NATIONAL COUNCIL OF SCIENCE MUSEUMS
(Ministry of Culture, Government of India)
SECTOR-V, BLOCK-GN, BIDHANNAGAR, KOLKATA – 700 091

NOTICE INVITING e-TENDER

For

Supply, Installation, Integration, Testing and Commissioning of hardware and software packages, interfaces, tools and / or drivers, offering onsite comprehensive warranty of five years, post warranty comprehensive maintenance for two years and operation for a period of seven years of the complete and fully integrated functional Fulldome digital 2D & active 3D immersive projection system

At

Indira Gandhi Science Complex Planetarium, Patna (Bihar)

NATIONAL COUNCIL OF SCIENCE MUSEUMS
SECTOR-V, BLOCK-GN, BIDHANNAGAR,
KOLKATA – 700 091

TENDER No. I/18012/7/21(86)

NOTICE INVITING e-TENDER

Name of the work: Supply, Installation, Integration, Testing and Commissioning of hardware and software packages, interfaces, tools and / or drivers, offering onsite comprehensive warranty of five years, post warranty comprehensive maintenance for two years and operation for a period of seven years of the complete and fully integrated functional Fulldome digital 2D & active 3D immersive projection system at Indira Gandhi Science Complex Planetarium, Patna (Bihar).

On-line Digitally signed open 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 **comprehensive** warranty of 5 (five) years, post warranty comprehensive maintenance for 2 (two) years and operation for a period of 7 (seven) years of the complete and fully integrated functional full dome digital 2D and active 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 existing 35mm Astrovision fish eye lens projection system and GM-II of GOTO Inc., Japan installed at **Indira Gandhi Science Complex Planetarium, Patna, Bihar**. Interested bidders may download the tender documents from the Procurement Portal www.eprocure.gov.in or from the Council's website **www.nscm.gov.in** as per the following schedule:-

1	Bid Document Published Date	26.08.2021
2	Bid Document Download Start Date	`27.08.2021
3	Bid Document Download End Date	20.09.2021.
4	Pre-Bid Clarification Start Date	27.08.2021
5	Last date of submission of Pre-Bid Queries or clarifications	24.09.2021, 16:00 hrs IST only at the following email id: k.unni@ncsm.gov.in . The bidder who will submit the pre-bid clarification through email shall get the intimation from NCSM to attend the pre-bid online. Bidders interested to attend the meeting online should send their email address.
6	Pre Bid Clarification End Date	As above

7	Pre-Bid meeting Date and Place	28.09.2021 **At IGSC Planetarium, Patna. from 11.30 a.m**
8	Bid Submission Start Date	04.10.2021
9	Bid Submission End Date	11.10.2021
10	Technical (Techno-Commercial) Bid Opening Date	12.10.2021
11	Date Place of Technical Presentation	*To be notified later*
12	Financial Bid Opening Date	*To be notified later*

The purchaser will open the tenders at the specified date & time and at the specified place as indicated in the NIT. However, in case the specified date of tender opening falls on / is subsequently declared a holiday or closed day for the purchaser, the tenders will be opened at the appointed time and place on the next working day.

Tender document can be downloaded from the Central Public Procurement Portal (CPPP) website "http:// eprocure.gov.in" and also from NCSM website : www.ncsm.gov.in.

1. **Visit of the IGSC, Planetarium, Patna**: Bidders are advised to visit the existing IGSC, Planetarium, Patna, Bihar to ascertain and fully understand the nature and quantum of work before tendering. **Site inspection may be carried out one day before the scheduled pre-bid meeting at IGSC, Patna. In case, the representative of the bidder is unable to attend the pre-bid meeting, the queries may be submitted through CPPP and email.** However, lack of knowledge of site conditions cannot be considered as an excuse for mistake/misrepresentation in the bid.
2. Submission of the Bid: This Tender is an e-Tender and bids are to be submitted through CPP Portal (**http://eprocure.gov.in**) only. Bids submitted in physical forms will be summarily rejected.
3. Details of submission of tender, etc. are indicated in the e-tender document.
4. The online bid, both Technical (Techno-Commercial) Bid and Financial bid, duly furnished in Cover –I and Cover-II respectively, should be uploaded by the due date and time as per the above schedule. The responsibility to ensure the same lies with the bidders.
5. 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.

6. NCSM reserves the right to amend/withdraw any of the terms and conditions in the tender Documents or to reject any or all tenders without giving any notice or assigning any reason. NCSM also reserves the right to accept or reject any or all tenders in full or part without assigning any reason whatsoever. NCSM shall also not be bound to accept merely the lowest tender but the technical suitability, capability and superiority of the concept / technology interface / system etc. shall be of prime consideration for selection of the appropriate set of concept/ technology interface /system collectively considered as a complete solution.

Place : Kolkata
Date : 26.08. 2021

(Dy. Controller of Stores & Purchase)
National Council of Science Museums

General Information and Instructions

1. 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.

2. Bids shall be submitted online only at CPPP website: https://eprocure.gov.in/eprocure/app Manual bids shall not be accepted.

3. The instructions given in **"Annexure-A"** for **"Instruction for Online Bid Submission"** should be strictly followed during submission of the Bid.

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

5. An agent of foreign OEM, for submitting the offer on behalf of overseas OEM, would be required to produce a copy of their legal bidder agreement with their principal and a copy of registration / enlistment with DGS&D as an Indian agent failing which their bid would be disqualified.

6. EMD for this tender is **NIL**. However, in lieu of Bid Security, the bidder has to sign **"Bid Security Declaration"** on their letterhead accepting that if they withdraw or modify their bids during period of validity etc., they will be suspended for **THREE** year in participating in any such tender in NCSM and its units. Kindly refer Annexure – K.

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

8. **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.

9. 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.

10. 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.

11. The Financial Bid shall be filled in and signed by the authorized signatory online as per Proforma **"Annexure-C"** available at Central Public Procurement Portal e-tender system website http://eprocure.gov.in/eprocure/app. Off line Financial Bid shall not be accepted.

12. 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) The scanned copy of "General Terms & Conditions" duly signed by the Authorized Signatory with official stamp as a token of acceptance of the bidders.

iv) The scanned copy of "Technical specifications and Scope of Work" duly signed by the Authorized Signatory with official stamp as a token of acceptance of the bidders.

v) "Technical Compliance Table" (as per **Annexure-D** format) duly filled in and digitally signed with official stamp.

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

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

viii) Name, Address, Name of the contact person and his/her mobile number etc. of Indian Agent of overseas OEM.

Cover-2

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

ii) "Cost Break-up" (as per **Annexure-H** format Part A &) duly filled in and digitally signed with official stamp. It should be ensured that all the columns of Cost break-up sheet are filled up failing which the same will be rejected.

iii) "Cost Break-up" (as per **Annexure-H**1 format Part A & B duly filled in and digitally signed with official stamp. It should be ensured that all the columns of Cost break-up sheet are filled up failing which the same will be rejected.

The Cover-1, i.e. Technical (Techno-commercial) Bid shall be opened by the Council at the first instance and evaluated by the competent authority of the Council. 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.

Annexure A

NATIONAL COUNCIL OF SCIENCE MUSEUMS
SECTOR-V, BLOCK-GN, BIDHANNAGAR,
KOLKATA – 700 091.

TENDER No. I/18012/7/21(86)

Instructions for Online Bid Submission

1. The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submit their bids online on the CPP Portal.

2. More information useful for submitting online bids on the CPP Portal may be obtained at https://eprocure.gov.in/eprocure/app

A. REGISTRATION

i. Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "**Online Bidders Enrolment**" on the CPP Portal which is free of charge.
ii. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
iii. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
iv. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.) with their profile.
v. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
vi. Bidders may then log-in to the site through the secured log-in by entering their user ID/password and the password of the DSC / e-Token.

B. SEARCHING FOR TENDER DOCUMENTS

i. There are various search options built-in the CPP Portal to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization 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 Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
ii. Once the bidders have selected the tenders they are interested in, they may download the required documents/tender schedules. These tenders can be moved to the respective 'My

Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

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

C. PREPARATION OF BIDS

i. Bidders should take into account the original e-NIT/RFP and any subsequent 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 documents 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 a black and white option which helps in reducing the 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 the "My Space" or ''Other Important Documents'' area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for the bid submission process.

D. 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. A standard Price Schedule format (BOQ) has been provided with the tender document 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 (rate quote sheet for Façade Lighting), open it and complete the blue coloured (unprotected) cells with their respective financial quotes and other details (such as the 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.
In addition to the above, the **Cost Break-up** shall be submitted in tabular format duly digitally signed with an official stamp.

iv. 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.

v. 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 the 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.

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

vii. Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message and a bid summary will be displayed with the bid number and the date & time of submission of the bid with all other relevant details.

viii. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

E. 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.

ii. Any queries relating to the process of online bid submission or queries relating to CPP Portal, in general, may be directed to the 24x7 CPP Portal helpdesk. The contact number for the helpdesk is 1800 233 7315.

iii. All communications related to tender including the submission of Proposal should be addressed to :

Dy. Controller of Store and Purchase
National Council of Science Museums
33, Block GN, Sector – V, Salt Lake,
Bidhannagar, Kolkata – 700091
email id: k.unni@ncsm.gov.in

ANNEXURE-B

NATIONAL COUNCIL OF SCIENCE MUSEUMS
SECTOR-V, BLOCK-GN, BIDHANNAGAR,
KOLKATA – 700 091

TENDER No. I/18012/7/21(86)
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 (NCSM would like to procure the entire system from a single source)	:	
v.	Whether capable to supply and install the Fulldome System as per minimum requirement/and Technical Specification given in Annexure-C (Please mention "YES" or "NO" in Annexure- D)	:	
	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 detailed specifications of the offered product including copies of Product brochure	:	

vi.	Mention recommended seating 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 (Bihar)	:	
ix.	Shelf-life time of the Digital immersive full dome 2D/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 fulldome 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.	5.1 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, exit and emergency exit signage and LED step lighting with all associated electrical wiring works	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 NCSM while handing over. Suggested training scheme, topics may also be included in this	1 Set

	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 fulfill 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
vii.	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 I / we shall abide by the decision of NATIONAL COUNCIL OF SCIENCE MUSEUMS regarding selection of eligible firm(s) / type of equipment or system / multimedia show contents scheme for opening of Financial Bid (Part-II).

Dated Official Seal & Signature of the Bidder/Constituted Attorney

NATIONAL COUNCIL OF SCIENCE MUSEUMS
SECTOR-V, BLOCK-GN, BIDHANNAGAR,
KOLKATA – 700 091

TENDER No. I/18012/7/21(86**)**

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 comprehensive 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 2D and active 3D Digital 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 / 3D digital 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, Bihar.

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.

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

vii. "**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.

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.**

2.1 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 7** of the General terms and conditions.

2.2 The successful Bidder shall submit the following within 7 (seven) days from the date of placement of the work order :

a) Duplicate copy of the work order duly signed and official stamp on all the pages as a token of acceptance of the order.

b) Non-judicial stamp paper of appropriate value for entering into an agreement as per prescribed format.

3. ELIGIBLE BIDDERS:

The following are the Qualifying Eligibility Criterion for bidder.

i. Limited Company/Corporation/Agency/Consortium/JV etc. are allowed to bid for the work.

ii. Limited Company/Corporation/Agency/Consortium/JV etc. shall have the experience of implementing 2D & ACTIVE 3D Fulldome immersive projections system. The Bidder/manufacturer must be an original manufacturer of the Digital Fulldome system software and/or the planetarium shows or authorized agent of the manufacturer. In case the bidder is an authorized agent of the manufacturer then the authority letters should be furnished with all the details.

iii. The Bidder/manufacturer must have previous experience of having supplied and installed Digital Fulldome 2D & 3D theatres /planetariums worldwide. The bidder must have installed at least 1(one) 4K or higher resolution active 3D immersive projection system of 15-meter

diameter or higher worldwide which is currently operational (supporting document must be furnished).

iv. 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.

v. 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.

vi. **Work Experience Eligibility**: The Bidder should have completed similar works during the last 07 (seven) years from the date of the issue of this E-TENDER.

Estimated cost of the project is INR 22.00 Crore. The bidder should fulfill the following eligibility criteria.

One similar work of value not less than 80% of the estimated cost of work.

Or

Two similar works each of value not less than 50% of the estimated cost of work.

Or

Three similar works each of value not less than 40% of the estimated cost of work.

Notes:

- Here the **similar works** shall mean concept, design, supply, installation, testing & commissioning of Digital Fulldome 2D & Active 3D immersive projection system.
- In the case of Consortium/JV participating in this E-TENDER, the works of all the individual members of the Consortium/JV done independently will be considered as valid work experience.
- If any bidder has executed the similar work as a part of a consortium/JV in the past then the work experience of the bidder shall be considered as valid only if all the consortium/JV partners are participating together in the present E-TENDER also.
- The details of qualifying works/projects shall be furnished as per the proforma in **Annexure-E** and if required, the bidder shall also facilitate inspection of the above qualifying project(s) by NCSM's officials to ascertain the performance of the system.
- Documents Required: The bidder should submit a copy/copies of the work order(s) issued in the name of the agency as well as copies of work completion certificate of the same work, clearly indicating the value of the work of similar nature. If the work order contains several works, only the value of the works of a similar nature shall be considered for work experience. If the value of the works of similar nature is not specifically mentioned in the cost breakup, the work experience against that work order will not be considered as valid.

NCSM may inspect any of those works at its discretion to verify the credentials of the bidder for the qualifying works/ projects indicated above for which the Bidder shall provide references (including Referee names and contact details) in respect of the projects implemented.

The bidder should provide documentary proof to clearly substantiate each eligibility criteria, failing which the bid will be summarily rejected.

vii. 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.

viii. 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.

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

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

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

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

xiii. The Average Annual Turnover of the Bidder (of the lead partner in case of consortium/JV) for the last three financial years (2018-19, 2019-20, and 2020-21) should be minimum INR 22 Crore.

Documents Required: Turnover of the bidder (**of the lead partner in case of consortium/JV**) and the duly certified document from CA clearly indicating the Turnover of the last three financial years (2018-19, 2019-20, 2020-21) as per **Annexure – F**

- Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:
- Made misleading or false representation in the forms, statements and attachments submitted in proof of the qualification requirements; and/or Record for poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.

Note:

1. Notwithstanding 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. **JOINT VENTURES/CONSORTIUM**

i. In the event that the successful bidder is a consortium/joint venture formed, lead partner/prime contractor in whose name the bid was issued, shall be fully and solely responsible for the performance of contract and all works designed and executed under the contract.

ii. Bids submitted by a consortium or joint venture of atleast two firms including lead partner, all partners shall comply with the following requirements:

a. The consortium as a whole must be a sound entity technically and the lead partner must be a sound entity financially.

b. The Consortium as a whole must satisfy the qualification criteria set forth herein. The turnover of the lead partner must satisfy the eligibility criteria of the tender. The bid shall contain a statement of the members of the consortium and shall provide all information necessary to satisfy Client/Employer that the Consortium fulfils the qualifying criteria.

c. The Bids shall contain original copy of the Memorandum of Understanding (MOU) on Rs.100/- Non-Judicial Stamp paper (or as applicable) between the consortium members clearly identifying the lead partner, scope and responsibility and financial part of each member in the performance of the contract.

d. The consortium members will obtain approval of the Client for any change in the shareholding structure and scope of work or any other terms of MOU.

e. The lead partner of the consortium shall be nominated as being in-charge to represent the Consortium in all dealings with the Client/Employer and for providing any information or clarification sought from the Consortium.

f. The Bid shall be signed by all the consortium firms by their authorized person. The lead partner shall be authorized to incur liabilities and receive instructions for and on behalf of any and all member(s) of the Consortium and all dealings including billing and payments, shall be done exclusively with the leader of the consortium.

g. Only firms or joint ventures that have been qualified under this procedure will be eligible to bid for this project.

h. All members of the Consortium shall be liable for the execution of the project in accordance with the terms of the MOA and Contract agreement.

i. Any individual bidder or member of a consortium cannot be a member in another consortium and participate in this tender.

j. All correspondence or communications will be done by the Lead partner (or authorized representative of Lead partner) of the consortium.

k. Bidder submitting their bid shall not be under liquidation, court receivership or similar proceeding.

Notes:

1. Technical bids of the agencies that fulfil the above pre-qualification criteria shall be opened.

2. The bidder has to upload the compliance letter on its letterhead duly signed by the authorized signature & other supporting documents as asked for in the bid in scanned format. Failing to submit the same or non-compliance/deviation from any bid terms and conditions, eligibility criteria or technical specifications may result in rejection of the bid.

5. EVALUATION / SELECTION CRITERIA

A two -stage Evaluation will be adopted in evaluating the proposals

i. Eligibility Criteria Evaluation: Any shortcoming of the documents will lead to rejection of the bid and other envelopes will not be opened.
ii. Technical Presentation Evaluation: The agencies qualifying on the basis of their credentials /evaluation will only be called for Technical Presentations which can be at a very short notice of even three days.
iii. Financial Evaluation: Only the bidders/firms securing the minimum qualifying marks based on Eligibility Criteria Evaluation and Technical/Presentation Evaluation as described in details below will be eligible for their Financial Bid Opening & Financial Evaluation.

A. Technical Evaluation

i. The Evaluation Committee appointed by the competent authority shall carry out its evaluation applying the evaluation criteria specified in the bid document. Evaluation of the application would be done as per the documents submitted. Bidders/agencies who are in the trade and are fulfilling the eligibility criteria as per the documents required would only be called for presentation which can be at a very short notice of even three days.

ii. Further, during the technical presentation the evaluation would be carried out where the technical evaluation would be given upto 100 marks.

iii. Each responsive proposal shall be attributed a technical score. On the basis of the technical assessment, **agencies securing minimum 70 marks out of 100 will** be shortlisted and the financial bids of **only** the shortlisted agencies will be opened. The date and time of opening of the financial bids will be intimated to the selected /shortlisted agencies through CPP portal.

B. Financial Evaluation

Financial Bid:

a. The Financial Bids of the technically qualified bidders will be opened online through CPP Portal.
b. The lowest financial bid complete in all respects shall be selected for award of contract.
c. Only fixed price financial bids indicating total price for all the work/services specified in this bid document will be considered.
d. Details of the taxes and duties leviable on the basic cost to be indicated clearly in the financial bid.

e. Errors & Rectification: Arithmetical errors will be rectified on the following basis: "If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail".

f. In the event the bid composite bid scores are "tied", the bidder securing the highest technical score will be declared as the Best Value Bidder for award of the Project.

Note:

Technical Bids will be evaluated on the basis of documents as detailed above & presentations to be made by the eligible agencies before the Constituted Committee. The date and time of the presentations will be conveyed to the eligible agencies.

D. Technical Evaluation Marking Scheme

The Technical Bids will be evaluated on the basis of the indicated parameters in the table below:

Evaluation of bids found eligible as per eligibility criteria would be undertaken by the Technical Evaluation Committee Constituted by the competent authority as per parameters cited below.

Sl. No.	Parameter	Criteria	Max. Marks 100
1	Experience of applicant/agency in the tendered work	5 Years - 10 Marks	15
		More than 5 years upto 10 years - Bonus 2 Marks	
		More than 10 years –Bonus 5 Marks **Maximum Marks - 15 marks**	
2.	Financial Soundness (average annual turnover [**of Lead Partner in case of consortium**] during the last three years (2020-21, 2019-20, 2018-19)	i. For average annual turnover above Rs. 22.00 Crore -10 marks	20
		ii. For average turnover in excess of Rs. 22.00 Crore @ 1 mark per Rs. 1.00 Crore each **Maximum Marks - 20 marks**	
3.	Similar Work Experience	● For one similar completed works having value ≥ Rs.17.60 Crore - 10 marks ● For two or more similar completed works each having value ≥ Rs.17.60 Crore - 15 marks	15
		● For two similar completed works having value ≥ Rs 11 Cr <20 Cr – 7 marks	

		• For three similar completed works having value ≥ Rs 8.8 Cr – 5 marks **Maximum Marks – 15 marks**	
4.	Operation and Maintenance experience for active 3D Fulldome shows	• Minimum 1 project - 3 Marks • 1 mark for each additional project **Maximum Marks - 05 Marks**	05
5.	Technical presentation before the Technical Evaluation Committee	a. Design and execution of Fulldome 2D and Active 3D theatre as per scope of work and technical specifications given in the tender document - 25 Marks	45
		b. Technology adopted / quality of proposed equipment - 10 Marks	
		c. Experience in execution of ancillary works such as supply and fixing of chairs, acoustic insulation, civil works etc. - 10 Marks	

The bidder will have to enclose a presentation on the proposed solution along with the technical proposal to NCSM. The presentation shall cover the comprehensive details, approach & methodology, Organization structure, Work program, Implementation strategy, offered equipment list, Technical brochures and specification sheet, timeline etc.

6. 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 onsite **comprehensive** warranty (5 Years), post warranty (2 Years) comprehensive maintenance and operation for a period of seven years of the complete and integrated functional Fulldome 2D & active 3D digital immersive projection system at IGSC Planetarium, Patna. The price should include the cost of all civil work inside the dome, electrical work, Air-conditioning work, planetarium chairs etc., providing training for the operation of the system to the representatives of National Council of Science Museums/I.G.S.C Planetarium, Patna in detail.

The selected bidder shall be responsible for proper co-ordination with NCSM 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,***

Patna may provide custom duty exemption certificate, if any, as per norms. **BCST, Patna will have the final ownership of this project, all necessary invoices/documents should be in the name of BCST, Patna. However NCSM 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 NCSM 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 the bidder.**

The rates of Excise Duty / Custom Duty (if any), Goods and Service Tax and other taxes / levies to be imposed on the quoted rates as the case may be 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.

7. 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 2D & active 3D digital 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 35mmAstrovisionfisheyelensprojectionsystem and GM-II of GOTO Inc., Japan installed at I.G.S.C. Planetarium, Patna shall be completed within **15 (FIFTEEN) months from the date of placement of confirmed order and opening of Letter of Credit.**

8. 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, National Council of Science Museums reserves the right to cancel the order.** The decision of **NCSM** 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.

9. 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 National Council of Science Museums. Any /all defect(s) pointed out to the successful bidder by the competent representative of National Council of Science Museums 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 National Council of Science Museums failing which penal action shall be taken as deemed fit by National Council of Science Museums. The decision of National Council of Science Museums in this regard shall be final and binding on the successful bidder.

10. 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 Fulldome digital 2D and active 3D immersive projection system at site and successful running of Fulldome 2D/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 Fulldome digital 2D/3D immersive projection system for a minimum period of 10 (ten) consecutive days and on submission of a certificate issued by National Council of Science Museums stating that installation of the ordered system has been done satisfactorily and also on submission of warranty certificate as detailed in clauseNo.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 Fulldome digital 2D/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 the authorized representative of IGSCP/BCST, Patna and satisfactory running of the entire Fulldome digital 2D/3D immersive projection system for a minimum period of 10(ten) consecutive days and on submission of a certificate issued by National Council of Science Museums stating that installation of the ordered system has been done satisfactorily and also on submission of warranty certificate as detailed in clauseNo.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 NCSM equal to 3% (three 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 IGS&P, Patna/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. Annual operation contract will be awarded to the Indian associate of the foreign bidder.

11. 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.) @ 1% 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.

12. Defect Liability period / Onsite comprehensive 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 National Council of Science Museums/I.G.S.C. Planetarium, Patna within reasonable time. **The successful bidder shall maintain an inventory of all necessary components to reduce downtime.**

13. 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 National Council of Science Museums for clarification. The successful bidder should obtain written approval of National Council of Science Museums for any deviation from the approved specifications, if required due to site conditions or for betterment and safety of visitors and installations.

14. The authorities of the National Council of Science Museums 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 National Council of Science Museums for such amendments.

15. In case the successful bidder refuse to accept the offer after finalization 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 finalized and accepted terms & conditions, earnest money deposit would be automatically forfeited and the order shall be cancelled forthwith.

16. The authorities of National Council of Science Museums 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.

17. 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.

18. National Council of Science Museums/ Bihar Council of Science & Technology 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.

19. SECURITY DEPOSIT:

i. The Security Deposit shall be 3% of the gross value of work ordered and shall be submitted by the successful tenderer in the form of Bank Guarantee before release of any payment including opening of LC. In case, the gross value of the work executed is more than the ordered value, the successful tenderer shall submit additional Bank Guarantee for the differential amount before the release of final payment.

ii. The security deposit shall be released after expiry of the defect liability period of 5 years from the date of satisfactory completion of the installation and commissioning of the system.

iii. In case of cancellation of the contract, the Security Deposit submitted by the tenderer in the form of Bank Guarantee shall be revoked and the amount necessary to make up this amount shall be recovered from any money due to the successful bidder under this or any other contract with NCSM/BCST.

iv. In case of death of successful bidder, Security Deposit shall be returned /refunded to the legal heir of the successful bidder after adjustment of dues, if any, post the actual completion of the work & upon expiry of the specified guarantee/defects liability period.

20. FORCE MAJEURE

Neither the successful bidder nor NCSM shall be considered in default in performance of its obligations under the terms of this MoU, if such performance is prevented or delayed for any causes beyond the reasonable control of the party affected such as war, hostilities, revolution, riots, civil commotions, strikes, lockouts, epidemic, explosion, flood, earthquake or because of any law and other proclamation, regulations or ordinance of any government or sub-division thereof or because of any act of God or any other cause beyond the control of the concerned party which could not have been foreseen or avoided by the exercise of due diligence and so it becomes impossible to perform, provided notices in writing of any such cases, with necessary evidence that the obligation under this tender thereby affected or prevented or delayed is hereby given within 14 days from the happening of the event in case it is not possible to serve the notice within the said 14 days period, then within the shortest possible period without delay. As soon as the cause of Force Majeure has been removed, the party whose liability to perform its obligation has been affected shall notify the other party the actual delay occurred in such affected activity and resume the performance immediately.

21. 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.

22. The successful bidder may engage suitable and competent agencies to take up the necessary civil, electrical, HVAC etc. related works inside the dome as per Annexure L.

23. All disputes and differences between the successful bidder and National Council of Science Museums 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 National Council of Science Museums, whose decision in this regard will be final and binding on both the successful bidder and the National Council of Science Museums. 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.

24. Errors & Rectification: Arithmetical errors will be rectified on the following basis: "If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail"

25. Make in India products would be preferred as far as practicable.

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

Technical Specifications and Scope of work

Section I

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 RGB PURE LASER light source** 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/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

1. 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 Astrovision35 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.
2. Dismantling and stacking of aluminium dome screen (lead space of 500 meters) and speakers including submission of bill of materials so dismantled.
3. 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.
4. Site Preparation along with leveling and making of robust floor in the space created due to removal of existing equipments. This newly prepared floor will house additional chairs.
5. All civil and structural work for stepped gallery including chairs, carpet and other finishing work etc.
6. All necessary civil work for complete installation of all equipments including projectors will be done by bidder. The scope of work includes inclined/stepped gallery structure and all other civil works within the dome, Electrical work, Air-conditioning work etc. the probable items of which are enclosed as per **Annexure 'L'**. 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.
7. All electrical and HVAC work with necessary modification to the existing system including ducting etc.
8. Separate enclosure as per heat load of the projector and servers will be provided by the bidder. Enclosure will be of required size with spilt AC and dehumidifier for each projectors and servers.

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

1. High resolution Active 3D visualization system with minimum 53 Million Pixel on the 16 meter perforated dome screen.

2. 3 Chip DLP projectors with combined ANSI lumens of minimum 180,000, minimum individual contrast ratio of 5000:1 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 .Optimized blending technology should be adapted for laser light source.

3. Each 3 chip DLP projector shall be pure RGB Laser with 30,000 hrs life to 80% brightness.

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

5. A high performance multi-channel media creation, image generator and playback system which can create as well as play high resolution 2D and3D 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.

6. Display management system shall control the display configuration like tiling, positioning, alignment etc. Video transmission should be through QFSP+ module and multimode OM3-OM4 fibre optics.

7. 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.

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

9. 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.

10. 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 NCSM for approval before initiating the work.

11. 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 should be minimum **200** with space at the front for live interaction as per design provided by the bidder and approved by NCSM.

12. A 5.1 surround audio system with **minimum 5 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/3D theatre of the IGSC, Patna.

13. LED cove lighting of the full dome theatre and its integration with show control system. It is mandatory to have brightness of minimum 1600 Lumens per unit including fixture 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 and Tablet.

14. Good quality active 3D glasses and design of space for distribution of special glasses for 3D films, including its storage, UV sanitization unit, collection storage cabinet etc. Contactless charging cabinet for charging minimum 300 active 3D glasses, simultaneously from single switch must be provided.

15. Emergency LED based exit signage inside the theatre suitable LED STEP LIGHTS with its associated electrical wiring works.

16. Public address system inside the theatre for making announcements and or for conducting the live show with necessary wiring & cabling work.

17. Sound proofing and acoustic treatment of the Full dome theatre wherever necessary including Acoustic/insulation jacket for Dome Screen, shall be under the scope of the bidder.

18. **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 NCSM.**

19. The bidder shall provide site plan document with plan, elevation and mounting details for placement of Projectors, Screen, Viewer Gallery, and Rack Mounted assemblies for Image Generators and Playback system, Speakers and Display Management System.

20. 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, etc.

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

22. 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.

23. The bidder shall provide the requirement of fire extinguishers (type and quantity) to be placed in different areas of full dome theatre. NCSM shall install it after obtaining the approval from fire department.

24. 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.

25. 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.

26. 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.

27. 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.

28. 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.

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

30. 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 IGSC& P, Patna 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).

31. 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.

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

Note:

All civil and electrical works relating to the installation of the system/show, acoustic paneling, 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 /paneling and steel structure for installation of projectors array as described earlier.

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 by the selected vendor.

Section II

TECHNICAL SPECIFICATIONS OF INTEGRATED HIGH-RESOLUTION FULL DOME DIGITAL 2D AND ACTIVE 3D IMMERSIVE PROJECTION SYSTEM FOR A 16-METER DIAMETER PERFORATED ALUMINIUM CHAIN-SUSPENDED DOME SCREEN NON TILTED WITH GEOMETRICAL CORRECTION, IMAGE STITCHING AND BLENDING ETC. FOR SEAMLESS PROJECTION OF HIGH-RESOLUTION 3D AND 2D DIGITAL FULL DOME FILM SHOWS AND DIGITAL PLANETARIUM SHOWS.

1.1 Fully High-Resolution Full dome digital Active 3D immersive projection system

The integrated High Resolution Full dome Digital 2D and ACTIVE 3D Immersive Projection System consists of Projectors array, new 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, 5.1 surround sound system, LED Cove lighting and Exit signage, emergency exit signage, LED Step Lights ,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 16-meter diameter Dome Projection Screen

Acceptable OEMs: Astro-tec, Spitz or equivalent make

DESIGN PARAMETERS FOR DOME PROJECTION SCREEN

1. The projection dome shall be self-supporting suspension type and capable of maintaining a perfect hemispherical geometrical characteristic when supported by its structural system 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. 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 NCSM.

5. 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.

   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.

6. The projection surface shall consist of not more than 150 perforated 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.

7. The Dome should be suspended by chains by at least/about 20 vertical suspensions and lateral restraints in 45°-60° spacing to be connected with closed eye bolts (industrial grade) for load bearing system of the building and adjustable with industrial grade turnbuckle.

8. 360 °Aluminum 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.

9. 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 crimped & flushed or butt finished 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

INSULATION BACK-COVER FOR DOME SCREEN

1. A blackout insulation jacket with ASTM E84 standard with minimum 1inch thickness and NRC 0.6 to be installed on the top of the Dome screen and to be supplied by the Dome manufacturer.

Scopes Included:

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

ii. All necessary modifications of civil structure inside the dome for installation of screen shall be designed and executed by the bidder with due concurrence of NCSM. It is in the scope of the bidder and the same may be vetted by NCSM.

Table 1.1.1

Specifications	Detailed description
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 1.2 - 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.

Insulation of outer concrete dome, inner surface:

- **New Insulation**: Appropriate Thermal & Acoustic insulation shall be installed by replacing the old insulation material. Thermal Insulation material shall be laid with Vapour Barrier to achieve at least R-35 as a first layer on the concrete surface. Acoustic insulation should be laid over the thermal insulation to achieve a NRC of 0.6 for the Dome Theatre. Please refer to the table below for overall minimum specification for the materials to be used:

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 paneling below the dome screen:

Wall paneling 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 or high quality wooden slats and acoustic fabric backing and at least 40mm Polysynth

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 minimum 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 RGB Pure Laser Light Source Lumens of 30000 or more and contrast ratio of 5000:1 or better with high frame rate of 120hz active stereo
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 and manufactured by the same OEM in their own factory. Minimum 6 projectors must be proposed by the bidder.

Acceptable OEMs: BARCO/Christie/NEC /Sony

Table 1.1.3

Specifications	Detailed description
Display Technology	Three chip DLP
	Source : RGB Pure Laser
Minimum native Resolution	4096 pixel x 2160, 120 Hz, at minimum 5000: 1 contrast ratio.
Internal Input / Output ports	HDMI/Display port/QSFP+
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	25,000 hrs to 50% brightness when operated at 30,000 lumens from initial start up
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°C 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**
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 3D & 2D Projection Modes.
	The system must have software and hardware to adjust and calibrate the geometric **auto** alignment 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 (minimum 12+2+2 standby and maximum 24+2+2 standby. However, lesser nos. are preferred due to ease of installation and maintenance)

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 two image render server for each projector for Fulldome 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	• NVidia Quadro M5000or higher graphic cards latest version • NVidia Gsync fully utilized (frame and swap sync) in hardware and software • 8 Core Intel Xeon or Higher processor per computer • 32GB 2133MHz DDR4 RDIMMECC • Solid state Hard drives • 500 GB system hard drives • Windows 10 or higher robust operating system
Media Server Architecture	• Choice of video codecs with loss less compression • Full control of distortion correction-warp & blend & channel management
Pre-process Data transfer Rate*	• No jerks, flicker or image tearing should appear onscreen. • Frame rates up to 60fps per eye in 3Dstereo.

** 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 Fulldome 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 OEM software with perpetual license for playback of Fulldome shows and planetarium shows and with facility to convert large format shows into Fulldome shows.**
- **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 allow KML Support – Keyhole Markup Language files to be downloaded from the Internet and used to demonstrate a wide range of scientific concepts. 2. The system should allow full Python and JavaScript integration for advanced real-time capabilities. 3. 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: 3D Models of Sun, Planets including their Moons, Minor Orbital Objects including Asteroids, Outer Solar System Objects, comets etc., with possibility of incorporating new 3Dmodules. 8. Space Missions: Cassini, Voyager & Voyager2, latest Mars missions, Pioneer, International Space Stations, 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 & Milky way galaxy from far away points. 12. More such features like simulations of the Milky Way, 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 3D&2D digital shows by different developers around the world both in 4K and 6.5 K. ➢ 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 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:

	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. Self-defined lines, grids, scales 7. Stars and sky motions 8. Sun, Moon &Planets 9. 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. 10. 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. 11. Library of images, clippings, visuals, animation on space and astronomy related objects and events. Images of ancient astronomers and their works and contributions. 12. Software compatible to the supplied system to create shows should be licensed. 13. There should be provision for on line updating. 14. The text editor to create show elements should be capable of handling English. 15. 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 6.5 K 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.
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/HVEC 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 8 K 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 8 K 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. On/Off Control: Projectors, Illumination, Audio and Dimmer control for COVE lighting
• Interactive screen for controlling DIGITAL IMMERSIVE FULLDOME PROJECTIONSYSTEM
• The screen should have following: Display size: 32 inch (diagonal), Display Resolution: Upto 1920X1080 or better

1.5 Calibration and Alignment

For Fulldome 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.

Table1.5.1

Specifications	Detailed description
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, 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.

Table1.5.2

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 5.1 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 Fulldome projection environment to ensure maximum immersive experience. The system shall also provide public address system inside the theatre.

Table 1.6

Specification	Detailed description
5.1 channel surround audio system	The audio system shall be fully integrated with the show control system. Audio system shall consist of 5 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 kilo ohmsbalanced, 10 kilo ohms 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 UPS system with parallel redundancy of reputed make and having backup time of **30 minutes** to be provided by the bidder for digital immersive Fulldome 2D/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 (Minimum 200 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 NCSM 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 140mmradius. 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 fixing the 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/Carpet Flooring	**(a)** Supply & laying of Nylon carpet over an under layer of 6 mm thick kinny foam in Planetarium of IGSC&P, Patna as per following specifications: Make: Heritage Labelle, Colour: 6906 Peninsula or equivalent approved make & colour. Specifications Construction: 1/10" or 1/8" Tufted Cut & Loop Pattern, Fibre : 100% Solution Dyed Nylon, 2-Ply Heatset., Pile weight: ca 1085g/sqm(32oz/y2), Total weight: ca 1870g/sqm (55.14 oz/y2), Pile height: ca 6.5mm (+/-3%),Total height: ca 8.5mm (+/-3%), Total height: ca 8.5mm (+/-3%), Density: 4500, Primary Backing: PP woven cloth, Secondary Backing : Action Bac, Standard Roll size: 3.66m x 30m Performance: Stain Resistance: 10(AATCC-175-2003), 3M Scotchguard Treatment, Static Control: Built in Permanent, Tuft

	Bind 6.5lbs(ASTM-D-1335), Dimensional stability: Max 0.2% change (AACHEN), Flammmability Radiant Panel 0.12W/cm2 (ASTM-E-648), US Federal Flammability Std: Passed (GB20286-2006/Cf1-S1-T0), (ASTM-D-2859-96), Smoke density: Max 450(ASTM-E-662-06), Colorfastness: to light 5(AATCC-16E), to wet & dry cleaning 5 (AATCC-165), to ozone: 5(AATCC-129), Indoor Air Quality: CRI Green Label Plus No. GLP1350. **(b)** Supply & fixing of 2" x0.5"x 3mm Aluminium color anodised stair nosing of approved quality.

1.9 A. LED Cove light

Cove lighting to be integrated with show control system.

Specification	Detailed description
Cove Light	Beam Angle 120° x 120° Lumens 16 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. Continuous lighting to be provided to avoid dark zones. Provision for software programmability of different modes and colour effects along with programmable hardware presets and Smartphone or Tablet operation with Wi-Fi connectivity.
Ramp lighting, Exit signage and Emergency Exit signage	• **Step 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 6mmCarpet • **Entry & Exit Ramps Lighting:** LED wall light should provide 2.2lux 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 Fulldome theatre when the main lighting is dimmed.

1.9 B. Active 3D spectacles with storage and sterilization (700 active 3D spectacles)

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 radio frequency (RF) synchronization (range upto 50m), wide reception angle Bright Images & Natural Colours Unbreakable Frames

Charging and Storage Cabinet	Contactless charging cabinet for charging & Storing minimum 300 active 3D glasses, simultaneously from single switch must be provided.
UV 3D Glasses Sterilization Unit	UV Sterilization : 255nm range UV-C type lamp based unit for Active 3D glass sterilization Sterilization Cycle : 15-20min each cycle Capacity : Should have adequate capacity or racks for not less than 126 glasses Interior: High grade reflective Aluminium metal sheet interior Electricity/Power 230V-240V, 50Hz / less than 1kWh

1.9 C. The selected bidder shall provide at least 8 Free full dome Planetarium as well as Astronomy Sky Shows available in-house or from international producers like NASA/ESO/ESA etc. in English. The agency will also provide Hindi version of the shows for which translation and Hindi voice over will be provided by NCSM.

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 NCSM. The decision of the NCSM 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 Projectors, Lenses, Mounts, Blending and Geometric Correction Units, Display Management System, etc.
2. Brochures and specifications for Image generator servers, Interactive planetarium software and Fulldome 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 dome and acoustic paneling 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 ramp 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 Fulldome Digital 2D/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 **IGSC Planetarium**, **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 FULLDOME PROJECTION SYSTEM

Sl. No.	Detailed Description
1.	Architecture of FULLDOME PROJECTION SYSTEM
2.	Hardware components of FULLDOME PROJECTION SYSTEM (Projectors, screen, controller, image servers, network elements, storage etc)
3.	FULLDOME 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 1**5 (FIFTEEN) 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 Window Onsite Comprehensive Warranty** on all the items supplied under the purchase order as has been enumerated in details below. **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 NCSM.**

AMC: The comprehensive annual maintenance contract will be for a period of two years, after expiry of the warranty period of five years.

i. Bidders shall quote for **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 NCSM 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.

ii. During defect liability period of five years and subsequent comprehensive maintenance contract, comprising of 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. All replaced parts shall remain as property of BCST, Patna.

d) 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.

e) 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.

f) 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.

g) The selected bidder will maintain the minimum essential spares at their own stores and the required tools

h) / test equipments / software so as to reduce the break-down time.

i) 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 NCSM.

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

6. Operation of 3D and 2D Full dome planetarium and film shows for a period of 7 years:

Successful bidder shall operate full dome shows from 11:00 a.m to 7:00 p.m for the visitors of IGSC Planetarium, Patna. 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 bidder at 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 NCSM at 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 and successful completion of training and other compliances as may be applicable to commence operation.
- The bidder or its authorized agency will have to give separate quotation for operations & maintenance part.
- The bidder company, if it is a foreign company, can authorize an Indian agency to take complete responsibility of O&M and payments of the O&M amount can be made to the authorized agency directly. Quoted price will be given to authorize agency over a period of 7 years with each year payment being one seventh of total quoted Operation & Maintenance cost.

  An overall remote supervision of the operations and maintenance should be observed by the foreign bidder in case the O&M responsibility is undertaken by their local agency.

ANNEXURE - D

TECHNICAL COMPLIANCE TABLES

Table1.1.1

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Screen type and dimensions	The 16-meter diameter chain suspension type dome should be made of good quality aluminium perforated sheets with necessary ribs, support structures and industrial grade suspension mechanism. 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		
Insulation for Dome Screen	Blackout insulation jacket with ASTM E84 standard with minimum 1 inch thickness and NRC 0.6 to be installed on the top of the Dome screen and to be supplied and installed by the Dome manufacturer.		

Table1.1.2

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 Pure RGB Laser, with ANSI Lumens of 30000 or more and contrast ratio of 5000:1 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 : Pure RGB Laser		
Minimum native Resolution	4096 pixel x 2160, 120 Hz, at minimum 5000:1 contrast ratio.		
Internal Input / Output ports	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 20000 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. Self-contained liquid cooled		
Noise	< 55 db at 25°C per projector		
Accessories	All standard accessories including IR remote, Line cord etc.		
Color gamut	96% of the Rec. 2020 color space		

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
Image	Geometry Correction		
Operations	Hardware Edge Blending for Laser Light Source		
	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 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 (minimum 12+2+2 standby and maximum 24+2+2 standby. However, lesser nos. are preferred due to ease of installation and maintenance)

Table 1.2

Specifications	Detailed description	Compliance (Yes/No)	Reasons for deviation, if any, with complete justification
Image Generators	NVidia Quadro RTX4000 or higher graphic cards latest NVidia Gsync fully utilized (frame and swap sync) in hardware and software 8 Core Intel Xeon or higher processor per computer 32GB 2133MHz DDR4 RDIMM ECC Solid state Hard drives 500GB system hard drives, Windows 10 or higher robust operating system		
Media Server Architecture	Fully Genlocked hardware & software Choice of video codecs from loss less Full control of distortion correction-warp & blend & channel management. 10 bit per RGB channel colour depth capability. Full control of distortion correction-warp & blend & channel management. No cutting, slicing or re-rendering of domemaster media.		
Pre process Data transfer Rate*	No jerks, flicker or image tearing should appear on screen. Frame rates up to 120 fps per f 3D ACTIVE stereo.		
Central Data Storage & Remote Service Server (NAS)	At least 30TB fully redundant RAID 5 adaptive NAS for Media storage Dedicated Remote service server for online maintenance		

Specification	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. Earth & Moon System Features: High Resolution Earth & Moon Map, moons of Planets as per selected options. 2. Shadow to represent eclipses, Earth orbiting Satellites for Navigation and mapping etc. 3. 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. 4. Solar System: Sun, Planets including their Moons, Minor Orbital Objects including Asteroids, Outer Solar System Objects, comet etc. 5. Space Missions: Cassini, Voyager & Voyager2, latest Mars missions, Pioneer, International Space Stations are also to be added. 6. 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 / 3D digital shows by different developers around the world in 4K/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 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. 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. Audioclips 6. Text Labels and Text Boxes which can be added in live shows in English . 7. Self-defined lines, grids,scales 8. Stars and skymotions 9. Sun, Moon &Planets 10. 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. 11. 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. 12. Library of images, clippings, visuals, animation on space and astronomy related objects and events. Images of ancient astronomers and their works and contributions. 13. Software compatible to the supplied system to create shows should be licensed. 14. There should be provision for on line updating. 15. The text editor to create show elements should be capable of handling English . 16. 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/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.		

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/HVEC 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 6.5 K 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 6.5 K 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.		

13 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. On/Off Control: Projectors, Illumination, Audio and Dimmer control for COVE lighting		
	Wooden Console Desk for ergonomic operation of the system with all integrated controls for Audio, Cove Lighting & Fulldome operation		
	The screen should have following: Display size: 32 inch (diagonal), Display Resolution: Upto 1920X1080 or better		

1.4 Calibration and Alignment

Table1.5.1

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, 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 and 3Dmodes.		

Table1.5.2

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
5.1 channel surround audio system	The audio system shall be fully integrated with the show control system. Audio system shall consist of 5 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 kilo ohms balanced, 10 kilo ohms 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 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
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 U.P.S system including make and model. Please include suitable surge protection unit at UPS input		
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 (200chairs)

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 center20". 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 Nylon66 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 NCSM 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 mm radius. 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 fixing the 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 16 LED Channels Red / Green / Blue Mixing Distance 2 in (51 mm) to uniform light Tablet or Smartphone operation with wifi connectivity		
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 hourlife 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 mounted300mm 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)

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 radio frequency (RF upto 50m range) synchronization, wide reception angle. Contactless charging cabinet for charging minimum 300 active 3D glasses, simultaneously from single switch must be provided.		
UV Sterilization	UV sterilization for suitable for sterilization of 3D spectacles working with AC 230 V.		

1.9C Free Full dome planetary as well as Astronomy Sky Shows in English

Specification	Detailed description	Compliance (Yes/No)	**Reasons for deviation, if any with complete justification**
Complete Full dome Planetarium as well as Astronomy Sky Shows in English.	At least 08 Free shows available in house or from international producers like NASA/ESO/ESA etc. in English.		

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, Fulldome configuration & 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 dome and acoustic paneling below the aluminium dome inside the theatre proposed and with relevant drawings, material specifications etc.		
Details and product catalogues of LED Cove 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 15 (Fifteen) 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 NCSM		
The comprehensive annual maintenance contract will be for a period of two years, after expiry of the warranty period.		

5.0 Operation of 2D/3D Fulldome 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 IGSCP, Patna. 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-E

Past Experience in supply, installation, testing and commissioning for an integrated functional full dome digital 2D and Active 3D immersive projection system.

Agency Experience (Limited Company/Corporation/Agency/Consortium/JV Projects)

S. No	Name of the project	Cost of the Order awarded in INR (*)	Name of the Client	Phone of Contact Person of Client	Starting Date of Project	Completion Date of Project	Details/ Scope of work

Note : In case order is awarded in foreign currency then conversion rate on the date of placement of order may be taken for converting in INR value

Annexure-F

FORMAT FOR ANNUAL TURNOVER AS PER THE AUDITED ACCOUNTS

TOWARDS THE QUALIFYING EXPERIENCE

S. No.	Financial Year	Turnover in Indian Rupees(INR)
1.	2018-19	
2.	2019-20	
3.	2020-21	

(In case of Consortium, the Turnover of only lead partner needs to be mentioned)

_____

(Signature of Authorised Signatory)

This is to certify that the above information has been examined by us on the basis of relevant documents; books of accounts & other relevant information and the information submitted above is as per record and as per details annexed.

Signature, Address, Seal & Membership No of Chartered Accountant.

ANNEXURE-G

PROFORMA FOR ISSUING "UNDERTAKING BY ORIGINAL SYSTEM INTEGRATOR"

(To be submitted in OEM's Letterhead)

Dated:

To
The National Council of Science Museums,
Block-GN, Sector-V, Bidhannagar,
Kolkata : 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 has been made by us directly.

Accordingly, we stand by all the terms, conditions and stipulations as defined in tender XXXXXX of National Council of Science Museums.

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

Thanking you,

Yours faithfully,

(Authorised Signatory with Seal).

(Not to be quoted here, to be quored in separate cost break up sheet and uploaded as part of Cover II)

ANNEXURE – H

PART A:

S. No.	Description	Quantity/Unit cost as may be applicable	Rate	Amount	Applicable Taxes (with break-up)	Total Amount
1	a) Dismantling and stacking of existing planetarium equipment, Dome chairs and carpet etc. (to be quoted in INR only)					
	b) Re-assembling and installation of GM-II of GOTO Inc., Japan planetarium within IGSC Planetarium for display purpose. (to be quoted in INR only)					
2.	Supply and installation of Projection Dome Screen including all associated structures and including cost of scaffolding, labour etc.					
3	Acoustic paneling below the dome screen (to be quoted in INR only)					
4.	Supply, installation, testing and commissioning (SITC) of Projector Array with geometric correction and image blending for seamless projection.					

5.	**SITC of Image Generator Server**					
	networked with Image generator workstations.					
6.	**SITC of Interactive planetarium and Fulldome configurator and playback software**					
7.	**SITC of Show control system**					
8.	**SITC of Automatic Calibration and alignment system**					
9.	**SITC of Integrated 5.1 surround sound system (to be quoted in INR only)**					
10.	**SITC of U.P.S system with parallel redundancy with 30 minute backup including electrical panel for distribution of power to the installed equipment. (to be quoted in INR only)**					
11.	**Seating Arrangement a) Supply, fabrication and installation of tubular structure for new seating layout with enhanced leg space and covering the structure with 38 mm plywood (marine grade, water proof, termite resistant and fire retardant) with all required fasteners and structural materials for complete finished floor suitable for installation of chairs and laying of carpet.**					

	(to be quoted in INR only)					
	b) Supply and installation of at least 200 chairs as per approved layout. (to be quoted in INR only)					
12.	**SITC of LED Cove light, staircase lighting, step lights, exit and emergency exit signage etc.**					
13.	**Supply of Active 3D spectacles (700 nos.) along with supply and installation of storage, contactless charging and UV Sterilization equipment.**					
14.	**Training on FULLDOME PROJECTION SYSTEM**					
15.	**Any other items of work/equipment etc. not covered above, under Sl. No. 1 to 14 but required as per scope of work provided.** *(add additional rows as may be required)*					

PART B (To be quoted in INR only)

PS: Refer Annexure L for details.

S. No.	**Description of the work**	**Quantity/Unit cost as may be applicable**	**Rate**	**Amount**	**Applicable Taxes (with break-up)**	**Total Amount**
1.	**Dismantling work/repairing/renewing**					
2.	**Setting out of grid**					

	lines, main arc lines etc.					
3.	**Brick work and concrete work**					
4.	**Misc. work of AC Return & Light Box**					
5.	**Flooring work**					
6.	**Panelling, Woodwork & False Ceiling**					
7.	**Painting & Finishing work**					
8.	**Image Generator Room & other work**					
9.	**AC & Electrical works**					
10.	**Any other items of work/equipment etc. not covered above, under Sl. No. 1 to 9 but required as per scope of work provided.** *(add additional rows as may be required)*					

Total amount of INR of PART A and PART B taken together (to be entered by bidder) Note: The total amount should be tallied with column N of Price bid BoQ.	Rs.
Total amount quoted by the bidder in PART A other than INR (to be entered by bidder) Note: The total amount should be tallied with column M of Price bid BoQ.	USD/GBP/EURO

IMPORTANT NOTES:

1. The bidders shall along with Annexure H (PART A) submit in their letterhead a detailed list of deliverables along with cost break-up of each item, break-up of taxes considered while arriving at the gross value of each item as per the following format:

S. No.	Description of item	Base rate (INR/USD /EURO)	Quantity	Total amount	Details of taxes and duties included with clear break-up of each tax considered	Any other cost with details	TOTAL

2. The bidders may note that while arriving at the total cost, NCSM 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.
3. The bidders shall consider the prevailing tax rates while quoting the rates. However, inthe event of any changes in the statutory taxes and duties, the rates applicable at thetime of payment shall be made by NCSM against submission of supporting documentary evidence.
4. The total cost provided in the cost breakup sheet should exactly match with total cost quoted in the financial bid.
5. In case there is discrepancy in the cost breakup sheet and the cost quoted in the financial bid, the cost quoted in the financial bid will prevail.

6. **Rate/ information of the following items may also be provided**

   (This will not be considered for evaluating the Financial Bid)

S. No.	Item description	License fee for one year lease	License fee for five year lease	License fee for perpetual lease
1.	**List of available 2D/3D Fulldome shows with time duration of each on topics related to science, technology, environment etc. suitable for screening after completion of this facility with charges for yearly/5 yearly/perpetual lease.**			
	a) 2D/3D Fulldome Planetarium shows			
	b) 2D/3D Fulldome shows			
	c) Large format converted 2D/3D live shows (Attach extra sheet if required)			

2.	**Shelf-life time of the Digital immersive Fulldome 2D/3D projection system (i.e. up to which period technical support as well as spare parts including consumables shall be available with the firm).**	
3.	**Hindi translation and voice over for the free Fulldome planetarium and astronomy shows (per show)**	

(Not to be quoted here, to be quored in separate cost break up sheet and uploaded as part of Cover II)

Annexure H-1

NATIONALCOUNCILOFSCIENCEMUSEUMS
(Ministry of Culture,Government of India)
SECTOR-V, BLOCK-GN, BIDHANNAGAR,KOLKATA –700 091

Cost Break Up Sheet

PART A Total operation charges for seven years(To be quoted in INR Only)

Sl. No.	Particulars	Year	Rate	GST Percentage	GST Amount	Total Amount
01	Total Operation Charges during defect liability period(DLP) of 5 years (To be quoted in INR Only)	1st Year				
		2nd Year				
		3rd Year				
		4th Year				
		5th Year				
02	Total Operation Charges after defect liability period(DLP) of 5 years (To be quoted in INR Only)	6th Year				
		7th year				
	Grand Total(In figures) The total operating charges for seven years should tally with column AZ of Price Bid provided in separate excel sheet.					

PART B Two years Comprehensive Maintenance Charges after Defect Liability Period of 5 Years

Sl No.	Particulars	Year	Quoted Currency	Rate	Amount of Tax Component (if any)	Total Amount including Amount of Tax Component
01	Comprehensive Maintenance Charges after defect liability period of 5 years. (Quoted currency should match with column L of price bid provided in separate excel sheet.)	1st Year				
		2nd Year				
	Grand Total(in figures) The Total Comprehensive Maintenance Charges after defect liability period of 5 years should tally with column M of price bid provided in separate excel sheet.					

Dated……..

Official Seal **Signature of the Tenderer/Constituted Attorney**

ANNEXURE - J

FORMAT FOR CONTRACT AGREEMENT

ARTICLES OF AGREEMENT made at ……..…….
(Place)

this……..……day of ……..……..
(Date) *(Month & Year)*

between the *National Council of Science Museums, a Society registered under the Societies Registration Act of West Bengal, 1961, hereinafter referred to as NCSM which expression shall include its successors and assigns on the one part and*

……

……
(Name of the successful e-tenderer)

trading in the name and style of ……..
……
……..……

(Name and complete address of the successful e-tenderer)

hereinafter referred to as the successful e-tenderer which expression shall include his/their respective heirs, executors, administrators and assigns on the other part.

WHEREAS the NCSM is desirous of getting the work of ……..……
……..……therein done and has caused
(Name of the work)

Notice Inviting E-tender (Including appendix), drawings, schedule of quantities and specifications describing the work and conditions of contract.

AND WHEREAS the said NIT (including appendix), specifications and the priced schedule of quantities and conditions of contract have been signed by or on behalf of the parties hereto. AND whereas the Successful e-tenderer has deposited in Bank Draft/Pay Order/ NEFT/RTGS
……..…….
(Exact amount in words)

the amount being …… of the ordered value of the e-tender) with the Museum /Centre as Security Deposit for the due performance of this Agreement as provided in the said conditions.

NOW IT IS HEREBY AGREED AND DECLARED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. In consideration of the payments to be made to him as hereinafter provided the successful e-tenderer shall upon and subject to the conditions herein contained execute and complete the

work within.....months from the date of issue of letter of intent / Work Order (as defined in the scope of work of the NIT) and described in the said specifications and the said priced schedule of quantities along with the progress of the work.

2. The Museum/Centre shall pay to the successful e-tenderer such sum as shall become payable hereunder at the time and in the manner specified in the said conditions.

3. Time is the essence of this agreement and the successful e-tenderer shall proceed with the work, throughout the stipulated period of this contract, strictly according to the Terms & Conditions of NIT. At any stage during execution, if any work lags behind the for reasons directly attributable to the successful e-tenderer, he shall pay or allow the Museum/Centre to deduct the same from the Security Deposit or from any money due to him a liquidated damage as per Clause …….

4. This agreement comprises the work above and all subsidiary works connected therewith, even though such works may not be shown on the drawings, or described in the said specifications or the priced Schedule of Quantities.

5. The Museum/Centre through the Engineer reserves to itself the right of altering the specifications and of adding to or omitting any item of work or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall not vitiate this agreement.

6. After successfully completion of works in all respect, successful e-tenderer will hand over all the materials including equipments and machineries, brochures, drawings etc. to the end-user IGSC&P/BCST, Patna in presence of NCSM representative and shall also render all services such as operations & maintenance of the systems, provide warranty of the equipment, machineries etc. at the finalized rates, terms & conditions of the tender documents.

7. All disputes and differences of any kind whatever, arising out of or in connection with the contract on the carrying out of works (Whether during the progress of the work or after their completion and whether before or after the determination, abandonment or breach of the contract) shall be referred to arbitration as per Clause ….. of Annexure - ….. of the said conditions of contract. In case of any legal dispute, other than the arbitration, the court of jurisdiction shall be at the place written in the first line of this agreement.

The provisions of the Arbitration & Reconciliation 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 proceedings under this clause.

In witness whereof the parties have set their respective hands the day and the year and the place hereinabove written.

Signed by for and on behalf of the Museum/Centre ……

In the presence of

1. ……

Seal

2. ……

Signed by the said Successful e-tenderer ……

In the presence of

1. ……

Seal

2. ……..

ANNEXURE K

(To be typed in official letter head duly signed with official stamp.)

Bid-Securing Declaration

TENDER No. I/18012/7/21(86**)**

Date:_____

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the NCSM or its units for the period of time of 3 **years** starting on....., 2021 , if we are in breach of our obligation(s) under the bid conditions, because we:

(a) have withdrawn our Bid during the period of bid validity specified in the Letter of Bid; or

(b) having been notified of the acceptance of our Bid by the NCSM during the period of bid validity, (i) fail or refuse to execute the Contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with ITB 38.

We understand this Bid-Security Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of our Bid.

Signed: [Signature & Seal of the bidder]

Name: [insert complete name of person signing the Bid-Securing Declaration]

Duly authorized to sign the bid for and on behalf of: [insert complete name of

Bidder] Dated on_____day of_____,_____[insert date of

signing] Corporate Seal (where appropriate)

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid.]

Annexure-L

Probable item of civil, electrical & HVAC related works (for interior of RCC dome) for refurbishing and installation of design, supply, installation and commissioning of an integrated functional full dome 2D and active 3D digital immersive projection system at Indira Gandhi Science Complex & Planetarium, Patna.

1. **Dismantling work/repairing/renewing: -**

   - Dismantling of existing projector and dome, wood work, panels, ducts outlets, central existing projector podium, dismantling and integrating new trench and central projector well, RCC cove/shelf, RCC beam and ring slab, cutting RCC ring slab as required for opening exhaust cut outs, dismantling existing IPS flooring in hall, chase cutting in existing floor, dismantling existing insulation work, existing electrical lines and conduits and temporary brick pillars etc.

2. **Setting out: -**

   - Setting out of grid lines, main arc lines etc.

3. **Brick work and concrete work: -**

   - 250 mm & 125 mm thick Brickwork over existing floor, central projector Podium, cove/shelf infill, temporary brick pillars for Dome ring, entry & back projection gallery, return AC duct in back gallery etc.
   - Plain cement concrete 1:2:4 in hall floor.
   - Reinforced cement concrete (M25) at the central projector podium slab including reinforcement, centering, shuttering and staging etc.
   - Foam cement concrete work in hall floor as per requirement.

4. **Misc. work of AC Return & Light Box: -**

   - Supplying, fixing and laying 75/100x150x50 or chosen size zinked steel box for return air inlet & Footlights

5. **Steel work: RHS, SHS, Plates & Bolts: -**

   - Special steel work, using standard MS Plates and Standard IS Sections for Dome Chain fixing, Studs and inserts to be fastened to concrete using high strength fastners, Special steel work, using standard Tubular Steel Sections Tata Structura or similar, RHS & SHS in Stepped Gallery including sockets, base plates, stiffeners, bolts and HS fastner bolts etc.

   - RHS 80x40x4 and SHS 40x40x4 for Gallery Sloped members, including plate sockets and bolts, RHS 80x40x4 for Stepped Gallery Upper members: Chords & Radials including plate sockets and bolts, RHS 80x40x4 & SHS 40x40x4 for Gallery Upper Main and Secondary members including plate sockets and bolts,

Special steel work, using standard Tubular Steel Sections Tata Structura or similar, RHS in Projection Gallery (Back wall)

- RHS Vertical Studs, Transome and Ties as also Horizontal chords, using RHS sections 66x33x3.6 with MS sockets and plate(6mm) welded to steel stiffener plate on Ring Slab, Standalone Table Type Projector Stands (Type A & B) using SHS sections 50x50x3.6 with MS sockets (6mm) and fixing plate, grouted/fixed to the floor with 8mm fastner anchor bolts (75 long). Hilti or similar.

- Special Erection & steel work for Aluminium Dome, using custom Chain ties fastened to Dome and cleats in outer wall and Ring slab, Misc. steel work, using standard IS sections including all sockets, base plates, stiffeners, bolts and MS fastner bolts etc.

6. Flooring work: -

- IPS flooring in Hall portion, Block board work in platforms (Stepped Gallery) covering the structure with 38 mm plywood (marine grade, water proof, termite resistant and fire retardant) with all required fasteners and structural materials for complete finished floor, Malaysia Sal Wood/ or similar Hardwood nosing, Finishing Hall and stepped galleries with Heritage or similar branded looped or Pile Carpet etc.

7. Panelling, Woodwork & False Ceiling: -

- Projection Gallery (Back wall) Acoustical insulation, Projector Enclosures Acoustical treatment in Walls & Ceiling, Projection gallery wall finish with Perforated Coated Steel Panels or Channels, Wooden flush Door Panel with Malaysia Sal Door Frames, stainless steel railing, Gypboard False ceiling in Projector Enclosures and Theatre entries etc.

8. Painting & Finishing work: -

- Cement plaster of 20 mm thick, POP Putty work, painting all exposed walls with 2 coats of Acrylic Emulsion paint over 2 coats of primer, painting all steel surfaces with two coats of Synthetic Enamel, Painting MDF Boards with 2 Coats of Flat oil paint, Painting rear wall inside gallery with rubberized paint, 2 coats over a coat of primer, for vapour barrier etc.

9. Image Generator Room & other work:

- Image Generator/Server Room and ceiling Acoustical insulation, Finishing Power Dome Room with Heritage or branded Carpet, covering cable trench, total AC & electrification work in Image Generator/Server Room etc.

10. AC & Electrical works

- Re-alignment of ducting wherever necessary as per requirement, electrical work including fitting, fixtures as per functional requirement.

Note: -

The basic items of work as mentioned above are generic in nature and if any other items of work, not specifically mentioned, are required for satisfactory completion, the same has to be accounted in the quoted rate for successful installation of the equipment.