

**REQUEST FOR COMMENTS OF STAKEHOLDERS/OEM/FIRMS
ON QRS (QUALITY REQUIREMENT) & TDS (TRIAL DIRECTIVES)
OF VIRTUAL CLASS ROOM**

1. The proposed QRs/TDs of VIRTUAL CLASS ROOM is attached as **Appendix 'A & B'**. The OEMs/Vendors are requested to forward information of the product which they can offer and also forward correct specifications of their system against each parameter. Complied or not complied remarks will not be accepted.

2. The required information/details may please be forwarded at the following addresses by **12th Jan 2019**.

Directorate General CRPF

East Block-7, Sec-1, R.K. Puram, New Delhi-110066

Email: comncell@crpf.gov.in

3. An early response is requested.

Qualitative Requirements of Virtual Classroom

Virtual Class room should have the below mentioned features and functionalities:

1. Ultra-Immersive Video Collaborative Learning and Training Telepresence Suite with 3 video streams having 48 seating capacity along with in built capability for connecting multiple such rooms having 3 video streams each.

Virtual Classroom

Specification for Ultra-Immersive Learning and Training Virtual Classroom with 3 video streams having 48 seater Training/Learning Room/Seminar Hall

Construction of State of the Art Ultra Immersive Virtual Classroom with 3 video streams having seating capacity of 48 participants which will be all inclusive package of integrated solution including the trainer's lectern/head table with complete in built rack storage, tables for the trainees/attendees with complete concealed cabling & Interiors that are natively embedded with complete hardware, software, Lighting, Electrical, Audio Visual, Conferencing & control systems, uninterrupted power supply (UPS) (separate UPS for class room Optional item to be in AVSI scope) and Air conditioning (Optional item to be considered in AVSI scope). The Virtual Classroom would be upgradable in future if bought with 3 Video Streams to 5 Video Streams and subsequently to 7 Video Streams with additional hardware and software without making any substantial changes in the infrastructure/layout of the room.

The Virtual Classroom would be capable of conducting local Trainings, conferences and seminars with head table of 4 and total attendee seating capacity of 48; Ultra Immersive Experience of Virtual Classroom for connecting multiple video streams and any combination of above simultaneously.

1. Scope of Work

S. No	Detailed Description	Technical Requirement (Virtual Classroom Set Up)
1	Intended Location:	Seating capacity for Ultra Immersive Experience of Virtual Classroom, conferences, seminars; Ultra Immersive Video Collaborative Training and Learning for 48 participants.
2	Room Design & Furniture Real Estate Setup	<ul style="list-style-type: none"> • The training room should be designed in a manner that the trainer is centrally positioned to all the trainees/attendees present locally in the suite and everybody sits directly facing the trainer. • The trainer should be able to see all the trainees (48) present locally all the time. • The trainer lectern should be placed in a manner that it is not acting as an obstruction for the trainees available locally and they are able to see trainer always in the most effective manner from anywhere in the room. • The lectern should be designed in a manner that it is providing an effective front drop to give the appearance of the distant trainer as if he/she is present locally behind the lectern. • The lectern should have in-built equipment rack with silent fans for cooling mechanism. • The lectern setup should be designed in a manner that it provides space for not just one single trainer but to at least 3 additional trainers/hosts for panel training to take place. • The lectern should not block any passage for people to move easily around it. • The trainee tables should be designed in a manner so that all the trainees seated should always be visible to the trainer from the lectern. • The trainee table should have a design in which a 15 to 15.6” non-motorized, inclination angle adjustable content monitors are installed so that they should

		<p>become totally unobtrusive and do not block any view or eye contact between the trainer and the trainees available locally across the room.</p> <ul style="list-style-type: none"> • The same special design on the table should also house the gooseneck microphones along with the speakers, the way on table content monitors are installed. • The trainee table should house all the above mentioned items however still no obstruction between the trainer and the trainees. • The trainees table should be designed in a manner so that no liquid spillage should damage any equipment in the setup. • The lectern should be provided with 4 nos. high chairs and the trainees should be provided with mid back height mesh chair with built-in synchro tilt mechanism, sturdy castors and 2D adjustable arms. • The trainees table should have complete front and back modesty panels so that all the required components can be kept securely inside the table with lockable shutter. (if required) • The design of the table(s) in Training Room should be such that no wires or cables are visible neither on the table nor at the legs of the tables. • The tables should be designed in such a way that, it is ready for both computers based as well as soft skills based training session. • Bidder to provide complete Virtual Classroom interiors design including design of the tables, walls as well as the ceiling design. • The Virtual Classroom design should be such that it is optimized for local trainings, Distance Ultra Immersive Video training and Distance Ultra Immersive Video learning without compromising the quality of training and interaction in any ways. • Erection and fabrication of the rooms - Only
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		<p>bare shell space would be provided with raw power. Bidder to erect entire partitions, interiors including joinery, all furniture, carpeting, false ceilings,</p> <ul style="list-style-type: none">• raised/stepped flooring etc.• 0.9 NRC sound absorption panels covered with fire retardant fabric to be provided.• The carpet used should be of high quality Nylon and the Virtual Classroom walls should be tastefully veneered up to the dado level and should be constructed out of 'A' grade commercial MDF and PVC veneers.• The provided HVAC in which noise should not exceed 41db(A).• The True sine wave UPS with minimum power backup of 15 minutes.
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3	<p><u>Local Training/Local seminar/Local conference Room Experience</u></p>	<ul style="list-style-type: none"> • The trainer should be able to select the local training mode with all the local training required back-end equipment switched on at a press of a button. • The trainer should be able to share content over laptop, and document during local meeting/local training and all this should be done with just one press of a button on the lectern. • The shared content over any source/medium should be visible on the front smart interactive 86” touch displays and also visible on the table content monitors provided to the trainees on their table and also on the table content monitor on the lectern for the trainer. • The trainer should be able to annotate/highlight on the content monitor provided to him on his lectern. • The annotated/highlighted screen work out should be visible to all the trainees on their table content monitors and are also visible on the front interactive displays. • The on table content monitors should have at least 6-8 different colour palate for annotating, highlighting and white boarding/black boarding capability. • The annotation/highlighting on the content monitor should not be asking the user to upload software or to connect a laptop with USB connections neither any special pen/stylus should be required and just by using finger all capabilities should be achieved. • The trainees also should be empowered to annotate and highlight on the content monitor, which is provided to him/her on the table, in order to ask any question and to clear any doubt. • The trainer should be able to open a whiteboard/blackboard on the content monitor. • The shared work on the table whiteboard of the trainer should be visible to all the trainees’ table content monitors as well as the
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		<p>front interactive displays.</p> <ul style="list-style-type: none"> • The content monitors should be adjustable to go back by 150 degrees so that they don't act as an obstruction on the table/on the trainer lectern. • The trainees should be able to write on the same white board which the trainer wrote on/used without physically going to the whiteboard. • The annotated/highlighted content on the whiteboard should get saved with a simple touch on the content monitor. • The annotation, highlighting and the whiteboarding screen should be mailed or can be printed by the trainer. • The whiteboard on the table should be extendable to multiple screens so that the user can work on them and with one touch, all the different whiteboard screen extensions shrink to become one whiteboard. • The trainer apart from annotation on the content monitor should also be able to annotate/highlight on the front interactive displays all by double tapping on the screens without using any pen, just by using the fingers
4	<p>Audio Experience During Local Training / Seminars / Conferences & During Video Collaborative Sessions</p>	<ul style="list-style-type: none"> • The room should have front of the house speakers for the spatial presentation audio which will be audible across all the corners of the room. • The trainees should be provided with most effective on table local speech reinforcement solution so that everyone is able to hear each other very clearly during the local training. • For local speech reinforcement, the trainees should be provided with on table gooseneck microphones along with the speakers for the same. • The audio of the trainer should be uniformly spatial for the same location across all the trainees. • All the trainees should be heard crystal clear by the local trainees irrespective of place they are sitting in the room.

		<ul style="list-style-type: none"> • During Video training the trainer voice should be easily send across the other sites without shouting. • The near site trainees and far site trainees during this session should feel as if they are in the same room. • The far site audio of the video participants should come from the front speakers in a manner as they are present there.
5	<p><u>Experience in a 1+1 location Video collaborative teaching and learning</u></p>	<ul style="list-style-type: none"> • The trainer, at the near location, should be able to see all the trainees, of the other location all the time in such a manner that every single person can be recognized and everybody's name tag is visible and they can be addressed by their names along with seeing the trainee asking a question in life like mode in the completely automated manner. • The trainees in the near location as well as the far location should also be able to see each other at all the times along with seeing the trainer/trainee asking a question in a life like manner. • The trainer should be able to share the content from laptop, and document to the far site at a press of a button. • The shared content should be visible to the far site and local trainees on their front 86" interactive displays and also should be visible on their table content monitors. • The trainees present locally or in far sites should be able to annotate/highlight on the shared content from the teacher and the same should be visible to every location that are connected in the call. • The trainer/trainees should be able to annotate/highlight/whiteboard/mail/print and save the working in video session at a touch of a button. • The far site trainees should also be able to annotate/highlight once the near site trainee have shared the content. The same annotated/highlighted content should further be annotated/highlighted by the near site

		<p>either trainees/Trainer or the same can be mailed printed or can even be saved by the site which is active.</p> <ul style="list-style-type: none">• When connected to 1 other location, the trainer at the near site should be able to see the trainees at the other location at all the times.• In the location, whosoever speaks and press the on table button that can be either on content monitor or microphone button, will be seen life like to the far location trainees and the trainer.• After asking question, once the button is pressed off the default view of that location should be visible to the near site trainees however for the far site trainees, the trainer will again come back in the life like mode as the trainer starts speaking.• Trainer should be visible to all the participants all the time completely where ever he moves across the class room both to the near/far site trainees.• The camera focussing the trainer should track the trainer when he moves from lectern to the left or right side.• Trainees at locations should also be able to simultaneously see each and every other trainee at the other location at all the times on separate dedicated LCD/LED monitors in front, in the most efficient format• The Trainer should also be able to see each and every Trainee of the other location at all times on separate dedicated LCD/LED monitors in the most efficient format.• Simultaneously with the above, if some trainees ask questions/speak, they should automatically take the centre stage and appear in a real life like size at the press of a microphone button without having to manually pan, tilt or zoom the camera for the trainer. After they have finished asking the question, the trainer should reappear on the centre stage.• The trainer should be able to explain from
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		<p>complete landscape or portrait documents, catalogues & models with complete clarity at just press of a button without arranging for any other device. The zooming facility should be provided at mere press of a button with amazing ease of use.</p>
6	<u>Display units- 9 No.s</u>	<ul style="list-style-type: none"> • 2 Nos. of 86”4k ultra HD Professional LCD/LED interactive & anti-glare displays in front along with 1 Nos. 84” Ultra HD Professional LCD/LED display in front. Two 86” displays will be used to see the content shared / received from any site & one 84” display will be used for showing trainer near to life like mode during distance learning mode while standing. • 3 Nos. of 55” or bigger full HD professional LCD/LED Displays in front. • 2nos. 65” full HD professional LCD/LED displays along with 1 no. 55” full HD professional LCD/LED display in the back. • All displays to be flushed with the wall partitions
7	<u>Recording & Viewing of Training</u>	<ul style="list-style-type: none"> • One touch local / Ultra Immersive Video training / Ultra Immersive Video meeting recording system. • All the trainings and meetings (Local training/distance learning/distance teaching) conducted in the Virtual Classroom should be able to be recorded automatically at the press of a button by the trainer with good audio and video quality without any IT or Admin Assistance • Once the trainer starts/pauses or stops the training, he/she should hear the automated voice message loud and clear. • The trainer should also be able to pause & stop the training all by himself. During recording, the recording should not only be of the video of the trainer but also synchronous recording of the content (Laptop and documents) being explained by the trainer. During recording if a trainee asks a question from the local or distant location to the

		<p>trainer, audio and video of that trainee should also be recorded automatically. Even if the question has been asked feebly the same should also be recorded.</p> <ul style="list-style-type: none"> • If trainer is not showing the content, then the recording should be done for complete trainer or trainees asking the question and when the content is shared, then both the trainer and content should be recorded. • During distance learning, the system should be capable of recording the complete session even when the lecture is delivered from legacy video conferencing system. • At the touch of "Record My Training" button on the touch panel, the training session along with Trainer's desktop, videos and documents are recorded in a synchronized manner.
8	<u>Connecting Participants</u>	<p>Add or disconnect locations on demand- During a running call, the calling location should be able to add end users themselves on demand, more number of participating locations over Virtual Classroom or legacy VC or only audio endpoints or similarly drop the chosen participant locations on demand from the lectern touch panel itself.</p> <ul style="list-style-type: none"> • User selectable bandwidth and call type- Trainer from any of the locations should also be able to select the bandwidth to get the desired video quality from the lectern touch panel itself.
9	<u>Lighting</u>	<ul style="list-style-type: none"> • The lighting in the Virtual Classroom should be such that it is optimized for local training as well as for Ultra Immersive Video training. • In distance training and learning, lighting should be such that both the trainer as well as trainees faces appear well lit without any excessive glare and without any under eye shadows (crystal clear). The lighting intensity on the faces should be approx. 20 foot candles and above & at an angle of 45 degrees.

		<ul style="list-style-type: none"> The arrival of a distance learning video call should switch on all the desired lighting for the same automatically when all the lights were off.
10	<u>Connection Points</u>	<ul style="list-style-type: none"> The trainer should have access to power plug, LAN, audio cable and should be able to show his/her presentations or documents at a press of a button.
11	<u>Interoperability with ITBP's Ultra Immersive 3 video stream enabled Boardroom</u>	<ul style="list-style-type: none"> The proposed Virtual Classroom should be able to connect to ITBP's Multipurpose Conference Room at HQ in New Delhi, which will also have 3 Video Streams based calling enabled set up
12	<u>Other Requirements</u>	<ul style="list-style-type: none"> There should be a universal power outlet and Network connectivity for every trainee on the table.
13	<u>Automatic start & shut down system with manual override</u>	<ul style="list-style-type: none"> Remote-less, one single touch button System switch off and on: The entire system is automated, and with just one press of a button, entire system takes a power on and off. No remote is required to switch on/off the displays & other back end equipment. All functionalities of the Virtual Classroom should be easily controllable using a touch panel of size not more than 8" – 10" on the Trainer Lectern The entire system should get a power off and on with pre specified timing with manual override.

Qualitative Requirements

S.N	Specifications
1	<p><u>86" LCD/LED touch/interactive anti-glare Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 3840x2160 4K Ultra HD • Contrast Ratio: 4000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS 232 connectivity • Brightness: 350 cd/m² or higher • Tempered glass with Anti-glare coating
2	<p><u>84" LCD/LED Ultra HD Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 3840x2160 4K Ultra HD • Contrast Ratio: 4000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS232 connectivity • Brightness: 350 cd/m² or higher
3	<p><u>65" LCD/LED Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 1920x1080 (full HD) or higher • Contrast Ratio: 3000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS232 connectivity
4	<p><u>55" LCD/LED Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 1920x1080 (full HD) or higher • Contrast Ratio: 3000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS232 connectivity
5	<p><u>15.6" LCD/LED non-motorized touch enabled monitor with annotation</u> capability, highlighting, white boarding, on the fly printing, saving emailing capability. 150 degree of inclination angle so as they do not obstruct the trainee/trainer interaction. Resolution: 1920x1080 (full HD) VGA/HDMI input connectivity USB Port 2.0 RS-485 & RS232 connectivity</p> <ul style="list-style-type: none"> • Silver colour finish to gel with room interiors

S.N	Specifications
6	<p><u>High definition spatial audio system</u> for ultra-immersive video collaborative learning/collaborations. Audio Solution integrated with: a) 3 Nos. or more triple Element ultra-high sensitivity ceiling microphones with cables b) 28 or more Channel high definition digital signal processor based digital acoustic echo canceller along with PSTN calling interface.</p>
7	<p><u>Required Sound System</u> including FOH/in-Ceiling speakers & multi-channel power amplifier</p>
8	<p><u>Local as well as in video speech reinforcement Solution for the Trainees</u> including 500mm gooseneck microphone one for every two trainees along with required speakers & back controller/processor. The microphone switch on & off button should also recall the trainee camera pre-set views. The system should natively embed in to the trainee tables.</p>
9	<p><u>Local as well as in video speech</u> reinforcement Solution for the Trainer Wireless Lapel/Head worn Microphone system with dual diversity UHF receivers</p>
10	<p><u>Video Conferencing Codecs</u> (without camera & microphone)</p> <ul style="list-style-type: none"> - Support H.264, H.264 High Profile, H.264 SVC, 2 channels of 1080p 60 fps video + content together - Support full HD (1920 x 1080) 60 fps video resolutions - 2 x HDMI/DVI video/audio output for monitors - 1 x HDMI video input for PTZ camera along with RS-232 for PTZ control - 1 x DVI-I for content input with 1080p 60 fps resolution support - Support: G.711, G.728, G.729A, G.722, G.722.1 Annex C, AAC-LD/LC, G.719 Audio standards - H.323 & SIP support with minimum 4 mbps bandwidth firewall traversal with auto NAT discovery HTTP & STUN, H.460.18 & 19 support - H.235v3/Annex D / AES 256 security standards support - Dual H.239 (H.323) BFCP SIP support - USB for firmware support - 2 x 10/100/100 Base-T full duplex network interface support - IPv4 & IPv6, auto gatekeeper & QoS support - 1 x 3.5 MM line & line out jack for auxiliary audio <p>API & Web management support</p>

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11	<p><u>Trainer/Teacher auto tracking</u> full HD dual inverted type video camera system</p> <ul style="list-style-type: none"> - Full HD 1080p60 fps video capture - PTZ Camera with 72 degree horizontal field of view - 12x Optical zoom - Pan range (100° /-100°) - Tilt range (+20, -30°) - Auto focus <p>Individual Ethernet control for both cameras for third party controllers along with IR remote controls</p>
12	<p><u>Trainee PTZ Cameras:</u></p> <ul style="list-style-type: none"> - Full HD 1080P 60fps Inverted type PTZ Video Camera - 12x Optical zoom & 72 degree horizontal wide angle field of view. - Support both HDMI & USB parallel outputs. <p>Ethernet control for third party controllers along with IR remote control</p>
13	<p><u>In-ceiling Document Camera:</u></p> <ul style="list-style-type: none"> - Full HD 1080P 30 fps in-ceiling camera - 25x or more Optical zoom - 1080p or higher output resolution - 1200x900 capture area for documents - Ethernet support for live video streaming - DVI-I or HDMI output for live video - Ethernet control for third party controllers along with IR remote control - Auto White balance/focus/IRIS

S.N	Specifications
14	<p><u>Trainer empowering & controlling system for high Learning effectiveness in Virtual Classroom</u></p> <p>A set of required back end control, switching equipment but not limited to the following:</p> <ol style="list-style-type: none"> a. Ethernet based control processors for all the room controls along with button interface as per solution requirement, b. 16x16 HDMI seamless type matrix switcher as per solution requirement c. Multi-format 2 VGA + 10 HDMI switchers with dual HDMI scaled outputs as per solution requirement d. HDMI distribution amplifiers as per solution requirement. e. Dual HDMI with USB switcher with Ethernet control for every content monitor as per solution requirement f. Hi & low power relay systems as per solution requirement g. USB switchers/distribution amplifiers as per solution requirement. h. Dual Lighting control systems at both doors i. Power conditioning systems, j. Wireless central 8” control touch panel/tablet along with required software etc. for all the controls to be provided to run the overall set up & desired solution <p>- Ethernet switches for control & network distribution across the room trainee tables & at lectern etc. & access point as per solution requirement</p>
15	<p><u>A set of required Cables and Connectors</u>, wall plates, IO panels for video, audio & network cabling like HDMI/VGA/PC Audio/Speaker/Control/Microphone/Ethernet/USB etc.</p>
16	<p><u>Lighting</u> should be a mix of direct and indirect fixtures. In the Video meetings the lighting intensity on the faces should be 20 foot candles and above at an angle of 45 degrees. The lighting solution consist of:</p> <ol style="list-style-type: none"> a) Special dimmable/non-dimmable 600mm x 600mm x 150mm fixture with 2x36 watt CFL lamps having colour temperature of 4000 Kelvin. b) 7” diameter or suitable as per site down lighter with led lamp and colour temperature of 4000 Kelvin and antiglare reflector. c) Appropriate cove lighting for indirect lighting
17	<p><u>Chair for Trainer Panel:</u> High Height chair for the trainer Adjustable height and arm rests Sturdy castors</p>

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18	<p>Trainer lectern: Appropriate size of table for 4 seating capacity for trainers with inbuilt spaces for multiple equipment racks including equipment rack as per solution, pull out drawers for storages, silent fans for cooling mechanism, 15.6” touch monitor for annotation capability, 32” diagonal or bigger confidence monitor in a manner that is not blocking the view of the trainer & trainees & cable management solution for HDMI/ VGA/ Power/Ethernet connectivity. Appropriate power to be provisioned for equipments/racks.</p> <p>The tables should be constructed using a medium density fibre boards covered with high quality PVC veneer in approved wood grain for table tops and MDF for non load bearing surfaces</p>
19	<p>Chairs for Trainees</p> <ul style="list-style-type: none"> - Scientific and ergonomic seat back design - Mid back with mesh sitting - Medium back height - Built in synchro tilt mechanism with single point control - Adjustable height and arm rests <p>Sturdy castors</p>
20	<p>Trainee Tables: Integrated training tables with provision for mounting microphones and other controls in such a way that no liquid spillage affects the electronics and microphones. Set of tables sufficient to accommodate 48 trainees and 4 Trainers at a time.</p> <p>Each trainee table to be provisioned with 1 x 10AMP universal type power socket with switch & 1 Ethernet I/O port for client provided CPU.</p> <p>The tables should be constructed using a MDF board covered with high quality PVC veneer in approved wood grain.</p>

Trial Directives

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1	<p><u>86" LCD/LED touch/interactive anti-glare Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 3840x2160 4K Ultra HD • Contrast Ratio: 4000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS 232 connectivity • Brightness: 350 cd/m² or higher • Tempered glass with Anti-glare coating 	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>
2	<p><u>84" LCD/LED Ultra HD Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 3840x2160 4K Ultra HD • Contrast Ratio: 4000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS232 connectivity • Brightness: 350 cd/m² or higher 	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>
3	<p><u>65" LCD/LED Display Panel</u></p> <ul style="list-style-type: none"> • Resolution: 1920x1080 (full HD) or higher • Contrast Ratio: 3000:1 • Viewing Angle (Horizontal / Vertical): 178° / 178° • Power Consumption (Off Mode): Less than 1 Watt • 2 HDMI / VGA with audio connectivity • Ethernet or RS232 connectivity 	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>
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5	<p><u>15.6” LCD/LED non-motorized touch enabled monitor with annotation</u> capability, highlighting, white boarding, on the fly printing, saving emailing capability.</p> <p>150 degree of inclination angle so as they do not obstruct the trainee/trainer interaction.</p> <p>Resolution: 1920x1080 (full HD)</p> <p>VGA/HDMI input connectivity</p> <p>USB Port 2.0</p> <p>RS-485 & RS232 connectivity</p> <ul style="list-style-type: none"> • Silver colour finish to gel with room interiors 	BOO will checked physically/ OEM certificate will be provided by Firm
6	<p><u>High definition spatial audio system</u> for ultra-immersive video collaborative learning/collaborations. Audio Solution integrated with:</p> <p>a) 3 Nos. or more triple Element ultra-high sensitivity ceiling microphones with cables</p> <p>b) 28 or more Channel high definition digital signal processor based digital acoustic echo canceller along with PSTN calling interface.</p>	BOO will checked physically/ OEM certificate will be provided by Firm
7	<p><u>Required Sound System</u> including FOH/in-Ceiling speakers & multi-channel power amplifier</p>	BOO will checked physically/ OEM certificate will be provided by Firm
8	<p><u>Local as well as in video speech reinforcement Solution for the Trainees</u> including 500mm gooseneck microphone one for every two trainees along with required speakers & back controller/processor. The microphone switch on & off button should also recall the trainee camera pre-set views.</p> <p>The system should natively embed in to the trainee tables.</p>	BOO will checked physically/ OEM certificate will be provided by Firm
9	<p><u>Local as well as in video speech</u> reinforcement Solution for the Trainer Wireless Lapel/Head worn Microphone system with dual diversity UHF receivers</p>	BOO will checked physically/ OEM certificate will be provided by Firm

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11	<p>Trainer/Teacher auto tracking full HD dual inverted type video camera system</p> <ul style="list-style-type: none"> - Full HD 1080p60 fps video capture - PTZ Camera with 72 degree horizontal field of view - 12x Optical zoom - Pan range (100° /-100°) - Tilt range (+20, -30°) - Auto focus <p>Individual Ethernet control for both cameras for third party controllers along with IR remote controls</p>	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>
12	<p>Trainee PTZ Cameras:</p> <ul style="list-style-type: none"> - Full HD 1080P 60fps Inverted type PTZ Video Camera - 12x Optical zoom & 72 degree horizontal wide angle field of view. - Support both HDMI & USB parallel outputs. <p>Ethernet control for third party controllers along with IR remote control</p>	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>
13	<p>In-ceiling Document Camera:</p> <ul style="list-style-type: none"> - Full HD 1080P 30 fps in-ceiling camera - 25x or more Optical zoom - 1080p or higher output resolution - 1200x900 capture area for documents - Ethernet support for live video streaming - DVI-I or HDMI output for live video - Ethernet control for third party controllers along with IR remote control - Auto White balance/focus/IRIS 	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>

S.N.	Specifications	Trial directives
14	<p data-bbox="315 132 1110 205"><u>Trainer empowering & controlling system for high Learning effectiveness in Virtual Classroom</u></p> <p data-bbox="315 254 987 327">A set of required back end control, switching equipment but not limited to the following:</p> <ol data-bbox="315 331 1110 1419" style="list-style-type: none"> a. Ethernet based control processors for all the room controls along with button interface as per solution requirement, b. 16x16 HDMI seamless type matrix switcher as per solution requirement c. Multi-format 2 VGA + 10 HDMI switchers with dual HDMI scaled outputs as per solution requirement d. HDMI distribution amplifiers as per solution requirement. e. Dual HDMI with USB switcher with Ethernet control for every content monitor as per solution requirement f. Hi & low power relay systems as per solution requirement g. USB switchers/distribution amplifiers as per solution requirement. h. Dual Lighting control systems at both doors i. Power conditioning systems, j. Wireless central 8” control touch panel/tablet along with required software etc. for all the controls to be provided to run the overall set up & desired solution <p data-bbox="347 1262 1110 1419">- Ethernet switches for control & network distribution across the room trainee tables & at lectern etc. & access point as per solution requirement</p>	<p data-bbox="1133 132 1433 289">BOO will checked physically/ OEM certificate will be provided by Firm</p>
15	<p data-bbox="391 1449 1110 1644"><u>A set of required Cables and Connectors</u>, wall plates, IO panels for video, audio & network cabling like HDMI/VGA/PC Audio/Speaker/Control/Microphone/Ethernet/USB etc.</p>	<p data-bbox="1133 1449 1433 1606">BOO will checked physically/ OEM certificate will be provided by Firm</p>

S.N.	Specifications	Trial directives
16	<p>Lighting should be a mix of direct and indirect fixtures. In the Video meetings the lighting intensity on the faces should be 20 foot candles and above at an angle of 45 degrees. The lighting solution consist of:</p> <p>a) Special dimmable/non-dimmable 600mm x 600mm x 150mm fixture with 2x36 watt CFL lamps having colour temperature of 4000 Kelvin.</p> <p>b) 7” diameter or suitable as per site down lighter with led lamp and colour temperature of 4000 Kelvin and antiglare reflector.</p> <p>c) Appropriate cove lighting for indirect lighting</p>	BOO will checked physically/ OEM certificate will be provided by Firm
17	<p>Chair for Trainer Panel: High Height chair for the trainer Adjustable height and arm rests Sturdy castors</p>	BOO will checked physically/ OEM certificate will be provided by Firm
18	<p>Trainer lectern: Appropriate size of table for 4 seating capacity for trainers with inbuilt spaces for multiple equipment racks including equipment rack as per solution, pull out drawers for storages, silent fans for cooling mechanism, 15.6” touch monitor for annotation capability, 32” diagonal or bigger confidence monitor in a manner that is not blocking the view of the trainer & trainees & cable management solution for HDMI/ VGA/ Power/Ethernet connectivity. Appropriate power to be provisioned for equipments/racks.</p> <p>The tables should be constructed using a medium density fibre boards covered with high quality PVC veneer in approved wood grain for table tops and MDF for non load bearing surfaces</p>	BOO will checked physically/ OEM certificate will be provided by Firm
19	<p>Chairs for Trainees</p> <ul style="list-style-type: none"> - Scientific and ergonomic seat back design - Mid back with mesh sitting - Medium back height - Built in synchro tilt mechanism with single point control - Adjustable height and arm rests <p>Sturdy castors</p>	BOO will checked physically/ OEM certificate will be provided by Firm

S.N.	Specifications	Trial directives
20	<p>Trainee Tables: Integrated training tables with provision for mounting microphones and other controls in such a way that no liquid spillage affects the electronics and microphones. Set of tables sufficient to accommodate 48 trainees and 4 Trainers at a time.</p> <p>Each trainee table to be provisioned with 1 x 10AMP universal type power socket with switch & 1 Ethernet I/O port for client provided CPU.</p> <p>The tables should be constructed using a MDF board covered with high quality PVC veneer in approved wood grain.</p>	<p>BOO will checked physically/ OEM certificate will be provided by Firm</p>

