Through website

PRASAR BHARTI
(India's Public Service Broadcaster)
Director General : Doordarshan
Doordarshan Bhawan, Copernicus Marg
New Delhi -110001.

Dated: 25/10/2022

Subject: Draft Technical specifications for supply of fully built and integrated native UHD Modular Fly Pack OB Units consisting of a total 32 Cameras and of up to 5 Standalone Configurations.

The Draft specification of the upcoming tender is enclosed herewith to offer comments, if any by prospective bidders/Firms/OEMs.

2. Bidders/OEMs are requested to provide information about available
local content (Make in India)in respect of items listed in suggestive BOM along with budgetary quote.

3. Bidders may please submit the above detail on or before due date by e-mail to ddpurchase401@yahoo.co.in or at following Address.

Assistant Engineer
Room No. 403,
Directorate General: Doordarshan,
Doordarshan Bhawan, Copernicus Marg,
New Delhi -110001 (India)
Telephone: **011- 2311 4403/4401**

Specification For: Draft Technical specifications for supply of fully built and integrated native UHD Modular Fly Pack OB Units consisting of a total 32 Cameras and of up to 5 Standalone Configurations.

Specification no: SD 10/2022 dated 20.10.2022

Due Date to offer Comments: 09.11.2022

Encl.: As above (39 Pages)

Signed by Girish Kumar
Date: 25-10-2022 14:24:55
Reason: Approved

(Girish Kumar)
Assistant Director (Engg)
Doordarshan Directorate: Doordarshan

PRASAR BHARATI
(INDIA'S PUBLIC SERVICE BROADCASTER)
DIRECTORATE GENERAL: DOORDARSHAN

Technical Specifications for the supply of fully built and integrated Native UHD Modular Fly Pack OB Units consisting of a total of 32 Cameras and of up to 5 Standalone Configurations

Specifications No.: SD 10/2022
Dated: 20.10.2022

1. Overview:

The specifications outlined in the following project tender document are for the supply of fully built and integrated multiple OB Fly Pack Units. These Modular Fly Pack OB Infrastructures should be equipped for use in *at least* the following different configurations:

A) 1X32 Cameras Fly Pack OB Unit
B) 2X16 Cameras Fly Pack OB Units
C) 1X16 Cameras + 2X8 Cameras Fly Pack OB Units
D) 1X 24 Cameras + 1X8 Cameras Fly Pack OB Units
E) 4X8 Cameras Fly Pack OB Units

Each Fly Pack OB Unit should be equipped for outputs in Baseband and in IP SMPTE ST 2110-20/30/40, SMPTE ST 2082-10 as well as production in 12G Ultra High Definition (UHDTV) & High Definition (HDTV) formats for Doordarshan Network.

Each such Fly Pack OB unit, formats of which are similar / the same, will be used as independent program production facilities, anywhere in India, for venue based production, remote production (IP output through the cameras) as well as in Baseband (3G and 12G) for a wide spectrum of events – indoor and outdoor. The outputs from these facilities shall include content for multiple genres including News, Current Affairs, Conferences, Ceremonial and other events coverages.

2. General:

a) The broadcast and other infrastructural equipment offered in the bid should be from reputed manufacturers and the same should be field proven and in use by globally renowned broadcasters/ media houses.

b) The bidder should not include and quote for end of life equipment.

c) The bidder should submit a list of broadcasters/ media houses with whom the quoted major equipment viz camera chains, lenses, vision mixers, routers, intercom systems, graphics, sound consoles, wireless camera

systems, etc. are in usage. Any bid without offered model specific users list is liable to be rejected.

d) The bidder shall submit only one solution (Single BOM) for the offered system. Any bid with multiple options (BOMs) is liable to be rejected.

3. Eligibility Criteria:

a) The bidder should have a proven track record of design, build and operation of multi-camera Fly-pack OB Units / OB Vans/ Broadcast Studios during the last 10 years (Each system with a minimum of eight UHD/ HD Camera Chains). The bidder should submit the following relevant documents which will corroborate its experience and ability, required to undertake this project:

(i) Minimum of one such project equivalent to or more than 80% of the estimated cost of this project, or

(ii) Minimum of two such projects, each equivalent to or more than 60% of the estimated cost of this project, or

(iii) Minimum of three such projects, each equivalent to or more than 40% of the estimated cost of this project.

Estimated cost of this project is approximately INR 60 crores plus applicable taxes.

Contact details of clients with whom work has been done and cited as relevant experience, are required in the bid.

Cut-off date for the experience shall be the last date of bid submission for this project.

Experience documents including copies of signed contracts and/or work orders supported by self-certified documents confirming that the design, build, operation and value of the project/s are in accordance with the requirements stated above shall necessarily have to be submitted along with the bid, without which the bid is liable to be rejected.

Any entity not possessing the relevant work experience and/or experience of executing such projects equaling to or more than the value as specified above, but are interested in bidding for the project as stated above, may tie up with a partner possessing such experience. The two parties will necessarily have to sign a notarized MOU (Memorandum Of Understanding) specifically for the execution of this project. The said MOU will have to be notarized before the submission of the bid. Both members entering this notarized MOU shall be jointly responsible for the execution of the project. Experience document/s, as mentioned above, should be submitted along with the bid. In the absence of such document/s, as stated above, the bid is liable to be rejected.

b) The bidder should be registered under the Companies Act 1956 or the Companies Act 2013 or should be a Partnership firm/ LLP registered in India under the Partnership Act 1932/2008, as amended, and should have been in operation in India for at least the last 3 Years.

c) The average annual turnover or Net Worth (*CA certified document*) for the last 03 Financial Years (*Except the Financial Years affected by Covid i.e. FY 2020-21 and FY 2021-22*) should be:

(i) Average Annual Turnover equivalent to or more than 100% of the estimated cost of this project, in the last 03 financial years (FYs 2017-18, 2018-19, 2019-20), or

(ii) Cumulative Turnover equivalent to or more than 300% of the estimated cost of this project in the last 03 financial years (FYs 2017-18, 2018-19, 2019-20), or

(iii) Average Annual Net Worth of a minimum of 50% of the estimated cost of this project in the last 03 financial years (FYs 2017-18, 2018-19, 2019-20), or

(iv) Cumulative Net Worth of a minimum of 150% of estimated cost of this project in the last 03 financial years (FYs 2017-18, 2018-19, 2019-20)

d) The bidder should be Solvent as on the bid submission date. Self certification by the bidder to confirm the above has to be submitted along with the bid.

e) The bidder should not be blacklisted/debarred by any Government organization in India as on the bid submission date.

4. Build, Integrate and Supply of Fly Pack OB Unit/s: Key Features

i. This turnkey project includes Build, Integrate and Supply of Modular Fly Packs OB Infrastructures including all broadcast equipment as outlined in this tender document.

ii. It will be the bidder's responsibility to ensure after-sales service. A warranty for 03 years from the date of supply/commissioning will need to be provided along with the bid. This warranty must be from manufacturers of, but not limited to Camera Chains, Lenses, Vision Mixers, Sound Mixers, Graphics Systems, Intercom Systems, Routers, Wireless Camera Systems, UPS, Flight Cases, Racks, etc.

iii. The bidder will need to use the highest quality of appropriate video/audio/ data/power cables, connectors and other accessories.

iv. All Racks should be equipped with efficient cable management systems. All racks should be of the highest quality steel to ensure they are able to

take the weight of equipment installed on them without bending, along with the finest quality of powder coating.

v. Appropriate / Relevant Technical Block and Line diagrams need to be provided at the time of supply. These Technical Blocks, Line Diagrams and Schematics have to necessarily be part of the bid.

vi. Comprehensive input and output routing of video and audio signals, to and from the Routers/ Distribution Amplifiers, Vision mixers, etc. should be ensured.

vii. The specified inputs, outputs and performance parameters as mentioned in this document are suggestive in nature and minimum in quantity. Better parameters and more I/Os can be offered.

viii. The successful bidder needs to submit necessary certificates and licenses, if required.

5. Technical Infrastructural Requirements: Key Features

1) All equipment should be housed in flight cases and on racks (where applicable). The inner, top, bottom and sides of all flight cases should have tough and high quality rubber / foam to ensure complete safety of equipment at all times.
2) Each flight case should have multiple metal locks at appropriate places and should be air tight to prevent any dust or water from seeping into them. They can also have more than one levels of protection (whether metal or wood) keeping in mind the twin principles of robustness and weight control.
3) Racks inside the flight cases should be of toughened steel and include metal trays which can carry the weight of the equipment mounted on them, without bending. The depth of the racks should not exceed 1200 mm.
4) Flight cases should be fabricated from the highest quality of world class plywood (similar to birch wood) of a minimum of 9 mm thickness and pasted with matte laminated sheets and / or metal e.g. aluminum.
5) All plywood for flight cases of different sizes should be cut from extremely precise dies to ensure that removable covers of similar flight cases are interchangeable.
6) Flight cases with racks inside should have shock absorbers mounted at all inner corners to prevent any damage to equipment during transits / movements.
7) All corners of each flight case should be identical and similar to enable stacking of one similar flight case over another, with high quality anodizing to prevent any rust.
8) All castors (wheels) on flight cases should be military grade with locks on at least two of the four castors on each flight case in order to maintain steadiness when they are in static position. The castors should be of a

large diameter in order to enable them to take the full weight of the equipment inside the flight case.

9) HOFC cables should be on metal rollers and/or flight cases of coffin design while other cables should be in flight cases of coffin design. Multicore audio and video cables can also be on rollers. Each roller should be capable of taking up to 350 meters of HOFC.
10) The sizes of all flight cases should be in accordance with dimensions permissible in the cargo holds of commercial airlines, both Indian and international.
11) All rack mounted equipment should be cabled through breakout panels and panel mounted connectors. More specifically, no equipment should be hard patched.
12) All cables from breakout panels should, as far as possible, run through cable sleeves to ensure neatness and an efficient & secure cable management system.
13) All flight cases have to be numbered and have high quality stickers with arrows pointing to which side should be up as well as notifying "Fragile" on them. The stickers should have a red background. All flight cases should have a metal / plastic plate screwed on to them with the name, address and other contact details of Doordarshan Kendra, which shall be notified to the successful bidder.
14) All flight cases, racks, etc. must be robust enough to stand up to tough road conditions, when in transit.
15) Each bidder must submit the design of the Fly Pack OB Unit/s vide 2D drawings, quantify the number of flight cases in each configuration including estimated dimensions as well as the total gross/volume weight.

6. Power Supply: Key features

a) Each Fly Pack OB Unit should operate on three phase (phase to neutral 230 volt ± 10%, @50 Hz) commercial power supply.

b) The bid should include details, specifications and cost of 01 No. of 40 KVA On - line UPS and 03 Nos. of 20 KVA On – line UPS working on 3-phase input & 3-phase output with a minimum of 20 minutes backup for each UPS. Power Supply to all critical equipment should pass through the UPS. The successful bidder, after calculating the load of all such equipment should finalise on the load bearing capacity of the UPS.

c) Mains and UPS Power Supply status (Aural & Visual) should be available.

d) Aesthetically designed three phase Power Distribution Racks (4 in Nos.) with on load Change-over Switches and operable on mains and DG supply, inclusive of Digital Metering & Monitoring Panels, Separate Circuits & Switch Gears for Equipment Racks should be provided.

e) The bidder must ensure and certify that service and support for the UPSes are available pan-India.

7. Technical Specifications & System Requirement: General specifications of the System are mentioned in **Appendix-I**.

8. Equipment for this Fly Packs OB Project: Key features

a) Brands and model numbers of all equipment should be clearly mentioned in the Bill of Material (BoM) included in the bid.

b) Equipment Specifications are mentioned in **Appendix-II**. The bidder is required to provide the complete list of equipment: hardware, software and exhaustive list of technical furniture in order to comply with technical specifications. Quantity/ies including sub-modules are to be specified, failing which the bid is liable to be rejected summarily.

Following is the proforma for the BOM:

Sr. No.	Description of Equipment	Brand	Model No.	Part No., if any	Qty.	Remarks
1.	2.	3.	4.	5.	6.	7.

8.1 Camera Chains (with hard carrying cases and rain covers): Key features

a) The Fly Pack OB Unit/s should be designed, cabled, equipped, integrated and outfitted for thirty four (including 2 as standby) Native Ultra High Definition (UHD) Camera Chains for outputs in baseband (3G and 12G) and IP. Each camera chain should include Base Stations/ CCUs, Remote Control Panels, UHD Lenses, Camera Support Systems, etc. Each vision rack should comprise of four base stations / CCUs, four OCPs and associated equipment like intercom panels, router panels, monitors, one waveform monitor / vectorscope.

b) Each camera chain should be of broadcast standards and of the same brand and model. Each camera should have three 2/3" CMOS sensors, 16:9 Aspect Ratio, 3840 x 2160 or better native resolution sensors supporting UHD TV standard with 60 dB or better S/N Ratio, 2000 Horizontal TV Lines or better.

c) Each Chain should include one 7" (approximate) Colour LCD viewfinder equipped with LED backlit LCD panels having a resolution of 1920 (H) x 1080 (V) pixels or better, front and rear tally lamps. Rear tally lamps should be bright and large enough for images inside to be visible from all angles, without distortion.

d) The entire project should include a total of eight colour eyepieces (more than 2" each). These are in addition to the thirty four view finders as mentioned in Clause (c) above.

e) Each Camera should support High Dynamic Range (HDR): (HLG and/or SLog-3) and Wide Colour Gamut/Space (WCG).

f) Each Camera should have focus assist functions.

g) Should provide real time self-diagnostic systems displaying their status in the viewfinders and RCPs.

h) Camera heads/fiber adaptors should be connected to CCUs/ Base Stations through hybrid optical fiber cables with Lemo/ Lemo Type Connectors.

i) Camera heads should be equipped with motorized ND filter wheels and Optical/Electronic Color Correction (ECC) filters. Both filters should be remotely controllable from RCPs.

j) Bi-directional signal transmission between the camera head/ adaptor and the Base Station/ CCU should be enabled via telco provided IP network to support live remote production.

k) Besides UHDTV (3840 x 2160 4:2:2(YCbCr), the Base Stations/ CCUs should provide 12G-SDI and SMPTE-2110 IP Video outputs, HDTV (1080/50i & 1080/50p) outputs.

l) RCPs should be joystick type with full control over camera settings.

m) Cameras should be enabled with software control panels which can be operated from workstations or off the shelf available pads which can control all cameras.

n) Each camera should be supplied with one dual muff headset. In addition to these, eight single muff communications headsets should be provided for this entire Fly Packs OB project.

o) The bidder has to provide a total of thirty-six (36) UHD lenses, as detailed below:

(i) 23 X or higher magnification (minimum focal length varying from 7.6 to 7.8 mm) with 2X built in extenders, servo focus and servo zoom. Quantity: **12**

(ii) 14X or higher magnification Wide Angle Lenses (minimum focal length varying from 4.3 to 4.5 mm) with 2X built in extenders; servo focus and servo zoom with quick zoom facility: **8**

(iii) 45X or higher magnification (minimum focal length varying from 9.5 to 9.7 mm) with 2X built in extenders; servo focus and servo zoom with quick zoom facility, built-in optical image stabilizers and lens supporters. Quantity: **4**

(iv) 107X or higher magnification (minimum focal length varying from 8.3 to 8.4 mm) with 2X built in extenders; servo focus and servo zoom with quick zoom facility, built-in optical image stabilizers and lens supporters. Quantity: **8**

(v) 122X or higher magnification (minimum focal length varying from 8 to 8.2 mm) with 2X built in extender; servo focus and servo zoom with quick zoom facility, built-in optical image stabilizer and lens supporters. Quantity: **4**

p) Twenty-two (22) Camera Supports of the same brand and model consisting of a Head, a Tripod and a Dolly. The Head should be fluid and capable of holding a payload of at least 30 kg at a 150 mm Centre of Gravity over the full tilt range of +/- 85 Degrees with perfect functional counterbalance. The Tripod should be Two Stage, Aluminum/ Carbon Fibre. An accompanying Dolly on which the tripod legs shall be mounted is to be a part of this Camera Support System.

Another Twelve (12) Camera Support systems consisting of fluid heads with flat base having minimum payload capacity of 60 Kg at 200 mm centre of gravity over full Tilt Range with perfect counterbalance are required. Tripod Heads should have continuously variable perfect counterbalance and drag system.

q) All cameras, lenses and tripods should be offered along with hard carrying cases and rain covers.

r) <u>Camera Wireless Systems:</u>

Complete wireless camera systems (4 in Nos.), incorporating the latest 4K 12G technology, capable of 1080i, 1080p and HDR should be incorporated as part of the technical bid. Each camera system should have a COFDM transmitter which can be attached to a camera via a standard V-lock battery clip. Other key features of each wireless system should be:

1. Low battery consumption. Switchable RF power from 50mW to 250mW.
2. Swappable RF module to ensure ease of use in different frequency bands.
3. Ability to have HDMI or SDI inputs, 3G or 12G via removable SFP modules.
4. Choice of efficient modulation schemes for optimum performance: DVB-T, LMS-T, ISDB-T.
5. Integral data receiver for camera control.
6. Front panel display featuring Confidence Monitoring.
7. Latest technology for 1U 19" rack mount with ability to add additional receiver cards and expand upto at least 04 RF inputs in a range of output formats including SDI, IP.
8. The wireless camera system should have the feature of transmitting signals through a combination of cellular network signals as well as wireless COFDM.

9. The offered system should come with a minimum of four-way diversity and should be upgradable to sixteen-way diversity.

8.2 Recorders/Players: Key features

(a) The design and BoM should include eight Recording Decks (*to be provided by Doordarshan*). Rack space and cabling for the same should be factored in. In addition, two NLE systems loaded with Adobe Premier or similar software (licensed for the entire warranty period of 03 years) along with two 17" or bigger colour monitors will need to be provided by the bidder.

(b) The bid should include four SSD recorders supporting UHD/HD/SD, Sony XDCAM (MXF), Apple ProRes 422 (MXF), Avid DNX (MXF) formats, etc.

(c) The SSD Recorders should facilitate UHD file-based recording with in-built 1 TB or more storage. Each SSD recorder should be accompanied with four externally compatible SSDs of 2 TB each for UHD recording.

(d) An interface to transfer growing MXF file over FTP, simultaneous with recording, from the Deck to an NLE/Server should be part of the bid.

(e) Each SSD recorder should be equipped with a redundant power supply.

8.3 Graphics Systems: Key features

a) The bid should include four UHD/HD switchable I/O 3D Graphics Systems for this Fly Packs OB project. Each Graphics System should be able to edit all features on a preview channel while the program output is on Air (Same text on Air, but editing should reflect only after take).

b) Each System should support Unicode characters with fonts which are scalable in size, bold, italic.

c) Apart from English, the system should be loaded with fonts for Indian regional languages.

d) Each System should be genlockable to an external reference sync.

e) Each System should have a user friendly drag and drop graphical user interface (GUI).

f) It should be able to create single line as well as multi-line text on a single page, create multiple pages and images in a single document and facilitate seamless page scrolling.

g) Multiple simultaneous crawls, rolls and tickers in both directions.

h) Animation and Video File formats such as PNG, TGA, JPEG, BMP, TIFF, etc.

i) Each System should be loaded with 3D animation creation software for text and logos, as well as cut and paste tools.

j) Each System should facilitate wipes, effects, page transitions with audio as well as texts, have a built-in downstream keyer and a spell check feature too.

8.4 Digital Production Switchers (Vision Mixers – VMs): Key features

a) This project shall consist of four Digital Production Switchers (Vision Mixers – VMs). The Vision Mixers should be designed for UHDTV production with the same number of inputs and outputs in 3G/HD and 12G/UHD.

b) Power Supply should be redundant and hot swappable, for the main frames and control panels.

c) Configuration of Vision Mixers for this project shall be as under:

i) 3 M/E Vision Mixers with a minimum of 6 built-in full function keyers in each M/E – 2 complete units.

ii) 2 M/E Vision Mixers with a minimum of 6 built-in full function keyers in each M/E – 2 complete units.

Vision Mixers: Key Features

d) 02 Nos. of 3 M/E Vision Mixers (VMs): Key Features of each VM

i) 80 inputs and 40 outputs (UHD 2160p - SMPTE ST 2082 – 10) including Auxiliary Outputs.

ii) Out of 80 input sources at least 16 sources and out of 40 outputs at least 8 should be multi-format with internal up/down/cross conversion.

iii) Both VMs should have three full function multi-format M/Es and a minimum of six built-in full function keyers in each M/E. Each 3 M/E control panel should have rotary control to set various parameters of the key layers on each M/E.

iv) All full function keyers should have Linear, Luminance and Chroma Key (at least 6 Chroma Keys simultaneously), Mask, Matte, Fill and Key invert.

v) Both VMs should be equipped with at least four 3D DVEs capable of resizing and repositioning of respective windows on the screen.

vi) Each VM should have a minimum of 4 channels internal frame memory to store at least 1,500 frames of uncompressed UHD resolution. They should be able to instantly recall the stored frames/clips and support embedded audio for these clips. They

should also be able to import frames/clips through external interfaces.

vii) Each M/E should have wipe and pattern generators which can be modified with softness, position, aspect ratio, rotation, multiplication, modulation, border width and border color, etc.

viii) Each M/E should have two matte generators capable of multicolor wash and assignable to background, key fill and border fill.

ix) Each key should have a selection feature for assigning different key & fill signals. It should be able to copy the entire content of a keyer in the same or different M/Es.

x) The output of any one M/E should be usable as the background or a key on any other M/E.

xi) Each VM should have the ability to create transition/wipes using graphics from the frame memory. The VM should have 256GB or more internal storage to store different effects, timelines and macro control settings and be able to edit and recall these settings.

xii) Each VM should be able to facilitate transition from On-Air video to a new video through cut, mix (dissolve) and wipe. This transition should be possible manually by T-Bar fader as well as automatically from a button. Auto transition should be at the desired speed in terms of frames & seconds.

xiii) The 3 M/E Control panel for each vision mixer should have at least 24 directly accessible cross point source buttons in M/E Buses and access to the remaining through shift operation. It should be capable of mapping any source to any cross point.

xiv) All buttons on the control panel should be well illuminated and have assignable Mnemonic displays for directly accessible cross-points.

xv) Tally output for all inputs should be available.

xvi) Controls of the Vision Mixers should be enabled with high-resolution touch screen menu panels. In the absence of such panels, the bidder should offer external high resolution touch screen menu panels from either the VM manufacturer itself or similar panels of approximately 12 inches to 17 inches, diagonal in size, recommended by the OEM. These panels should have instant functionality selection with intuitive user control and work in any harsh environment.

xvii) The VMs should be able to create and store macros and recall them with automated multiple keystroke operations at the press of a single button. The macros should be editable through control panel buttons.

xviii) The VMs should indicate non-synchronous source(s), on-air source(s) and failure of power supply units.

xix) External devices such as Recorders/Decks and Video Servers should be directly controllable from the VMs via ethernet, serial AMP, serial BVW protocol, NMOS 1S-04 and IS-05

xx) The controls mentioned above should be possible through software panels too.

e) 02 Nos. of 2 M/E Vision Mixers (VMs): Key Features of each VM

i) 32 inputs and 16 outputs (UHD 2160p - SMPTE ST 2082 – 10) including Auxiliary Outputs.

ii) Out of 32 input sources at least 16 sources and out of 16 outputs at least 8 should be multi-format with internal up/down/cross conversion.

iii) Each VM should have two full function multi-format M/Es and a minimum of six built-in full function keyers in each M/E. The 2 M/E control panels should have rotary controls to set various parameters of the key layers on each M/E.

iv) All full function keyers should have Linear, Luminance and Chroma Key (at least 6 Chroma Keys simultaneously), Mask, Matte, Fill and Key invert.

v) Both VMs should be equipped with at least four 3D DVEs capable of resizing and repositioning of respective windows on the screen.

vi) The VMs should have a minimum of 4 channels internal frame memory to store at least 900 frames of uncompressed UHD resolution. They should be able to instantly recall the stored frames/clips and support embedded audio for these clips. They should also be able to import frames/clips through external interfaces.

vii) Each M/E should have wipe and pattern generators which can be modified with softness, position, aspect ratio, rotation, multiplication, modulation, border width and border color, etc.

viii) Each M/E should have two matte generators capable of multicolor wash and assignable to background, key fill and border fill.

ix) Each key of both M/Es in each VM should have a selection feature for assigning different key & fill signals. It should be able to copy the entire content of a keyer in the same or different M/Es.

x) The output of any one M/E should be usable as the background or a key on any other M/E.

xi) Both VMs should have the ability to create transition/wipes using graphics from the frame memory. The VMs should have 256GB or more internal storage to store different effects, timelines and

macro control settings and be able to edit and recall these settings.

xii) Both VMs should be able to facilitate transition from On-Air video to new videos through cut, mix (dissolve) and wipe. This transition should be possible manually by T-Bar fader as well as automatically from a button. Auto transitions should be at the desired speed in terms of frames & seconds.

xiii) The 2 M/E Control panel for each vision mixer should have at least 24 directly accessible cross point source buttons in M/E Buses and access to the remaining through shift operation. They should be capable of mapping any source to any cross point.

xiv) All buttons on the control panels should be well illuminated and have assignable Mnemonic displays for directly accessible cross-points.

xv) Tally output for all inputs should be available.

xvi) Control of the Vision Mixers should be enabled with high-resolution touch screen menu panels. In the absence of such panels, the bidder should offer external high resolution touch screen menu panels from either the VM manufacturer itself or similar panels of approximately 12 inches to 17 inches, diagonal in size, recommended by the OEM. These panels should have instant functionality selection with intuitive user control and work in any harsh environment.

xvii) The VMs should be able to create and store macros and recall them with automated multiple keystroke operations at the press of a single button. The macros should be editable through control panel buttons.

xviii) The VMs should indicate non-synchronous source(s), on-air source(s) and failure of a power supply units.

xix) External devices such as Recorders/Decks and Video Servers should be directly controllable from the VM via ethernet, serial AMP, serial BVW protocol, NMOS 1S-04 and IS-05

xx) The controls mentioned above should be possible through software panels too.

8.5 UHD/HD-SDI AUTO-SENSING ROUTER SWITCHERS AND MULTIVIEWERS: Key features

(a) The bidder should offer four Digital Routers of different sizes:

(i) Minimum size of 128 X 128 : 2 units

(ii) Minimum size of 64 x 64 : 2 units.

(b) Detailed specifications of the Digital Routers of the said configurations are spelt out as under:

(c) **02 Nos. of 128X128 12G / 3G / HD-SDI Routing Switchers: Key Features**

The specifications below lay down broadcast quality performance requirements for two 128x128 12G/3G/HD-SDI routing switchers, X-Y and Button Per Source remote control panels required. Each system should have the following essential features:

i. Accept 12G-SDI, 3G-SDI, HD-SDI signals with embedded ancillary data including audio and should route any input source to any desired destination.
ii. Should autosense 12G-SDI,3G-SDI, HD-SDI standard signals and should be genlockable with external reference signal.
iii. Switching should take place in vertical blanking as per SMPTE RP-168.
iv. The routers should maintain accurate switching for multiformat and multi frame-rate operations
v. The routers and panels should be 19" rack mountable and have redundant power supply units.
vi. The power supply should feed the entire router and not in zones.
vii. Each X-Y Panel should have dynamic LCD buttons for inputs and destinations.
viii. Visual indication on all panels regarding information of selected sources and destinations.
ix. The panels should be connected to the main electronics via Ethernet either in a daisy chain or directly from the main electronics for various control locations.
x. Cable length between the panels & main frame up to 100 meters each. The bid should include control cables with matching connectors at both ends.
xi. Both routers of 128X128 each should be accompanied with a total of 04 Nos. X-Y Panels & 24 BPS Panels. Each BPS panel should have a minimum of 64 buttons.

TECHNICAL SPECIFICATIONS:

The offered routing switcher has to be complied with for the following technical specifications: -

Sr. No.	Parameter		Performance values
1.	Matrix size	:	128 x 128 12G-SDI; 3G-SDI; HD-SDI signals with all embedded ancillary data

2.	SDI Input Equalization	:	Equalized for minimum cable length of 30m@12 Gb/s, 100m @1.5 Gb/s for Belden 1694A or equivalent cable.
3.	SDI Output	:	Auto Re-clocked
4.	Return Loss	:	≥15 dB @ 1.485 Gbps throughout the switching chain
5.	Reference input	:	Analog Black burst or Tri-level sync
6.	Standards		
(a)	UHD	:	3840x2160 /50/(16:9 aspect ratio) conforming to SMPTE ST424/2081/2082
(b)	HDTV	:	1920x1080/50/I /P(16:9 aspect ratio) conforming to SMPTE 292M and ITU 709 (CIF)
7.	Digital processing		
(a)	Sampling ratio	:	4:2:2
(b)	Quantization	:	10 bit or better
(c)	Video Data rate	:	12G: 11.86 Gb/s 3G: 2.97 Gb/s HD-SDI: 1.485 Gb/s
8.	Input/output Connectors		
(a)	SDI	:	BNC or HD BNC
(b)	Control	:	BNC or HD BNC, Ethernet, RS-422 or GPI.
9.	Signal		
(a)	Input/output signal Level	:	0.8 Vp-p □ 10% across 75 Ω /BNC or HD BNC
(b)	SDI Output Jitter	:	≤2.0 UIpp from 10 Hz to 100 kHz
10.	Operating Temperature	:	5° to 40° Celsius

11.	Power Supply	:	230±5% Volts AC, 50 Hz, Redundant

(d) **02 Nos. of 64X64 12G / 3G / HD-SDI Routing Switchers: Key Features**

The specifications below lay down broadcast quality performance requirements for two 64x64 12G/3G/HD-SDI routing switchers, X-Y and Button Per Source remote control panels required. Each system should have the following essential features:

i. Accept 12G-SDI, 3G-SDI, HD-SDI signals with embedded ancillary data including audio and should route any input source to any desired destination.
ii. Should autosense 12G-SDI,3G-SDI, HD-SDI standard signals and should be genlockable with external reference signal.
iii. Switching should take place in vertical blanking as per SMPTE RP-168.
iv. The routers should maintain accurate switching for multiformat and multi frame-rate operations
v. The routers and panels should be 19" rack mountable and have redundant power supply units.
vi. The power supply should feed the entire router and not in zones.
vii. Each X-Y Panel should have dynamic LCD buttons for inputs and destinations.
viii. Visual indication on all panels regarding information of selected sources and destinations.
ix. The panels should be connected to the main electronics via Ethernet either in a daisy chain or directly from the main electronics for various control locations.
x. Cable length between the panels & main frame up to 100 meters each. The bid should include control cables with matching connectors at both ends.
xi. Both routers of 64X64 each should be accompanied by a total of 04 Nos. X-Y Panels & 24 BPS Panels. Each BPS Panel should have a minimum of 64 buttons.

TECHNICAL SPECIFICATIONS:

The offered routing switcher has to be complied with for the following technical specifications: -

Sr. No.	Parameter		Performance values
1.	Matrix size	:	64 x 64 12G-SDI; 3G-SDI; HD-SDI signals with all embedded ancillary data

2.	SDI Input Equalization	:	Equalized for minimum cable length of 30m@12 Gb/s, 100m @1.5 Gb/s for Belden 1694A or equivalent cable.
3.	SDI Output	:	Auto Reclocked
4.	Return Loss	:	≥15 dB @ 1.485 Gbps throughout the switching chain
5.	Reference input	:	Analog Black burst or Tri-level sync
6.	Standards		
(a)	4K UHD	:	3840x2160 /50/(16:9 aspect ratio) conforming to SMPTE ST424/2081/2082
(b)	HDTV	:	1920x1080/50/I /P(16:9 aspect ratio) conforming to SMPTE 292M and ITU 709 (CIF)
7.	Digital processing		
(a)	Sampling ratio	:	4:2:2
(b)	Quantization	:	10 bit or better
(c)	Video Data rate	:	12G: 11.86 Gb/s 3G: 2.97 Gb/s HD-SDI: 1.485 Gb/s
8.	Input/output Connectors		
(a)	SDI	:	BNC or HD BNC
(b)	Control	:	BNC or HD BNC, Ethernet, RS-422 or GPI.
9.	Signal		
(a)	Input/output signal Level	:	0.8 Vp-p □ 10% across 75 Ω /BNC or HD BNC
(b)	SDI Output Jitter	:	≤2.0 UIpp from 10 Hz to 100 kHz
10.	Operating Temperature	:	5° to 40° Celsius

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11.	Power Supply	:	230±5% Volts AC, 50 Hz, Redundant

(e) **Multi-viewers (08 units): Key Features**

i. Each Multi-viewer should accept 32 numbers of Video with embedded Audio signals and display them in accordance with the layouts created by the user.

ii. Should be capable of simultaneous monitoring of multiple 12G/3G/HD-SDI sources tiled in dual display device.

iii. They should be capable of auto sensing the 12G, 3G and HD Video inputs.

iv. They should simultaneously display the output in HDMI or 3G-SDI outputs in BNC connectors for driving the Plasma or LED-LCD displays.

v. They should have quad head output with each output available in HDMI or BNC connectors to cater to four independent displays simultaneously with either the same or different layout for the available 32 video inputs.

vi. In addition to video images, the multi-viewers should facilitate displaying other informations like Timecode, Tally, Source names, logos, and alarms.

vii. They should also display the embedded audio signals as bar graphs either on the side of each channel or as overlay on respective Video sources.

viii. They should facilitate displaying the internally generated Analog & Digital Real time clocks along 32 Video PIPS.

ix. They should have the facility to customize the layouts created by the users to suit their specific requirements. The computer interfaces and softwares required for customizing the layouts should be user friendly and be part of the offer.

x. The bidder must quote for all options so that the completeness of the system can be ensured by suitably picking the required options.

xi. The offered systems should generate alarms like Video loss, Freeze Picture, Audio loss, silence, excessive audio. They should support multi color and blinking statuses based on severity, latching and status messages.

xii. The Multi-viewers should support tally for all inputs and for Program output through serial port with RS 422 option or GPI inputs. They should also accept inputs from Digital Production Switchers of various makes for tally display.

Multi-viewers: Key features

Sr. No.	Parameters/ Specifications		Parameters/Specifications Values
1)	Video Inputs	:	32 or more
2)	Input Connectors /cables	:	BNC or Mini DIN 1.0/2.3
3)	Serial Digital Interfaces	:	Auto detecting inputs
			12G/3G/HD-SDI
4)	Serial Digital Standards	:	SMPTE 2082, SMPTE 424M,292M
5)	Equalization	:	100 m or more for HD SDI 50m or more for 12G SDI
6)	Return Loss	:	>15db upto 1.5 Gbps
7)	Audio	:	Embedded Audio (SMPTE-272M-A)
8)	Input Impedance	:	75 ohms
9)	Control	:	Configurable through computer interface
10)	Alarms	:	No audio, audio high/low, no video, video black, video frozen.
11)	Black Burst	:	PAL 0.45 Vp-p, Tri: 0.6 Vp-p
12)	Number of Heads	:	4 (four simultaneous outputs giving four Independent layouts on same type of connectors)
13)	Output Connectors	:	4 x HDMI or 4x 3G SDI on BNC/mini DIN 1.0/2.3 along with standalone BNC/mini DIN 1.0/2.3 to HDMI Converter as suitable
14)	Analog Audio output	:	For Monitoring purpose
15)	Output Resolution	:	3G/1.5G (including 1920x1080p, 1920x1080i)
16)	On screen display	:	Borders, Labels, Fonts, Tally, Clock faces, Logos, UMD
17)	Control Interfaces for Tally	:	RS232 with RS422 or 485 option and GPI for tally and other controls
18)	Control Interface for System Configuration	:	RJ 45
19)	Power Consumption	:	≤600 W
20)	Weight	:	≤15 Kg

8.6 VIDEO MONITORING AND OTHER MONITORING EQUIPMENT:

The following provisions for Video Monitors and Waveform monitors/ Vectorscopes are required:

A. Video Monitors: For a Production wall/s consisting of twelve (12) UHD resolution (3840X2160) high end LCD Television Receivers cum Monitors, horizontally and vertically stacked. These monitors should have the following features:

i. High intensity and contrast, wide screen (49"/50" diagonal), wide viewing angle - both horizontally and vertically with no reduction in contrast, brightness and colour saturation, thin bezel.

ii. Input source connectors matching the multi-viewers.

iii. LED backlight technology resulting in lower power consumption and incorporating a slim lightweight design and faithful colour reproduction.

iv. Minimum response time and high refresh rate.

Video Monitors for other spaces: Provision for sixteen (16) 17" or more LCD video monitors including four being HDR compliant. Ten 4"X4" 12G-SDI quad input monitor stacks. Key features should include anti-glare/anti-reflection protection, high contrast ratio, high brightness, tally, tiltable mounting, third party tally and IMD support.

Twelve (12) 17" monitors for other functional areas of the Fly Pack OBs.

An additional two (02) high end HDR compliant 17" monitors for QC and the Producer.

B. Eleven (11) UHD, 12G/HD-SDI (1080p & 1080i) Digital Waveform Monitors/ Vectorscopes with cabinet and rack mounting kits. Ten (10) of these WFMs are required for Vision Engineering (08), Technical Director (01), Audio Engineer (01). The eleventh (11th) one should include the following for maintenance:

a. Eye/Jitter pattern display

b. Audio display capability

c. Data Analysis capability

d. High Dynamic Range (HDR)

C. One Audio Monitoring Station with an Audio Monitoring Unit (AMU) incorporating HD-SDI, AES/ EBU, analogue audio with audio bar graph and a pair of high end speakers should be part of the technical bid.

D. Multiple monitoring speakers with headsets for various bays within the Fly Pack OB project including but not limited to Production, VT, Technical Director, etc.

8.7 Glue/ Modular and other Video Equipment: Key features

a) SPGs and ACO: Four (04) sets of Dual SPG with an Auto Change-Over (ACO) unit. These SPGs should have HD Tri-level, Bi Polar Sync, Black Burst, VITC, NTP and LTC Time code Signal outputs. In addition, a built-in GPS receiver with GPS antenna and cable should be part of each SPG system.

b) Eight (08) 12G Digital Frame Synchronizers: UHD-SDI (12G), HD-SDI (upto 3G) Inputs/Outputs. These should also function as up/down/cross converters and have colour correction features. They should support HD/3G/12G/UHD up/down/cross conversion with clean cut features, RGB Legalizers with Black Level adjustment limits, Linear motion adaptive frame rate conversion for all supported standards, including UHD, HD 50/59.94/60p, along with video processing, picture enhancement, edge enhancement and noise reduction, upto16-channels of embedded audio processing and channel-based audio delay compensation, redundant power supply, Balanced AES and analog audio I/O.

c) Adequate Re-clocking Digital Distribution Amplifiers, Embedders and De-Embedders. Multiple outputs, based on approved workflow and provision for redundancies.

d) All Frame Synchronizers should have redundant power supplies.

8.8 Digital Sound Consoles and other Audio Equipment: Key features

The Fly Pack OB Kits should have a total of 04 Nos. of Digital Broadcast Sound Consoles designed for live productions: Venue, Remote and On-Air studio. Details of Sound Consoles for different configurations are spelt out hereunder:

A) 02 Nos. of 32 faders Digital Broadcast Sound Consoles: Key Features of Each Console

i. IP native SMPTE2110-30/31 with SMPTE2022-7 redundancy
ii. 32 faders with 12 layers operation
iii. Integrated or external Loudness metering (EBUR128 and ATC A85) for all channels.
iv. Touch TFT Screen for all channels
v. Minimum 8 groups of Automix
vi. Minimum of one free control knob per fader channel
vii. Local IOs - 16 Mic/line, 16 Line Out, 8 AES in/out, 1 MADI, 3 SMPTE2110-30/more than 30 pairs
viii. IP Native Core following standard SMPTE2110 (Home or equivalent)
ix. 192 Busses
x. 32 Auxes
xi. Stagebox IO Count in XLR:
32 Mic/Line, 16 Line Out

8 AES in/out
1 MADI
8 GPIO

Stageboxes Specifications for Inputs and Outputs

· Switchable MIC/LINE inputs on XLR, +48V phantom power. Support for balanced and unbalanced sources through floating analog stage design. Dynamic range of 119dB(A) with maximum input level of +24dBu

· Line outputs on XLR/D-sub. Floating balanced design supporting balanced and unbalanced destinations. Maximum output level +24dBu

· AES3 inputs (stereo) on XLR/D-Sub with SRC (input sample rates: 28.4~100kHz)
· AES3 outputs (stereo) on XLR/D-sub
· MADI ports (redundant pair) on SFP
· Media streaming & control ports (SFP/RJ45 100/1000Base-T Ethernet)
· Management & control port (RJ45 100/1000 Base-T Ethernet)
· Wordclock IN on BNC (75Ω)
· Wordclock Out on BNC (75Ω)
· Supported protocols required: SMTPE ST2110-30/31, AES67, RAVENNA
· Stream Redundancy SMPTE ST2022-7 class C (coping with up to 150ms redundant path differential)

· 128 audio RX channels with 128 RX stream receivers. Each RX audio channel should feature up to 160 ms of jitter buffer

· 128 audio TX channels in up to 128 TX streams. Stream formats from 1 to 64 channels should be supported

· Sample rates: 44.1, 48, 88.2, 96kHz
· IEEE1588 PTPv2 master or slave operation
· Wordclock master or slave operation

B) 02 Nos. of 16 faders Digital Broadcast Sound Consoles: Key Features of Each Console

IP native SMPTE2110-30/31 with SMPTE2022-7 redundancy

16 faders with a Central Module

DSP I/O Frame and should have the following i/os:

a) Core engine capable of at-least 1728x1728 matrix routing and 96 DSP channels
b) Inputs - 18 Mic/Line inputs, 4 AES in, 2 Ravenna Ports, 4 MADI and 8 GPI
c) Outputs - 10 Line Out, 4 AES out, 2 Headphones, 2 Ravenna Ports, 4 MADI and 8 GPO

Features should include but not be limited to the following:

a) Each fader module should have 6 Freely configurable buttons with 2 LCD displays
b) Central module should have at least 40 Freely configurable multi function buttons and 6 freely configurable knobs
c) Built in with 2 headphone out configurable as DJ and guest heaphone monitoring or PFL
d) Each individual module should be connected to the other on standard RJ45.
e) Status light for all buttons should be freely configurable and assigned with different color illuminations
f) Built in tone generator
g) The following signal processing modules should be assigned to every channel, if required: Parametric 3-band EQ, Dynamics with Gate, Expander & Compressor and Limiter and minimixers
h) Built in or external auto mic gain setting and automix
i) Built in 256 channels silence detection
j) One external screen panel of around 23" for metering and control.
k) Dual layer operation
l) VCA fader control

Input Channel Specifications:-

Mic / Line inputs
Frequency response : ± 0.03dB (20Hz...20kHz)
Dynamic range : 118dB(A)
THD&N : 0.0006%
Digital Inputs
Digital inputs should be able to receive AES/EBU and equipped with a sampling frequency converter
Sampling rate : 44.1kHz/48kHz
Input impedance : 110ohms
Sampling rate converter range : 4kHz...216kHz

Output Channel Specifications:-

Analog Outputs
Frequency response : ± 0.2dB (20Hz...20kHz)
Dynamic range : 118dB
THD&N : 0.0006%
Output Impedance : 50 ohms
Digital Outputs
Sampling rate : 48kHz
Output impedance : 110ohms

8.9 Digital Intercommunications Systems: Key Features

Four (04) Digital Intercommunication Systems are part of this Fly Pack OB project. Configurations / Sizes of the Intercommunication Systems are as under:

i. A minimum of 64 ports with a hot swappable redundant power supply unit – 02 systems.

ii. A minimum of 32 ports with a hot swappable redundant power supply unit – 02 systems.

The following are the key features of the Intercom Systems:

a) A total of thirty (30) Remote Control Panels (RCPs) with alphanumeric electronic displays for various keys for the entire project consisting of four systems. All panels should be with talkback headphones. Eight (08) gooseneck microphones should also be included.

b) Eight (08) wired beltpacks with light weight single muff headsets for Floor Managers. Four (04) additional wired beltpacks with IFBs for anchors/talents with single muff headsets.

c) Sixteen (16) base stations for permanent two-way communications stations should be integrated with the main digital matrix communication system. Forty eight (48) Walkies Talkies with headsets for hands free operation.

d) Four nos. of four-channel digital telephone hybrid systems shall be part of this project.

8.10 Other Audio Equipment: Key Features

a) Microphones:

- Wired Lapel (12 Nos)
- Wireless Lapel (06 Nos)
- Wired Handheld (08 Nos)
- Wireless Handheld (04 Nos)
- Stereo Shotgun Microphone with windshields, windjammers and pistol grips (24 Nos)
- Lip Microphones (08 Nos)

b) Digital Commentary Units (04 units): Dual Inputs

8.11 Other Miscellaneous Equipment: Key features

a) GPS Clocks with digital clocks display – Four nos.

b) Hand held & high precision Infrared Thermometer Guns for monitoring & measuring temperature of electrical contacts of various devices – Four units.

c) Tally Controller/ Distributor to distribute tally signal across the systems – Four units. Each unit should distribute UMD – Static and Dynamic, Tally to Multiviewer and Standalone UMD by interfacing to Mixers, Routers and other standard broadcast devices along with parallel circuits via inputs (GB) or outputs (GPO).

d) Stop Clock at the Production Bay – Four units.

8.12 Power Supply Systems: Key features

a) The main Power Distribution Panel should include switchgears like On load Change Over Switches, Bypass Switches, MCCBs, MCBs, Phase Sequence Switches, Digital Phase Sequence Meters, Digital Volt and Ampere Meters, Digital Frequency Meters, etc. Sub Distribution Panels should also be provisioned for, where necessary.

b) Automatic Changeovers for connecting external mains power and generator powered supply. UPSes should be bypassed in the eventuality of failure. Change Over and bypass switches should be MCCB type to ensure disruption free supply on change over at full capacity.

c) Details of UPS requirements and other associated power supply equipment are spelt out in Clause (06) of this document. The bidders are required to comply with the same. In the absence of it, the bid is liable to be rejected.

9) General Terms & Conditions: Key features

9.1 Completeness of the System:

(a) Features are macro level suggestive only.

(b) Completeness of the system is the responsibility of the bidder.

(c) The successful bidder will be solely responsible for commissioning of the system, in accordance with specifications in the approved bid.

(d) If, in the opinion of the successful bidder, the system requires altered / additional hardware & software for better functionality, it may quote for those items as Optional and provide justification for its utility. If accepted by Doordarshan, costs for the same shall be incorporated as additional costs.

9.2 Software:

a) All Software are required in original media and should be permanently licensed to Doordarshan.

A certificate to this effect is required to be submitted by the successful bidder.

b) The successful bidder will need to provide software upgrades free of charge during the warranty period. An undertaking to this effect, should be included with the bid.

10. Compliance:

(a) A point by point full compliance statement in respect of all parameters, from the principal manufacturers in the format given below, is to be part of the bid. Mere signature on the copy of DD specifications shall not be accepted as a compliance statement.

The above information should be supported by technical literature / data sheets enclosed with the bid. Reference to the page number should be mentioned in the relevant column. Bids without compliance statement or with incomplete compliance statement are liable to be rejected at the sole responsibility of the bidder/s. Any deviation from specifications detailed in the compliance statement is to be highlighted separately.

Sr. No of DD specs.	DD specs.	Compliance (Yes/No)	Performance Fig. of equipment Offered.	Reference to the Page Number of enclosed literature	Deviations, in case of non-compliance	Optional items, if any, required to make the system Compliant to DD specs.	Features in the offered Product which exceed DD specs.	Remarks, if any
1.	2.	3.	4.	5.	6.	7.	8.	9.

(b) A separate point by point compliance statement duly signed by the bidder/s in respect of all points laid down in the specifications for all equipment should be submitted as part of the bid in the above mentioned proforma.

If any bidder does not have the requisite experience and has entered into an MOU with a partner, a point by point compliance statement should be duly signed by the bidder as well as its partner.

(c) In addition to the above, authorization from manufacturers of the equipment listed below should necessarily be submitted along with the bid:

i. Camera Chains
ii. Lenses
iii. Camera Support Systems

iv. Wireless Camera Systems
v. Graphics Systems
vi. Vision Mixers
vii. Routing Switchers and Multiviewers
viii. Waveform Monitors / Vectorscopes
ix. Sync Pulse Generators
x. Glue/ Modular
xi. Digital Broadcast Sound Consoles
xii. Intercom systems

11)Technical Literature:

One set of electronic technical and operations manual for all equipment is to be provided on a non-returnable basis along with the bid to facilitate evaluation. In the absence such literature the bid is liable to be ignored. The successful bidder will have to supply an additional set of electronic technical, operational and maintenance manuals with respect to all equipment with the final delivery of the vans to Doordarshan.

12) Training:

The proposed full-blown Fly-pack OB Kit/s shall be inducted for the first time in the DD-network. Thus, it is considered prudent to have extensive training on every aspect of the operation of such Fly Pack OB Kit/s including quick loading/ unloading, rig/ de-rig, quick deployment and integration at OB Site/s, production and engineering techniques, as per internationally practiced norms.

As part of this process, hands-on training of consignee's technical and programme teams including camerapersons is considered essential. The successful bidder's core operational and engineering team shall need to be associated with Doordarshan's OB team/s at the Site/s of the OB coverage/s. Such coordination/ training, shall be for a period of at least six months from the date of commissioning. If required, this can be extended for another three months, without any additional cost to Doordarshan.

All this will at one level ensure safeguarding any potential failure of OB Kit. At the same time, it will enable smooth skill-sets transfer to DD teams. Such a provision will also make the successful bidder take ownership and belongingness with the Fly-pack OB Kit during the initial critical period.

The bidder/s will need to factor in their bids, the costs of their engineering human resources who shall be dedicated to and deployed with Doordarshan's

teams during this period. The number of senior broadcast engineers who shall be product specialists with the required knowledge, skillsets and operational experience of working on similar technology and kits in all genres, shall be at least four. In addition, two engineering assistants, one rig supervisor and two riggers with similar experience shall have to be part of this dedicated team.

13)Warranty:

a) The complete system including equipment & technical infrastructure including flight cases, racks, etc. should have a warranty period of three years from the date of commissioning. Failure, if any, during this period, will need be rectified free of cost to Doordarshan. In case it is not rectified within one week, or a time period approved by Doordarshan on the basis of a request from the successful bidder, replacement of the same shall be arranged by the bidder. Bidder/s will be required to give undertakings to this effect along with the bid.

b) Service level agreements (SLAs) for an additional five (05) years for immediate repairs/maintenance of the equipment after the completion of the three year warranty period should also be available, should Prasar Bharati request for the same. The maximum charges for such SLAs shall not exceed 5% on an annualized basis, of the value as mentioned in the bid. Such payment shall be made by Prasar Bharati to the bidder on a quarterly basis, in arrears. Bidder/s will be required to give undertakings to this effect along with the bid. For the avoidance of all doubts, the SLA period shall be from the beginning of year four to the end of year eight, after the initial successful commissioning of the project. Prasar Bharati shall also not be liable to pay any customs duty or levies on any imported spares, except for applicable local taxes like GST. All payments by DD shall be in Indian Rupees.

Bidders are required to submit details of arrangements for the execution of such service level agreements by undertaking to stock and store critical and other spares and provide the same in any location in India where the equipment may be at the time of breakdown. The undertaking for the SLA is attached in Appendix (IV) and will need to be signed by the bidder and submitted as part of the bid.

14)Delivery Period:

All bidders will need to submit an undertaking with the bid confirming that in the eventuality of their success in the bid, they will deliver the Fly Pack OB Project, in accordance with the bid specifications, within four (04) months from the date of supply order.
Delivery period does not include training as mentioned in this tender document.

15)Inspection:

The project, based on the approved specifications, shall be subjected to inspection, from time-to-time by Doordarshan officials, during the build period.

16)Enclosures:

The bidder/s must necessarily submit the enclosures, as specified in this document, alongwith the technical bid.

The bid is liable to be rejected in the absence of the above enclosures at the sole responsibility of the bidder.

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Appendix-I

GENERAL TECHNICAL SPECIFICATIONS APPLICABLE TO ALL EQUIPMENT

1.	**Systems/ Formats**	:	**UHDTV:** 3840x2160/50 conforming to SMPTE 2082-10 and ITU-R BT. 2020 (amended upto date) (UHD-SDI: 11.88 Gb/s) **HDTV:** 1920x1080/50/I/P conforming to SMPTE 292M, SMPTE 424M and ITU-R BT. 709 (CIF)(amended upto date) (HD-SDI: 3 Gbps & 1.485 Gb/s) The video in all systems has to be with embedded audio.
2.	**Digital Processing**	:	**UHDTV**: 4:2:2, Y: 148.5 MHz, Pr: 74.25 MHz, Pb: 74.25 MHz Sampling rate, 10 bit quantization. **HDTV**: 4:2:2, Y: 74.25 MHz, Pr: 37.125 MHz, Pb: 37.125 MHz Sampling rate, 10 bit quantization.
3.	**Power Supply**	:	230 Volts ±10 %, 50 Hz
4.	**Operating Temperature**	:	5 - 50 degrees, Celsius
5.	**Relative Humidity**	:	30% - 85%
6.	**Mounting/Dimensions**	:	Standard 19" Rack mount in case of Stand alone Units. Alternatively 19" Rack mounting kits should be provided.
7.	**Connectors**		
a)	Video	:	75 Ω BNC
b)	Audio	:	3 Pin XLR
c)	Control	:	BNC/Mini XLR/RS-422/GPI/Ethernet as applicable
8.	**Video Signals**		
a)	Digital Video	:	0.8 V p-p ± 10%, across 75 ohms.
b)	Reference signal	:	Tri-level sync and PAL black burst
9.	**Audio**		
		:	(a) Embedded audio unless specified otherwise.
		:	(b) AES/ EBU
10.	**Time code**	:	VITC on black and LTC

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Appendix-II

Suggestive Bill of Material for Modular Fly Pack OB Kit/s

Sr. No.	Description	Qty.	Remarks
(A)	**Video Equipment consisting of:**		
(I)	**Camera Chains:**		
1.	Digital UHD Camera Chains including Base Stations, Camera Control Units with individual RCPs, Tripod Adaptors, 7" Colour LCD Viewfinders equipped with LED backlit LCD panels having resolution 1920(H) x 1080(V) pixels or better. LEMO/ LEMO Type Connectors for HOFC cables with the following major specifications: Camera Head Specifications: Three 2/3" CMOS Sensors Aspect Ratio: 16:9; 3840 x 2160 Native UHD resolution: UHD Sensors; Supporting UHDTV standard; High Dynamic Range (HDR): HLG and/or SLog-3 & Wide Colour Gamut/Space (WCG), IP Direct mode support; F10 at 2000 lux (3200K, 89.9% reflectance), 60dB S/N Ratio or better; 2000 Horizontal TV lines or better; Gain: -6 dB to + 12 dB. Softwares for controlling camera systems from a PC or a tab. Motorized ND filter wheels and Optical/Electronic Colour Correction (ECC) filters. Both filters should be remotely controllable from the RCP. Bayonet lens mount. All cameras should be provided with Hard Carrying Cases and Rain covers. 19" Rack Mountable Full Rack Base Stations with LEMO / LEMO type Connectors for HOFC cables.	34	
2.	2" or more eye piece viewfinders for cameras in A. (I). 1	8	
3.	Dual muff camera talkback headsets	34	

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4.	Single man camera talkback headsets	8	
5.	Broadcast Quality EFP UHD Digital Zoom Lenses: 23X or higher magnification (minimum focal length 7.6 to 7.8 mm) with built in 2X Zoom Extenders, Servo Focus and Servo Zoom with hard carrying cases	12	
6.	13-14X Wide Angle Lenses (minimum focal length from 4.3 to 4.5 mm) with 2X built in extenders; Servo Focus and Servo Zoom with quick zoom facility with hard carrying cases.	8	
7.	Broadcast Quality UHD Digital Zoom Lenses: 45 X or higher magnification (minimum focal length from 9.5 to 9.7 mm) with built in 2X Extenders, Servo Focus, Servo Zoom, with quick zoom facility, built in Optical Image Stabilizers. Large Lens supporters with hard carrying cases.	4	
8.	Broadcast Quality UHD Digital Zoom Lenses 107 X or higher magnification (minimum focal length from 8.3 to 8.4 mm) with built in 2X Extenders, Servo Focus and Servo Zoom with quick zoom facility, built in Optical Image Stabilizer. Large Lens supporters with hard carrying cases.	8	
9.	122X or higher magnification (minimum focal length varying from 8 to 8.2 mm) with 2X built in extender; Servo Focus and Servo Zoom with quick zoom facility, built-in optical image stabilizer. Large lens supporters with hard carrying case.	4	
10.	Twenty-two (22) Camera Supports, of the same brand and model with minimum payload capacity of 30 Kg at 150mm centre of gravity at full Tilt Range and counterbalance. The tripods should be two stage aluminum with OB dollies.	22	

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11.	Twelve (12) Camera Support systems consisting of fluid heads with flat base having minimum payload capacity of 60 Kg at 200 mm centre of gravity over full Tilt Range with perfect counterbalance are required. Tripod Heads should have continuously variable perfect counterbalance and drag system. The legs should be two stage and with OB Dolly.	12	
12.	Wireless Camera system including permanent UHD license, camera mounted transmitter consisting of 3G and 12G inputs SFP, 4X Tx and Rx antennae, 4 way diversity upgradable to 16 way diversity; Receiver, 3G and 12G outputs SFP, 4X2GHz down convertors, connecting cables, SMPTE Fiber Base Station, SMPTE Fiber Remote Unit, Camera Control. Each system must be UHD COFDM based with a backup cellular adapter attached to the transmitter. The bonded cellular system should be capable of bonding at least four SIM cards.	4 System	
(II)	SSD recorders to facilitate 4K recording. (Necessary adapters for fast file FTP transfer while recording to an NLE/Server if required).	4	
(III)	2 TB SSD supporting 4K recording and playback.	16	
(IV)	NLE System based on a software similar to Adobe Premier.	2 Systems	
(V)	**Graphics Systems**		
1.	Should incorporate HD-SDI/UHD-SDI I/O and Support for Indian Regional Languages.	4 Systems	
2.	Indian regional language fonts as specified vide Specification's clause no. 8.3(ii)		
(VI)	**Vision Mixers and Routers**		

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1.	3 M/E Vision Mixers 80 Inputs and 40 Outputs As per clause 8.4 (d)	02 units	
2.	2 M/E Vision Mixers 32 Inputs and 16 Outputs As per clause 8.4 (e)	02 units	
3.	Digital Routers: (i) Min Size of 128X128 (As Per clause 8.5) (ii) Min Size of 64X64 (As Per clause 8.5)	02 units 02 units	
4.	Multi-viewers (32 inputs) (as per clause (8.5e))	08 Units	
VII	**Video Monitors**		
1.	UHD LED Televisions of a size of 49"/50"	12	
2.	17" LCD video monitors with 12G-SDI video inputs simultaneously having 3840 x 2160 or better resolution. Four of these should be HDR compliant. (as per clause 8.6 A)	30	
3.	4"X4" 12G Monitor Stacks	10	
IX	**Test and Measurement**		
1	UHD/HD/SD Digital Waveform Monitors/ Vectorscopes along with cabinets and rack mounting kits	10	
1.	UHD/HD/SD Digital Waveform Monitor/ Vectorscope with cabinet, rack mounting kit and the following display features: i. Eye/Jitter pattern display ii. Audio display capability iii. Data Analysis capability iv. High Dynamic Range(HDR)	1	
X	**Sync Pulse Generators with ACO**		

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	Dual SPG with Auto Change-over facility working as Master/Slave SPG. It should have HD Tri-level, Bi Polar Sync, Analog Black Burst, DARS, Word Clock, VITC, LTC Time code outputs, NTP, built-in GPS receiver and antenna & cable	04 Sets	
XI	**Glue / Modular**		
1.	HDR Compliant Digital Frame Synchronizers with UHD-SDI, HD-SDI & I/Os and Up/Down & Cross conversion facilities with redundant power supplies.	08	
2.	HDR Compliant Digital Glue, Based on Final Approved Design, including Embedders and De-Embedders, Re-clocking Digital Distribution Amplifiers, etc. All frames to be equipped with redundant power supplies.	1 lot	
(B)	**Audio Equipment consisting of:**		
1.	**Digital Broadcast Sound Console**: (i) 32 faders console (as per Clause 8.8 (A)) (ii) 16 faders console (as per Clause 8.8 (B))	02 Units 02 Units	
2.	**Audio Monitoring Station:** Audio Monitoring Unit having HD SDI, AES/ EBU and analogue audio with audio bar graph and speakers.	4	
3.	**Speakers:** Powered Speakers with AES/EBU and analog audio inputs	1 lot	
4.	**ADAs:** Audio Distribution Amplifiers with individual Level control on each output	1 lot	
(C)	**Intercom / Communications Systems**		
1.	(i) 32 Ports Digital Matrix Intercom Systems with belt packs and IFBs, RCPs as specified earlier in the document at clause 8.9 (ii) 64 ports at clause 8.9	02 System 02 System	
2.	Base stations for permanent two way communications integrated with main matrix communications.	16	

3.	Handsfree walkie talkies	48	
4.	4 Channel Digital Telephone Hybrid System	4	
5.	Dual channels digital commentary unit	4	
6.	Anchor earpieces, headphones and other audio accessories	1 lot	
(D)	**Microphones**		
1.	Stereo Shotgun Microphones with narrow acceptance angle for long distance sound pick up; switchable low frequency roll off. Microphones, operable on battery and phantom power	24	
2.	Wired Lapel Microphones	12	
3.	Wireless Lapel	06	
4.	Wired Handheld	08	
5.	Wireless Handheld	04	
6.	Lip Microphones	08	
(E)	**Miscellaneous**		
1.	GPS Clocks with digital clocks display.	4 sets	
2.	Hand held Mini Infrared Thermometer Gun.	4	
3.	Tally Controllers for Tally as well as IMD.	4	
4.	Stop clock for Production Bay.	4	
(F)	**Power**		
1.	20 KVA or higher load capacity UPS. (as per clause 6)	3	
2.	40 KVA or higher load on-line UPS (as per clause 6)	1	
3.	3 phase Power Distribution Panel.	1	
4.	Mains/DG Distribution Panel.	4	
5.	Auto Changeover Switches, MCCBs, MCBs, Phase Reversal Switch, Digital meters for Phase Sequence, Frequency, Voltage, Ampere, Terminal Blocks.	1 lot	
6.	Inverter type multiple Air Conditioning units for cooling levels and distribution.	1 lot	
(G)	Installation material including cables, racks.	1 lot	
(H)	**Hybrid Optical Fibre, Video, Audio, Data, Power and Other Cables including:**		

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1.	Optical Fiber Cables: 10 mtrs, terminated at both ends with LEMO / LEMO type connectors.	70	
2.	Optical Fiber Cable: 50 mtrs, terminated at both ends.	12	
3.	Optical Fiber Cables: 100 mtrs, terminated at both ends.	12	
4.	Optical Fiber Cables: 200 mtrs, terminated at both ends.	12	
5.	Optical Fiber Cables: 250 mtrs, terminated at both ends.	12	
6.	Optical Fiber Cables: 300 mtrs, terminated at both ends.	12	
7.	HOFC connector cleaning kits.	5	
8.	Flexible low loss microphone cables (four core rolls of 300 meters each), terminated at both ends.	8	
9.	Flexible low loss microphone cables (four core rolls of 200 meters each), terminated at both ends.	8	
10.	Video, audio, data, power cables of varying sizes: 10, 15, 20, 25, 50, 100 mtrs, terminated at both ends.	1 lot	
11.	Cable Rollers.	34	
(J)	**Technical Infrastructural Requirements for Fly-Pack OB Kit**		
1.	As per Clause (4) and (5) of the Technical Specification document.	1 Lot	
(K)	**Other Equipment**		
1.	Digital Thermometers & Humidity meters	4 Nos.	
2.	Modular, Sturdy and Ergonomically designed technical and other furniture.	1 lot	
3.	Tool kits consisting of essential Mechanical and Electrical tools for Cable Crimping, etc., Soldering, Digital Multi meter, Clip-on Meters, etc.	5 sets	
(M)	**Any Other Equipment/ Item for Completion of the Project**		
	All other equipment/installation material/works essential for completion of the project on SITC basis to ensure full functionality of the Fly Pack OB Kit/s (As per Clause 9.1).	1 lot	
(N)	**Training:**		

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1.	As per Clause 12	1 schedule	
(O)	**Software and Documentation:**		
1.	Software for all equipment to be supplied in original media, licensed to Doordarshan with perpetual validity.	1 lot	
2.	Operation & Maintenance Manuals of all equipment	1 set	

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Appendix-III

CONSIGNEE DETAILS

Sl. No.	Zone	Location of Doordarshan Centre	Qty.
1.	**North Zone**	DDK Delhi	01