D glasses, simultaneously from single switch must be provided.

1.9 **C** Complete Planetarium Full dome as well as Astronomy Sky Shows of 25-35 minutes duration in English and Hindi Language.

1. At least (4) four 4K full dome show in 2D
2. At least (2) two 8K full dome show in 2D
3. At least (4) four 4K full dome show in 3D
4. At least (2) two 8K full Dome show in 3D.
5. All the above shows should be provided with perpetual licence for projection and shall be sole properties of BCST.
6. Atleast 8 Free shows available from international producers like NASA/ESO/ESA etc. in English and Hindi

7. One Full Dome digitally converted large format film (of 25-35 minutes duration) of high edutainment value with immersive experience also be provided.

Note :

i. Necessary scripts and original sound tracks must be supplied.

ii. The shows should be of around 25-35 minutes duration.

iii. The selected vendors should provide list of all latest available shows in DVDs from which BCST will select above shows.

2.0 Brochures and complete specifications

Bidders shall provide printed brochures and detailed specifications for various OEM products. The brochures, documents and engineering drawings as per Table 2.0 have to be provided along with the technical bid including compliance Table 2.0. The bidders have to respond within stipulated time for additional information/clarifications sought afterwards, if any.

Bidders may be required to make technical presentations explaining their offered scheme after opening of Technical & Commercial Bids (Cover-1), if decided by BCST. The decision of the Council in respect of techno-commercial evaluation of Cover-1 of the tender and selection of qualified and eligible vendors for opening of Financial Bid (Cover-2) shall be final and binding on the bidders.

Table 2.0 Information to be submitted by the bidders in Cover-1

Detailed description
1. Brochures and specifications for Dome Screen, Projectors, Lenses, Mounts, Blending and Geometric Correction Units, Display Management System, etc.
2. Brochures and specifications for Image generator servers, Interactive planetarium software and full dome configurator & playback system and projection systems.
3. Brochures and specifications for Show Control System.
4. Brochures and specifications for Calibration and related instruments and software.
5. Brochures and specifications for Software Elements along with licensing details.
6. Brochures and specifications for Audio systems.
7. Brochures and specifications for UPS system with 30 minutes backup.
8. Engineering drawing (plan, elevation and sectional views wherever necessary for viewer's gallery and image servers room in pdf and AutoCAD file format), complete solution diagram, connectivity diagram, system deployment and foot print detail, electrical power requirement and location marked diagram/drawings, system cooling requirement (in BTU) with proper layout drawings.
9. Detailed write-up and specific system solution document explaining the integrated working of offered solution with the hardware and software describing various technical, interface and performance aspects, wiring / network diagram of the proposed solution. This has to explain how the proposed design or solution meets the specifications and overall requirements as mentioned in the tender document.
10. Schematic diagram and broad material specifications of the structure for mounting the projector array showing suggested location of the projectors including arrangement for accessibility to the projectors for maintenance.
11. Details and product catalogues of acoustic treatment of inner surface o concrete domeand acoustic panelling below the aluminium dome inside the theatre proposed and with relevant drawings, material specifications etc.
12. Details and product catalogues of LED Cove light, exit signage and emergency exit signage lighting and foot lighting scheme.

13. Details regarding source of content development for planetarium shows using datasets/library of 3D models/cloud assets.
14. Details and product catalogues of 3D spectacles and storage and sterilization equipment.

2.1 Write Ups Related to Design

Bidders shall provide following documents as per Table 2.1 along with technical bid.

Table 2.1

Detail Description
Document on design techniques highlighting how Full dome Digital 2D and 3D immersive projection system will be met by the offered solution using the proposed sub-systems. Detailed write-up of functional role of each subsystem in integrated solution shall be described.

3.1 User Training and Documentation

Two levels of training are to be arranged – Basic training of two days for 5 executives and 10 days of technical training for 5 participants is required to be organized at BCST, Patna. **Training material and complete installation manual in both hard and soft copies is to be provided (two sets of each).** The faculty providing training should be certified from parent company (OEM) or technical and experienced persons from system integrator.

Table 3.1 Training Topics on FULL DOME PROJECTION SYSTEM

Sl. No.	Detailed Description
1.	Architecture of FULL DOME PROJECTION SYSTEM
2.	Hardware components of FULL DOME PROJECTION SYSTEM (Projectors, screen, controller, image servers, network elements, storage etc)
3.	FULL DOME PROJECTION SYSTEM Administration: Hardware and Software Installation, Configuration, Trouble-shooting and Maintenance procedure including preventative maintenance
4.	Alignment and Calibration with usage of instrument and tools
5.	Field replaceable components and applicable procedures for field replacement
6.	Special features of the show control software
7.	FAQs

4. Delivery Schedule

The entire work shall be completed within **Six months** from the date of placement of order or opening of Letter of Credit whichever is later.

5. Warranty and AMC:

Warranty: The successful bidder shall provide **Single WindowOnsiteComprehensiveWarranty** on all the items supplied under the purchase order **except projector lamps** as has been enumerated in details below under clause 6 (f). **The Warranty period for the entire installation is for five years for all the components of the system except chairs for which warranty will be 2 years from the date of issue of acceptance certificate by BCST.**

AMC: The non-comprehensive annual maintenance contract will be for a period of two years, after expiry of the warranty period of five years. The bidder must submit the list of spares along with applicable rates

during the period of Annual Maintenance Contract. The list of spares shall include all the items that may require replacement beyond warranty period of five years.

i) Bidders shall quote for **non-comprehensive annual maintenance charges** along with applicable taxes **for two years**, after expiry of warranty period of five years from the date of commissioning and handing over to BCST on year to year basis. The tax break-up for all such rates shall be clearly spelt out as on the date of submission of the tender.

During Non-Comprehensive Maintenance Contract, comprising two years, the following terms shall be applicable.

a) Preventive Maintenance for all the equipment and peripherals supplied by the bidder. The bidders shall submit a schedule for such preventive maintenance and shall form part of the agreement.

b) Repair of faulty / defective parts and peripherals.

c) Replacement of faulty parts and peripherals **against payment as per the rates mentioned in the list of spares submitted by bidder**. All replaced parts shall remain as property of BCST.

d) If needed, the successful bidder shall install standby equipment / peripheral(s) in respect of faulty equipment / peripheral(s) till the faulty ones are made operational. Further, if the faulty ones are not made operational within the period under contract, then the standby equipment /peripheral(s) installed/supplied in place of faulty ones will become the sole property of BCST. The replaced part should be compatible with the system.

e) During the AMC period (when the life of the batteries is likely to be over) the selected bidder has to replace all the UPS batteries.The batteries shall be provided by BCST.

f) **During the warranty period (beyond the lamp warranty provided by OEM) and during the AMC period of two years, the successful bidder shall replace faulty/expired lamp(s) of the projection system. The successful bidder can procure 36 lamps per annum in seven shipments. No additional charges towards labour for replacement of lamps shall be borne by BCST.**

h) All the parts including networking cables, connectors, etc. that may be required to maintain the system shall be supplied by the bidder at their own cost.

i) Any break-down, failure or malfunctioning of the system shall be attended to and put back in service within 48 hours. However, all round efforts must be made to set right the system in shortest possible time. Service shall be available for at all times for 364 days in a year.

j) The selected bidder will maintain the minimum essential spares at their own stores and the required tools / test equipments / software so as to reduce the break-down time.

k) Spare parts manufactured by Original Equipment Manufacturer (OEM) will be preferred. However in unavoidable situations spares manufactured by equivalent manufacturers may be used with prior approval of BCST.

In case of any requirement for replacement of any supplied spares or lamps by the bidder, BCST shall not be responsible for re-export of the damaged components and that will be replaced by the successful bidder.

6. Operation of 2D and 3D Full dome planetarium and film shows:

Successful bidder shall operate full dome shows from 11:00 a.m to 7:00 p.mfor the visitors of BCST. This timing may vary during the peak seasons. The show shall remain operational for 364 days in a year (and 365 days in a leap year). Sterilization, cleaning and distribution of Active 3D spectacles to the visitors shall be under the scope of the successful bidder.

- Manning, operation and maintenance of the system shall be the sole responsibility of the successful bidderat their risk and cost by mobilising their resources and trained technical manpower. Adequate manpower shall be deployed for the complete duration of the operation of the theatre.
- Successful bidder shall operate the system in proper and professional manner without downtime and shall fulfil the statutory obligatory requirements on bidder's part for the purpose of contract.
- All necessary manpower, tools and tackles with allied requirements will be arranged by the successful bidder for operation of the system.
- The date for commencement of operation shall be communicated by BCSTat an appropriate time after successful commissioning of the entire installation. This shall be through a separate written communication after completion of Supply, Installation, Testing, Commissioning andsuccessful completion of training and other compliances as may be applicable to commence operation.

ANNEXURE - G

TECHNICAL COMPLIANCE TABLES

Projection Screen

Table 1.1.1

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Screen type and dimensions	The 16 meter diameter dome should be made of good quality aluminium perforated sheets with necessary ribs and support structures. The perforation should be 1.6 mm in diameter. The panels should be painted to enable scope for future repainting of the screen if required and shall have seamless joints, with single line of rivets with seamless overlaps. The opening of the Dome might be less than 180° based on Planetarium manufacturer's recommendation. The final reflectivity of the panels will also be recommended by the Planetarium manufacturer before finalization of the contract		

Table 1.1.2

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Number of Projectors	Please specify the total number of projectors and their make proposed to be used in the projector array. NB: All Projectors must be of same specifications and from OEM and shall directly project contents on the dome screen.		
Type of projector	3 Chip DLP Projectors with multiple NSH Lamp, with ANSI Lumens of 29000 or more and contrast ratio of 1800:1 or better		
Projector array comprising multiple projectors	To cover 16 meter dome screen non tilted		

Total Resolution before and after blending	**53 MP** or higher (before blending) and **28 MP** or higher (after blending)		
	➢ Anaglyph and linear polarization methods for 3D projection are not accepted. Color purity and clarity need to be given more importance. ➢ Active optics for 3D is essential. ➢ The 3D aspect of projection should be uniform over the entire dome including when using real-time graphics.		
Mounting	Projectors are to be mounted on the specially designed structure around the dome periphery. Each mount/cradle shall provide full optical alignment and calibration support along each of the X, Y and Z axes as well as rotation about the horizontal axis.		

1.1.3 Projector

Table 1.1.3

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Display Technology	Three chip DLP		
	Source : multiple NSH Lamp		
Minimum native Resolution	4096 pixel x 2160, 120 Hz, at minimum 1800: 1 contrast ratio.		
Internal Input / Output ports	DVI/HDMI/Display port		

Input / Output control and networking	RS232, TCP/IP.		
Lens Options	Standard Zoom to Wide Angle Zoom to cover the entire screen area as specified (please specify further technical details along with type and OEM of lenses to be used).		
Calibration	Support for controlling individual colour and intensity on each colour channel.		
Source Life	Minimum 2000 hrs		
Operating Hours	The System shall be capable of being used for twelve hours per day 364 days in a year.		
Monitoring Parameters	Source life, Fan status, Temperature status, etc.		
Noise	< 55 db at 25 ℃ per projector		
Accessories	All standard accessories including IR remote, Line cord etc.		
Warranty	Manufacturer's standard warranty of not less than five years on projectors.		

1.1.4 Blending and Geometry Correction (BG) unit:

Table 1.1.4

Specifications	**Detailed description**	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
Input / Output	DVI in/out		

Image Operations	Geometry Correction		
	Edge Blending		
	Colour Correction and Matching		
	Uniformity Correction and Matching		
	Software for geometric correction shall be incorporated in the system.		
Software Presets	Software Presets should be available for Switching Brightness of Projectors for 2D & 3D Projection Modes.		
	The system must have software and hardware to adjust and calibre the geometric **auto** alignment, **auto** brightness uniformity and **auto** edge blending of the digital projection system automatically and must be integrated into the show manager software.		

1.2 Image Generator Server and Playback System with full dome and planetarium show software (24+2+2 standby)

Table 1.2

Specifications	**Detailed description**	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
Image Generators	Nvidia Quadro M5000 graphic cards latest Nvidia Gsync fully utilized (frame and swap sync) in hardware and software Quad Core Intel Xeon processor per computer 32GB 2133MHz DDR4 RDIMM ECC Solid state Hard drives 256GB system hard drives, 2TB storage hard drives (to store high quality almost lossless Video Windows 10 or higher robust operating system		

Media Server Architecture	Fully Genlocked hardware & software Choice of video codecs from loss less compression to uncompressed Full control of distortion correction-warp & blend & channel management		
Pre process Data transfer Rate*	No jerks, flicker or image tearing should appear on screen. Frame rates up to 60fps per eye in 3D stereo.		

***** *Additional SSD and RAMs may be configured to meet the overall specifications, if necessary.*

1.3 Content creation Server /Player

Specifications	**Detailed description**	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
Interactive Planetarium Software	The interactive Planetarium software should consist of following standard & special features (More features are preferable): 1. The planetarium software must support JavaScript ECMA scripting language. 2. The planetarium software must allow KML Support –Keyhole Markup Language files to be downloaded from the Internet and used to demonstrate a wide range of scientific concepts. 3. The system should allow full Python and Java script integration for advanced real-time capabilities. 4. Earth & Moon System Features: High Resolution Earth & Moon Map, moons of Planets as per selected options. 5. Shadow to represent eclipses, Earth orbiting Satellites for Navigation and mapping, etc. 6. Constellations & Grids : 88 constellations, Stick figures, possibility to add arbitrary art overlays, IAU boundaries for J2000, Co-ordinate spheres for celestial,		

	ecliptic and galactic systems, Meridian, Equator, Cardinal Points. 7. Solar System: Sun, Planets including their Moons, Minor Orbital Objects including Asteroids, Outer Solar System Objects, comets, Oort Cloud, Kuiper belt etc. 8. Space Missions: Cassini, Voyager & Voyager2, latest Mars missions, Pioneer, International Space Stations, important Indian Spacecraft and space missions including 3D simulations are also to be added. 9. Milky way Galaxy: Hipparchus Star Catalog, Extra solar Planets, Open Star Clusters, Globular Star Clusters, Pulsars, Quasars, Planetary Nebulae, H II Regions, Supernova Remnants etc. 10. Extragalactic Space: Tully Galaxies (NGC, JC, 30,000 objects), 110 Messier Objects, Abell Galaxy Cluster, Deep Field Survey Objects, Sloan Digital Sky survey (SDSS). 11. Provision for viewing the Earth, Solar system & Milkyway galaxy from far away points. 12. More such features like simulations of the milkyway, the cosmic web... etc., as seen from different locations in space. 13. The supplier has to furnish the list of software systems that will be supplied. 14. Digital planetarium system software should be owned, developed and fully maintained by the digital planetarium system supplier.		
Provision of multiple usages of show	The show manager should be capable of using full dome 2D and 3Ddigital shows by different developers around the world in 8K. ➢ The system should be compatible (video & audio) for the full dome shows either converted from large format films into digital or the digitally created with live shoots (not animation). All details in this regard are to be provided.		

All System Navigation System	Supported navigation devices: Mouse/Ipad, Wireless Xbox, Keyboard, and Voice Control with the following or more features. 1. Scale Graph 2. Flight Assist for smooth acceleration & inertia 3. HALO Surface Feature 4. Volumetric Software 5. Show Modules 6. Resource material to teach basic Astronomy 7. Point Cloud Renderer 8. Mesh Renderer 9. Implemented Object Positions 10. Laser pointer and more features		
Show Elements	The following minimum elements need to be provided for creating in house shows. Also wrap up software need to be supplied for creating **full dome shows** in **8K in 2D and 3D.** 1. System must include the American Museum of Natural History Digital Universe. 2. The System must be able to display a volumetric Milky Way Galaxy in real-time. 3. Full dome videos 4. Full dome Clips 5. Audio clips 6. Real movie strips 7. Text Labels and Text Boxes which can be added in live shows in both English and Hindi. 8. Self-defined lines, grids, scales 9. Stars and sky motions 10. Sun, Moon & Planets 11. The system must allow the user to view the sky at any date/time from the surface of any solar system body, with correct local diurnal motion, where data is available. 12. Astronomy Picture of the Day by NASA should be capable of full integration into the system through one single click download during the live shows. 13. Library of images, clippings, visuals, animation on space and astronomy related objects and events. Images of ancient astronomers and their works and contributions.		

	14. Software compatible to the supplied system to create shows should be licensed. 15. There should be provision for on line updating. 16. The text editor to create show elements should be capable of handling English and Hindi. 17. Still images (regular images, panoramas, all-skies)		
Show Manager	Should be capable of integrating user created artwork, videos, photos, sounds etc. With the aid of a time line, any number of levels, tracks, layers. Chapters and animation parameters, still images, the system should be compatible of rendering images on the full dome. All elements should be loaded form the centralized data server into the resources window and previewed without any heavy rendering process, stitching, slicing etc. All required software with license are to be supplied. Provision for projecting 8K shows in 2D / 3D. ➢ Show Manager must include a live real-time view of the dome on the computer monitor. ➢ The show manager software should ideally be able to control audio, lights etc inside the theater to create special effects for custom shows and live shows. ➢ The pre-rendered video and real-time graphics inputs must be playable simultaneously and not mutually exclusive. ➢ They must be played through the same astronomy software. ➢ The System must be capable of using the drag and drop facility to include images, 3D models, videos or audio files into the Show Manager, without need to write any programming scripts. Dome View should immediately display these actions. ➢ The show Manager must provide the ability to obtain content from an Internet library that is		

	available to other sites. ➢ The show manager must be translatable to local languages without the need for recreating it. The translation includes all system errors, warnings, messages, etc. Changing languages should be possible within the user interface.		
Show Player	The tool for reproduction and control of shows, image distribution to the various channels, distortion correction, brightness and gamma adaptation as well as diaphragm calculations should be effective in real time, without prior slicing of raw images/customized ones in the software. ➢ Interference with a running show through the familiar control commands (Play, Pause, stop etc) should be available in the User Interface, Jump to predefined bookmarks chapters or layers should be made available in the Player or Show Editor. By means of a time pointer, moving to any point of time within a show and enable projection. ➢ Player must support general commands, such as controlling the dome illumination cove lights and configuring the projector. ➢ All the Player functions should be loaded onto a PDA/I PAD or other new technology devices, which can then be used to wireless remote control pre compiled shows as an alternative to the computer control. And MPEG encoder must be supplied with the system to enable the user to recode raw images or customized ones in the software to be converted in to full dome videos compatible to the system. Capable of projecting shows of 4K and 8K both in 2D and 3D.		

Flexibility to accept different shows made in different softwares	The system should be capable of playing all types of shows – full dome video shows including large format film shows and 2D and 3D movies in the dome. ➢ The system software must support generic real-time volume rendering and include astronomical and non-astronomical volume sample data.		
Library of Images/ Full dome Clips.	A library of Full dome Clips and images in 4K and 8K both in 2D and 3D, mainly related to major astronomical events and objects along with their resolution, future up gradation option should be provided. Details of the Library have to be provided with offer for evaluation.		
Library for Audio Clippings	A list of audio clippings, 5.1/7.1 along with duration and format need to be furnished. The above clippings are required for adding background music when in house shows are produced.		

1.4 Show Control System

Table 1.4

	Detailed description	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
	Table top control panel with Communication protocols: RS 232, TCP/IP, IR. On/Off Control: Projectors, Illumination, Audio and Dimmer control for COVE lighting		
	Interactive screen for controlling DIGITAL IMMERSIVE FULL DOME PROJECTION SYSTEM		
	The screen should have following: Display size: 32 inch (diagonal), Display Resolution: Upto 1920X1080 or better		

1.5 Calibration and Alignment

Table 1.5.1

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Auto alignment and calibration	Software, hardware and multi-camera based mechanisms to be included in order to ensure error free edge blending / geometric correction on screen as well as to maintain uniform colour, brightness and contrast on projectors and dome screen.		
	Auto alignment, **auto** edge blending and correction system shall be available in the system through GUI.		
	Software Preset to manage optimum brightness levels of Projectors in 2D & 3D modes.		

Table 1.5.2

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Tools for Verification of calibration and alignment	Set of Instruments and software for verification of calibration and alignment parameters at site as per table 1.5.1.		

1.6. Integrated Audio System

Table 1.6

Specification	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
7**.1 channel surround audio system**	The audio system shall be fully integrated with the show control system. Audio system shall consist of 7 speakers with dual subwoofer system mounted suitably above the viewing platform or else at suitable locations as may be required. Amplifiers are to be solid state and network controlled		
Front Left/Front Right/Centre Speakers	Large Format 12" High Power Cinema Surround. Power Rating1: 400 Watts continuous pink noise, 1600 Watts peak Sensitivity (1W/1m)2: 98 dB-SPL half space/ wall mounted Maximum Peak SPL3: 124 dB/1m Nominal Impedance: 8 ohms		
Surround Speakers with)wall Mount U-Brackets for all Speakers.	Very High Power Cinema Surround Speaker for Digital Applications Frequency Range (-10 dB): 60 Hz - 19 kHz Frequency Response (±3 dB): 75 Hz - 17 kHz Power Rating1: 350 watts continuous pink noise, 1400 watts peak Nominal Impedance: 8 ohms		
Subwoofer :	Dual 460 mm (18 in) Subwoofer System Rated Impedance: 4 ohms Minimum Impedance: 3.2 ohms POWER HANDLING CAPABILITY: Continuous Pink Noise1: 1200 Watts Continuous Program2: 2400 Watts Peak Power3: 4800 Watts		
Power Amplifiers for Speakers: **Centre/Front/Surround**	Minimum Guaranteed Power, 1 kHz:- 650Watts.Streo,8 ohms(per ch.) Frequency Response (At 1 watt into 4 ohms, 20Hz - 20 kHz) Crosstalk (below rated power, A-weighted) 20 Hz to 1 kHz >70 dB		

Power Amplifiers for Subwoofer	Minimum Guaranteed Power, 1 kHz:- 1600 Watts.Bridge-Mono.8 Ohms Frequency Response (At 1 watt into 4 ohms, 20Hz - 20 kHz) Crosstalk (below rated power, A-weighted) 20 Hz to 1 kHz >70 dB Input Impedance (nominal) 20 kilohms balanced, 10 kilohms unbalanced		
Audio Mixer	16-input channel 25-bus digital mixing 8 XLR outputs plus 6 additional line in/outputs 16 x 16 channel USB 2.0 audio interface Motorised Faders		
Microphones	The audio system should be integrated with microphones (2 numbers or more). It is to be mounted in the console area and 2 or more numbers wireless collar microphones are to be integrated.		

1.7 75 KVA online U.P.S system with parallel redundancy

Table 1.7

Specification	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Minimum 75 KVA online U.P.S system (True IGBT with parallel redundancy) with 30 minutes backup time of reputed brand : APC, Emersion or Numeric	Please provide specifications of the 75 KVA online U.P.S system including make and model.		
Battery bank with suitable rack	Please specify number of SMF batteries with detailed specifications. All batteries supplied must be from same batch of production.		

1.8 Seating Arrangement (250 chairs)

Table 1.8

Specification	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Reclining chair	1. Tip-up and back push reclined chair 2. Center to center 20". 3. ABS molded housing for seat & back cushions 4. All sheet metal parts with powder coated 5. Arm rest in Polyurethane injection moulded. 6. Seat numbering on inner both the side of the chair stands with silicon fluorescent thin stickers. 7. Row number for seat along the aisles. 8. Provision for LED lights on sides along with aisles with the row and the seat numbers display. 9. For Noise Reduction Nylon 66 components on moving parts		
Frames	15 mm thick high pressure steam pressed hard ply wood for seat and the back out of which the back is of 12mm the bent ply.		
Fabric	Colour to be approved by BCST authorities. All fabric that shall be used shall be fire retardant. Test certificates shall be submitted		
Spring	Spring for tip-up and back push mechanism torsion spring/spring steel IS:44541981 grade III		
Sheet-metal components	HRCA/CRCA Sheet metal IS:1079 1994 a) Side stand 3mm (+/- 0.2 mm) thick size: 415 mm(+/-5 mm) x345 mm (+/-5mm) both side bottom circular cutting with 140 mmradius. b) 75 mmx25 mm 16g 190 mm length tubular pipe for the leg wielded to the 3 mm plate. c) Flat for base of the stands 280 mm (+/-2 mm) length 50 mm (+/- 2 mm) x 5 mm (+/-0.2mm). d) Mechanism components 2 mm HRCA Back push box 180 mm(+/-2 mm) x 70 mm (+/-2 mm) & height of the box 15 mm(+/-2 mm), ear "L" bracket		

	attached to the box 190 mm (+/-2 mm) x 135 mm (+/-2 mm). With two slot holes for fixingthe back. Tip-up box 180 mm (+/-2 mm) x 70 mm (+/-2 mm) & height of the box 15mm (+/-2mm), ear "L" bracket attached to the box 95mm (+/-2mm) x 125 mm (+/-2mm). With two slot holes to fix the seat.		
Seat and Back cushion housing	ABS moulded vacuum forming out of 2mm sheet		
Vinyl Flooring	Dark coloured vinyl flooring with minimum 2mm thickness		

1.9 A. LED Cove light

Specification	**Detailed description**	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
Cove Light	Beam Angle 120 °x 120 ° Lumens as per BIS norms LED Channels Red / Green / Blue Mixing Distance 2 in (51 mm) to uniform light Lumen Maintenance† 50,000 hours L50 @ 50 °C (full output)		
Design	360 ° Layout in Aluminium Cove Trough in aesthetical indirect lighting arrangement. Ample amount of LED Modules to be provided to avoid dark zones. Provision for software programmability of different modes and colour effects along with programmable hardware presets.		
Foot lighting, Exit signage and Emergency Exit signage	• **Foot Lighting**: The lighting effect should be created using a fibre optic rod that is end-illuminated with high intensity LEDs with 50,000 hour life expectancy. • The unit should flush with 6mm Carpet • **Entry & Exit Ramps Lighting:** LED wall light should provide 2.2 lux at		

	1.9m distance when mounted 300mm above floor. • **Seat Row Indicators:** Seat row indicators should be installed to identify the location of seating rows, to provide illumination for guidance (e.g. by emergency exits) or to illuminate the floor for safe movement in full dome theatre when the main lighting is dimmed.		

1.9 B. Active 3D spectacles with storage and sterilization (700 active 3D spectacles Make : Eyes-3D-Shut/Expand 3D/Ultimate 3D)

Specification	**Detailed description**	**Compliance (Yes/No)**	**Reasons for deviation, if any, with complete justification**
Active 3D spectacles	For high-quality images preserved at all seating positions Automatic power-off function saves energy Bright images and natural colours Automatic IR synchronization, wide reception angle		
Sterilization	Machine suitable for sterilization of 3D spectacles working with AC 230 V Good quality active 3D glasses and design of space for distribution of special glasses for 3D films, including its storage, sanitization, collection etc. Contactless charging cabinet for charging minimum 300 active 3D glasses, simultaneously from single switch must be provided.		

1.9C Full dome as well as Astronomy Sky Shows of 25-35 minutes duration in English and Hindi Language

Specification	Detailed description	Compliance (Yes/No)	**Reasons for deviation, if any with complete justification**
Complete Planetarium Full dome as well as Astronomy Sky Shows of 25-35 minutes duration in English and Hindi	1. At least (4) four 4K full dome show in 2D 2. At least (2) two 8K full dome show in 2D 3. At least (4) four 4K full dome show in 3D 4. At least (2) two 8K full Dome show in 3D. 5.At least 08 Free shows available from		

Language	international producers like NASA/ESO/ESA etc. in English, Hindi		

2.0 Brochures & Complete Specifications

Table 2.0

Detailed description	Compliance (Yes/No)	**Reasons for deviation, if any**
Brochures and specifications for Projectors, Lenses, Mounts, Blending and Geometric Correction Units, Display Management System, etc.		
Brochures and specifications for Image generator servers interactive planetarium software, full dome configurator & playback system and projection systems.		
Brochures and specifications for Show Control System.		
Brochures and specifications for Calibration and related instruments and software.		
Brochures and specifications for Software Elements along with licensing details.		
Brochures and specifications for Audio systems.		
Brochures and specifications for UPS system with 30 minutes backup.		
Engineering drawing (plan, elevation and sectional views wherever necessary for viewer's gallery and image servers room in pdf and AutoCAD file format), complete solution diagram, connectivity diagram, system deployment and foot print detail, electrical power requirement and location marked diagram/drawings, system cooling requirement (in BTU) with proper layout drawings.		
Detailed write-up and specific system solution document explaining the integrated working of offered solution with the hardware and software describing various technical, interface and performance aspects, wiring / network diagram of the proposed solution. This has to explain how the proposed design or solution meets the specifications and overall requirements as mentioned in the tender document.		
Schematic diagram and broad material specifications of the structure for mounting the projector array showing suggested location of the projectors including arrangement for accessibility to the projectors for maintenance.		
Details and product catalogues of acoustic treatment of inner surface of concrete domeand acoustic panelling below the aluminium dome inside the theatre proposed and with relevant drawings, material specifications etc.		
Details and product catalogues of LED Cove light, Foot light, Exit signage and Emergency Exit signage..		
Details regarding source of content development for planetarium shows using datasets/library of 3D models/cloud assets.		
Details and product catalogues of 3D spectacles, storage, charging units and sterilization equipment.		

3.0 Delivery Schedule

Time Schedule	Compliance (Yes/No)	**Reasons for deviation, if any with complete justification**
The entire work shall be completed within six months from the date of placement of order or opening of Letter of Credit.		

4.0 Warranty and AMC:

Description	Compliance (Yes/No)	**Reasons for deviation, if any with complete justification**
The Onsite comprehensive Warranty period is for five years from the date of issue of acceptance certificate by BCST		
The non comprehensive annual maintenance contract will be for a period of three years, after expiry of the warranty period.		

5.0 Operation of 2D and 3D full dome planetarium and film shows:

Description	Compliance (Yes/No)	**Reasons for deviation, if any with complete justification**
Operation of full dome shows from 11:00 a.m to 7:00 p.m for the visitors of BCST. This timing may vary during the peak season. The show shall remain operational for 364 days in a year (and 365 days in a leap year). Sterilization, cleaning and distribution of Active 3D spectacles to the visitors shall be under the scope of the successful bidder.		

ANNEXURE-D

PROFORMA FOR ISSUING "UNDERTAKING BY ORIGINAL SYSTEM INTEGRATOR"
(To be submitted in OEM's Letterhead)

Dated:

To
The Bihar Council On Science & Technology,
I.G.S.C. Planetarium, Adalatganj
Bailey Road,
Patna : 700 091.

Dear Sir,

We, _____ hereby state that the product offered vide this tender by our authorized agent, M/s. _____and to be supplied if found suitable and selected shall be our original equipment and is to be deemed as if the supply hasbeen made by us directly.

Accordingly, we stand by all the terms, conditions and stipulations as defined in tender ……of Bihar Council on Science & Technology (BCST).

We also undertake to directly make good of any shortcomings either in product quality and/orin services which my/our authorized agent may fail to fulfil as a part of his obligations underthe terms & conditions of this tender.

Thanking you,

Yours faithfully,

(Authorised Signatory with Seal).

ANNEXURE – C

BIHAR COUNCIL ON SCIENCE AND TECHNOLOGY
INDIRA GANDHI SCIENCE COMPLEX PLANETARIUM,
ADALATGANJ, BAILEY ROAD,
PATNA- 800001

Financial Bid Format

Name of the Bidder						
Address						
S. No.	**Description**	**Rate**	**Currency**	**Applicable Taxes**	**Total Amount**	**Remarks (TaxBreakup)**
1	Dismantling and stacking of existing planetarium equipment, chairs and carpet etc.					
2	All civil and electrical work including air-conditioning for projectors and servers enclosures required for successful commissioning of the project					
3	Site Preparation along with levelling and making of robust floor in the space created due to removal of existing equipments. This newly prepared floor will house additional chairs.					
4.	Complete Planetarium Full dome as well as Astronomy Sky Shows of 25-35 minutes duration in English and Hindi Language as per clause 1.9 C.					
5	New Dome Screen installation with acoustic treatment by replacing the existing 16 meter dia dome glass wool insulation.					
6.	Supply, installation, testing and commissioning (SITC) of Projector Array with geometric correction and image blending for seamless projection.					
7.	SITC of Image Generator Server networked with Image generator workstations.					
8.	SITC of Interactive planetarium and full dome configurator and playback software					
9.	SITC of Show control system					
10.	SITC of Automatic Calibration and alignment system					
11.	SITC of Integrated 7.1 surround sound system					
12.	SITC of U.P.S system minimum 75 KVA online with parallel redundancy with 30 minutes backup including electrical panel for distribution of power to the installed equipment.					

13.	Seating Arrangement					
14	Supply and installation of 250 chairs as per approved layout.					
15.	SITC of LED Cove light, foot lighting, exit and emergency exit signage etc.					
16.	Supply of Active 3D spectacles (700 nos.) along with supply and installation of storage, sterilization and charging equipment.					
17.	Cost of operation per annum (to be paid quarterly after completion of work) for seven years on year to year basis.					
18.	Cost of AMC per annum for 2(two) years after 5 (five)years warranty (to be paid annually after completion of work).					
19.	Training on FULL DOME PROJECTION SYSTEM					
20.	Any other items of work/equipment etc. not covered above, under Sl.No. 1 to 19 but required as per scope of work provided.					
1.	The bidder may note that while arriving at the total cost, BCST shall consider the total cost of initial installation and subsequent cost of operations and maintenance for a period of seven years to decide on the lowest bidder.					
2.	The bidder shall consider the prevailing tax rates while quoting the rates. However, in the event of any changes in the statutory taxes and duties, the rates applicable at the time of payment shall be made by BCST against submission of supporting documentary evidence.					