संख्या. पी-63013/90/02/2024/मोड-I/सीसुबल 2574-85

भारत सरकार, गृह मंत्रालय
महानिदेशालय सीमा सुरक्षा बल
(रसद निदेशालय: आधुनिकीकरण सैल)
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(Fax: 011-24367683)

ब्लाक संख्या . 10,
सीजीओ काम्पलैक्स,
लोधी रोड, नई दिल्ली–03
दिनांक 17 मई 2024

सेवा में,

महानिदेशक:– आसाम राईफलस (through LOAR), केन्द्रीय औद्योगिक सुरक्षा बल, केन्द्रीय रिजर्व पुलिस बल, भारतीय तिब्बत बोर्डर पुलिस, सशस्त्र सीमा बल, राष्ट्रीय सुरक्षा गार्ड एवं पुलिस अनुसन्धान एवं विकास ब्योरो

विषय: **अनुमोदित गुणात्मक आवश्यकता /परीक्षण निर्देशों का प्रेषण**

तकनीकी विशेषज्ञों के उप समूह द्वारा किए गये सूत्रीकरण एवं महानिदेशक सीमा सुरक्षा बल द्वारा अनुमोदित "Digital Sand Model-Revision" के संशोधित गुणात्मक आवश्यकता/परीक्षण निर्देशों को आपकी अग्रिम कार्यवाही हेतु प्रेषित किया जाता हैं।

संलग्न : उपरोक्तनुसार

इ.दे. सिंह

(इन्द्र देव सिंह)
उप महानिरीक्षक (रसद)

प्रतिलिपि :–

1. तकनीकी निदेशक
The Technical Director
राष्ट्रीय सूचना–विज्ञान केन्द्र, नोर्थ ब्लाक, गृह मंत्रालय, नई दिल्ली
NIC, North Block, MHA
New Delhi, (द्वारा ई–मेल)
(ई–मेल पता : mpsugandhi@nic.in)
: आपसे अनुरोध है कि उक्त उपकरण के सूत्रीकरण किये गये गुणात्मक आवश्यकता /परीक्षण निर्देशों को गृह मंत्रालय की वैबसाईट (MHA website Division of MHA+ - Police Modernization Division- Qualitative Requirements-Qualitative Requirements of Machinery & Eqpt Items with Surveillance item) पर अपलोड करने का श्रम करें।
2. SO (IT), North Block, MHA
(Through E-mail)
(E-mail address: soit@nic.in)
: कृपया उपरोक्तानुसार कार्यवाही करने का श्रम करें।
3. तकनीकी विंग, सीमा सुरक्षा बल
: कृपया उक्त उपकरण के गुणात्मक आवश्यकता/ परीक्षण निर्देशों को सीमा सुरक्षा बल की वैबसाईट पर अपलोड करने का श्रम करें।
4. Sh. Anoop Dhanvijay, Director- Buyer Management (CPSEs & Central Ministries), GOI. Ministry of Commerce & Industry, Government e-Marketplace. Jeevan Tara Building.5-Parliament Street. New Delhi-110001
E-mail:- anoop.dhanvijay@gem.gov.in
For info with request to upload the approved QRs & TDs of " Digital Sand Model-Revision" on GeM Portal. Copy of QRs & TDs is attached with this letter.
5. Trg Dte, FHQ, BSF
: वास्ते सूचनार्थ आपके पत्र संख्या–5/1/Trg-Coord/Sand Model/3023/2785 दिनांक 01 अप्रैल 2024 के संदर्भ में।
6. फाईल।

Appendix-'A'

QRs & TDs OF DIGITAL SAND MODEL- REVISION

S/No	QRs/Specification	Trial Directives	Result expected /desired
A	DISPLAY SPECIFICATIONS		
1.	The Multi Window Processing (MWP) hardware The solution should have a Picture in Picture (PiP)/ Picture and Picture (PaP) capability	All the features to be illustrated to the BOO by putting necessary arrangements in the setting/ control panel	Must display feature in hardware.
2.	Memory - Dual SSD (Raid-1) 1 TB	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must display feature in hardware or should be mentioned in product datasheet
3.	Processor - Intel Xeon 2.10GHz 12-core or better	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters
4.	4x DP1.4 outputs each supporting upto 4K @120Hz active stereo output	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by BOO.
5.	Min 8x HDMI/DP inputs	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by BOO.
6.	Provision for Input & output expansion.	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by BOO.
7.	16GB RAM (expandable upto 256GB)	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by BOO.
8.	Min 2 x 1GB/s LAN ports	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by

S/No	QRs/Specification	Trial Directives	Result expected /desired
			BOO.
9.	02 x Wireless Keyboard, 02 x Wireless Optical Mouse	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Keyboard and Wireless optical mouse should work with any system.
10.	Operating System: 64-bit Windows 10 or better	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters and authenticity of certificate to be verified by BOO.
11.	Equipment Racks should be sufficient enough to host all equipment.	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters
12.	Conversion Cables for Workstation Inputs	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	Must align with QR parameters
	B. CONTROL AND PROCESSING SOFTWARE		
13.	Control software is required to achieve comprehensive and efficient use of all the hardware functionality. The controller software should be robust and must allow controlling the content being displayed by the display wall. Any change to the layout made via the controller software should reflect in the output of the display wall in real-time. The controller should be installable on any compatible Operating System.	-	-
14.	Auto-detection of various external input video sources connected to the MWP.	Feature to be demonstrated in presence of BOO.	Application should be able to detect various external input video sources connected to the MWP.
15.	Drag-and-drop user-interface to move active input video sources to the main display wall.	Feature to be demonstrated in presence of BOO.	Application should be able to move active input video sources to the main display wall.

S/No	QRs/Specification	Trial Directives	Result expected /desired
16.	Naming and specifying position/size of various sources on the main display wall	Feature to be demonstrated in presence of BOO. Place/mark a point on terrain and add text name to it. Rotate the terrain	Text direction will change as per the screen orientation
17.	Support for controlling all MWP parameters using a simple Graphic User Interface(GUI). The GUI interface should be hardware accelerated and provide a device-like look-and-feel.	Feature to be demonstrated in presence of BOO.	Application should be able to read Open Geospatial Consortium(OGC) compliant datasets
18.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen	Feature to be demonstrated in presence of BOO.	Additional PC could be added in network with more licenses and without changing anything in software
19.	All the various equipment should be connected over a Gigabit Ethernet network. The vendor should provide the switching equipment and accessories as required for system to run properly. The vendor should also supply and install the necessary high-quality Cat 6 cables and other accessories. VNC server or other third party apps can be used for network display protocol	Feature to be demonstrated in presence of BOO.	It must be possible to control the remote applications by executing local mouse/keyboard events on the MWP hardware on the remote systems.
20.	It should be able to display at least 2 input sources together, sharing their content wirelessly, simultaneously on the screen with auto-outlaying of Picture-and-Picture capability	Feature to be demonstrated in presence of BOO.	Multiple syndicate should be able to share their content wirelessly, simultaneously on the screen with auto-outlaying Picture-and-Picture capability
21.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall. Should also provide support for touchback, annotations & black boarding on Touchscreen displays.	Feature to be demonstrated in presence of BOO.	Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.

S/No	QRs/Specification	Trial Directives	Result expected /desired
22.	Support for manual-based switching of presets allowing different presets to become active during a user defined time interval	Feature to be demonstrated in presence of BOO.	User should be able to switch presets manually allowing different presets to become active during a user defined time interval
23.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.	Feature to be demonstrated in presence of BOO.	User should be able store the output of the complete display wall on the hard drive as a movie file for subsequent playback.
24.	Support for storing the output of the complete display wall on the hard drive as a movie file for subsequent playback.	Feature to be demonstrated in presence of BOO.	User should be able store the output of the complete display wall on the hard drive as a movie file for subsequent playback.
25.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.	Feature to be demonstrated in presence of BOO.	User should be able to add the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame..
26.	Should be able to clone input on different output display walls	Feature to be demonstrated in presence of BOO.	Must be able to clone any system file
27.	Support for specifying a border width and color for video sources displayed on the wall.	Feature to be demonstrated in presence of BOO.	-
28.	Support for color correction and applying various image filters on the video sources	Feature to be demonstrated in presence of BOO.	-
29.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall	Feature to be demonstrated in presence of BOO.	Picture quality of video to be same when video source is interpolated

S/No	QRs/Specification	Trial Directives	Result expected /desired
30.	Mandatory Features - Built-in geometry correction, blending, color correction & brightness control/matching	BOO should check the corrections by giving variations in colours, contrast and brightness.	Contrast and Brightness must be managed by user
31.	Support for overlaying multiple operational plans for evaluation purposes.	Feature to be demonstrated in presence of BOO.	Syndicate responses should be seen together on main file
32.	The architecture should be proven to be highly scalable and capable of delivering high-performance as and when the data volume increases. It is required that the hardware, software and application and deployment architecture should provide for Scale-Up and Scale out on the addition of multiple syndicate workstations, database servers, and all other solution components.	OEM certificate for specified features is to be provided	Aspect ratio should be same when scaled.
	C. BROAD / DETAILED SOFTWARE SPECIFICATIONS OF DIGITAL SAND MODEL ROOM		
33.	Features- Digital Sand Model- The E-Sand Model Room solution should include the complete range of software required to create digital sand models and conduct sand model exercises effectively. (a) The complete application software provided with the solution should be indigenous (developed in India). No dependency on third party application licenses. (b) Should be able to integrate with other OGC Compliant GIS data which are available in the Software Market. (c) Should be able to import open standard data formats.		
34.	Rendering- The main 3D workstation along with the sand model presentation software should run at 120 Hz for real-time active 3D visualization. Real-time visualization of complete geospatial world with 3D	Feature to be demonstrated in presence of BOO.	All the data created and added by the software should be visualized in real-time. Real-time fusion of multiple

S/No	QRs/Specification	Trial Directives	Result expected /desired
	terrain and other added information. All the data created and added by the software should be visualized in real-time. Real-time fusion of multiple geospatial layers: The software should allow visually combining multiple layers in real-time so as to include important features from both layers, e.g., roads in the map layer with buildings in satellite imagery by setting visibility for each layer individually.		geospatial layers. The software should allow visually combining multiple layers in real-time so as to include important features from both layers, e.g., roads in the map layer with buildings in satellite imagery by setting visibility for each layer individually.
35.	Extensibility/Flexibility encompasses the ease of extending the architecture to include new functions and technologies in the future. The software should be up-gradable (if required) for sensor simulation for Forward Looking Infra-Red and Night Vision. The software should allow for visualization of the terrain in Night Vision Mode and Infra-Red Mode.	Since it's an up-gradable requirement, feature cannot be demonstrated to BOO. But a certificate will be obtained from vendor if the required feature may be added in present software suite.	Any updates in future software to be provided to the user.
36.	Modular Architecture The architecture should be proven to be highly scalable and capable of delivering high-performance as and when the data volume increases. It is required that the hardware, software and application and deployment architecture should provide for Scale-Up and Scale out on the addition of multiple syndicate workstations, database servers, and all other solution components.	Feature to be demonstrated in presence of BOO.	Multiple syndicate workstations, database servers, and all other solution components should be able to manoeuver the image generator over the network.
37.	GIS Features for the Instructor & Syndicates i. Creation of overlays using GIS including commonly used military symbols. Feature to send overlay to other syndicates and control order should be there. ii. Easy feature & ability to mark Route of Advance based on drag and drop from	Feature to be demonstrated in presence of BOO.	Support for visualization of geospatial world as a single 3D Terrain (similar to Google Earth).

S/No	QRs/Specification	Trial Directives	Result expected /desired
	hierarchical orbat tree iii. Line of sight analysis iv. View shed analysis v. Find highest point within an area vi. Query to find area above a particular height vii. Integrated MS Office Word file within the GIS for explanation, narration with hyperlink to maps etc iii. Weapon placement & trajectory algorithm to identify effective ranges and hit locations ix. Integration of sun & moon almanac x. Automatic best route feature for cross country navigation omitting the no-go areas xi. GPS Integration		
38.	<u>Integrated Map Data & Content-</u> i. True colour satellite imagery at 25 meter or better resolution for whole of India and its bordering area. ii. 3D Digital Elevation data at 25 meter or better resolution for whole of India and its bordering areas. iii. Base data layer for the whole earth (low-resolution layer is acceptable). iv. Processing and integration of all data procured from 3rd party organizations. v. Processing and Integration of Digitized and Physical Map data. vi. High Resolution 1m or better satellite image for 10 exercise areas as requirement of the buyer: Eg:- 20 x 20 km – 10 Nos vii. Processing of all data to create a uniform 3D database for operational planning software	Base data layer for the whole earth and 3D Digital Elevation data at 25 meter or better resolution for whole of India and its bordering area to be presented to BOO. High Resolution 1m or better satellite image for 10 exercise areas to be shown to BOO. Processing of all data to create a uniform 3D database for operational planning software of this Feature to be demonstrated to BOO. BOO to also check the correctness of the feature.	Should have Base data layer for the whole earth and 3D Digital Elevation data at 25 meter or better resolution for whole of India and its bordering area. Should have High Resolution 1m or better satellite image for seven exercise areas. Should have Processing of all data to create a uniform 3D database for operational planning software of this feature.

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	viii. Digital Vector Map of India, scale 1:250000 or better, data comprising of the following: · Administrative boundaries · Town & Villages · Highways, roads etc · Railways and station etc ix. .Models & textures library- ·Trees – About 10 variety found in the Himalayan Range ·100 different tree models of common Indian trees. ·100 types of Huts/Building in the Himalayan ranges and Urban Buildings (India, Tibet, China) ·Characters like Human, Police& Paramilitary, Army, Civilian, Terrorist, Some animals etc ·Vehicles, Aircrafts, Helicopters ·Textures like Tracks, Glacier, Lake Glacier, Forest, Broken ground etc		
	D. <u>SOFTWARE FEATURE LIST FOR CREATING CONTENT</u>		
39.	<u>Raster –</u> (i) Facility for adding digital elevation data to the database. (ii) Facility for adding satellite imagery to the database. (iii) Facility for adding map data to the database, for example SOI (Survey of India) Digitized maps. (iv) Facility of combining multiple satellite images and Maps to create a uniform database. There should be no limit on number imager that can be added to the database. (v) Facility of removing images, elevation and map from the database.	Feature to be demonstrated in presence of BOO.	Software should be able to add digital elevation data , satellite imagery , map data to the database, for example Survey of India(SOI) Digitized maps. Software should be able to combine multiple satellite images and Maps to create a uniform database.

S/No	QRs/Specification	Trial Directives	Result expected /desired
	(vi) Facility for saving terrain database on Sand Model Server. (vii) Facility for viewing the database elements. (viii) Facility to add/ remove vector layers like shape file etc		
40.	Support for the following formats for vector data: a. Environmental Systems Research Institute(ESRI) Shape File.	Feature to be demonstrated in presence of BOO.	ESRI shape files can be added to software suite.
41.	Support for data files in various coordinate systems and conversions to a uniform coordinate system.	Feature to be demonstrated in presence of BOO.	User should be able to convert various coordinate systems to a uniform coordinate system.
42.	Capability to load raster data formats	Feature to be demonstrated in presence of BOO.	User should be able to upload any raster data..
43.	The module should have Data Dictionary with important map features as Survey of India/Copernicus Atmosphere Monitoring System (CAMS)	Feature to be demonstrated in presence of BOO.	User should be able to use Data Dictionary with important map features as Survey of India/CAMS
44.	Doctoring of Terrain- The user should be able to doctor a terrain to add features like support for marking and creating artificial structures that require terrain modification like Ditch cum Bundh (DCB) and Canals using the GUI including. (i) Software should provide a GUI for specifying the profile for a given DCB/Canal that can be modified interactively by the user before marking on the map. (ii) Software should allow controlling the width of the DCB/Canal at different locations such that the same feature can have different widths/profiles etc at different locations (iii) Software should automatically implement the necessary high-fidelity doctoring of the terrain	Feature to be demonstrated in presence of BOO.	

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	including modifications to the digital elevation data and the corresponding terrain according to the DCB/ Canal profile.		
45.	2D to 3D The software should easily toggle between 2D and 3D visualization mode with just click of a button	Feature to be demonstrated in presence of BOO.	User should be able to toggle between 2D and 3D visualization mode with just click of a button
46.	Library (i) 3D model library for operational symbology and 2D Symbols. These symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	Feature to be demonstrated in presence of BOO. BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	Trees – About 10 or more variety found in the Himalayan Range	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	100 or more different tree models of common Indian trees.	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	3D model library of buildings (i) 50 or more Urban Building models. (ii) 50 or more Hut models	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	3D model library for characters:- i. Terrorists. ii. Army personnel. iii. Police & Paramilitary. iv. Civilians. v. Naxalites. vi. Common Animals.	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	Vehicles, Aircrafts, Helicopters	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	
	Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground etc	BOO will check all 3D models and these symbols need to be compliant with Military standards and be further customized for the requirements of CAPFs.	Polygons with color code options to depict large areas for forests, ponds, lakes etc.

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47.	All regularly used military symbols should be available in 2D Format as well as in 3D	Feature to be demonstrated in presence of BOO. BOO will check all 2D military symbols and texture. BOO can recommend to add more symbols as required.	User should be able use military symbols available in 2D as well as in 3D format In different exercises.
48.	Support for the following formats for raster data:- i. GeoTIFF. ii. JPEG, PNG. iii. DTED. iv. DEM.	Feature to be demonstrated in presence of BOO. BOO will check Content creation module dated files, geotiff and popular GIS & open source file formats.	User should be able to create Content using module dated files, geotiff and popular GIS & open source file formats like, i. GeoTIFF. ii. JPEG, PNG. iii. DTED. iv. DEM.
49.	Visualization feature – Real-time visualization of complete geospatial world with 3D terrain and other added information. All the data created and added by the software should be visualized in real-time	Feature to be demonstrated in presence of BOO. Real-time visualization of complete geospatial world with 3D terrain and other added information must be shown to BOO.	User should be able to visualize complete geospatial world with 3D terrain and other added information in real Time.
50.	Real-time fusion of multiple geospatial layers. The software should allow visually combining multiple layers in real-time so as to include important features from both layers, e.g., roads in the map layer with buildings in satellite imagery by setting visibility for each layer individually	Feature to be demonstrated in presence of BOO. Real-time fusion of multiple geospatial layers must be shown to BOO.	User should be able to visually combining multiple layers in real-time so as to include important features from both layers, e.g., roads in the map layer with buildings in satellite imagery by setting visibility for each layer individually
51.	Place- marks should be displayed using screen oriented text located at accurate positions in 3D.	Feature to be demonstrated in presence of BOO.	User should be able to Place-marks using screen oriented text located at accurate positions in 3D
52.	Landmarks should be displayed at the correct location on the terrain as 3D models along with associated information.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	User should be able to locate the terrain as 3D models along with associated information.

S/No	QRs/Specification	Trial Directives	Result expected /desired
53.	Celestial bodies including Sun, Moon and Stars should be displayed at correct locations in 3D.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	
54.	Weather conditions including clouds, rain, snow and fog should be displayed realistically along with the rest of the 3D database.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	
55.	Natural features such as rivers and ponds should be displayed in 3D as well as 2D. The features should be draped over the 3Dterrain.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	
56.	Manmade features should be displayed in 3D as well as 2D using their corresponding 2D symbols.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	
57.	Hyperlinks should be displayed at the accurate locations using intuitive symbols.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	
58.	Support for guaranteed real time performance with arbitrary data sets to allow interactive sand model creation.	Feature to be demonstrated in presence of BOO. BOO will check performance by taking sample of a large size data file and its creation in real time	User should be able to perform large size data sets to create interactive sand model.
59.	Support for display of latitude, longitude and height above mean sea level, under the mouse pointer.	Feature to be demonstrated in presence of BOO. BOO will check correctness of latitude, longitude and height above mean sea level, under the mouse pointer.	User should be able to know latitude, longitude and height above mean sea level, under the mouse pointer.
60.	Support for Military Grid Reference System (MGRS) coordinates under mouse pointer.	Feature to be demonstrated in presence of BOO.	
61.	Support for tour recording and playback. User should be able to record topographic tour, inside building tour.	Feature to be demonstrated in presence of BOO.	User should be able to record topographic tour, inside building tour and can play over and over again for better planning.
62.	Support for hyper-linking recorded tours with narrative presentation.	Feature to be demonstrated in presence of BOO.	User should be able to recorded tours with narrative Presentation.
63.	The Image Generator should generate 3D terrain in real time (120Hz) on the fly (Direct from Source	Feature to be demonstrated in presence of BOO.	User customisable.

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Data) enabling the user to replace geo-referenced satellite images and elevation data easily without the need to process it through terrain generation or creator software.		
64.	Terrain changes-Should support dynamic terrain changes anywhere without forethought without corresponding change in the original source file. Like creation of ditch cum bund, crater, runways or mining areas. Modify the elevation data in real-time based on user- defined rules (flatten roads, rivers, lakes, airport, etc.). support for marking imp natural features using GUI including rivers and canals, ponds and lakes, forest and vegetation, border fencing, roads, bridges, electric and telephone poles.	Feature to be demonstrated in presence of BOO. BOO will add different layers from server and check its performance in real time. Time lag should not be high.	Software should be able to load the data.
65.	Handling – No requirement to create multiple level details (representations) of the 3-D models and be able to handle the same in real time	Feature to be demonstrated in presence of BOO.	User should be able to create multiple level details (representations) of the 3-D models and be able to handle the same in real time
66.	Image generation- Procedural image generation in real time without writing to the disk dynamic changes of terrain representation by just changing the content of XML file	Feature to be demonstrated in presence of BOO.	User should be able to create multiple level details (representations) of the 3-D models and be able to handle the same in real time
67.	Capability to extrude millions of 2-D footprints into 3-D buildings with textures and scattered rooftop features from shape vector files	Feature to be demonstrated in presence of BOO.	
68.	Support for visualization of dynamic change in weather and environment conditions based on current clock time in the operation animation.	Feature to be demonstrated in presence of BOO. To be checked through various change of whether and whether related events events by BOO.	User should be able to visualise weather and environmental condition variation with different climate/clock time.

S/No	QRs/Specification	Trial Directives	Result expected /desired
69.	Facility to manipulate other weather conditions such as rain, fog etc should be there.	Feature to be demonstrated in presence of BOO. To be checked through various change of atmospheric related events by BOO.	User should be able to visualise weather and environmental condition variation with different climate/clock time.
70.	Any time of Day/year should be commanded by the control order/instructor with a resolution of one second	Feature to be demonstrated in presence of BOO.	User should be able to command any time of Day/year by the control order/instructor with a resolution of one second
71.	Sun and moon modelled with the correct size and position and should move in accordance with a validated ephemeris model and sun and moon models to be properly attenuated by LOS visibility through clouds, haze, fog and rain	Feature to be demonstrated in presence of BOO. BOO will check sun and moon positioning variation in accordance with day/night and in different month of an year.	-
72.	Time-of-day, Weather and Atmospheric Simulation, and oceans	Feature to be demonstrated in presence of BOO.	User should be able to simulate time-of-day, Weather and Atmospheric Simulation, and oceans
73.	Elevation data-Analyses and colorized elevation data in real-time for Slope, Elevation, and Contours	Feature to be demonstrated in presence of BOO.BOO will check colorize elevation data for slope, elevation and counter must show different colours.	User should be able to analyses elevation data and see colorized elevation in real-time for Slope, Elevation, and Contours
74.	The system should support open standard data file formats including shape files, KML and GML formats.	Feature to be demonstrated in presence of BOO.	User should be able to iinteractively modify the XML control language graphically to change how the 3-D scene is represented from the source data
75.	Attribute data Analyze attribution data on ESRI shape data in real-time to colorize, scale, and remove objects	Feature to be demonstrated in presence of BOO	User should be able to Analyze attribution data on ESRI shape data in real-time to colorize, scale and

S/No	QRs/Specification	Trial Directives	Result expected /desired
			remove objects
76.	Formats Read, optimize, and render Geocentric Round Earth from DTED, JPEG2K, and other elevation formats	Feature to be demonstrated in presence of BOO	User should be able to read, optimize, and render Geocentric Round Earth from DTED, JPEG2K, and other elevation formats
77.	Geo specific imagery Load geo specific imagery from jpeg file by assigning coordinates to the corners	Feature to be demonstrated in presence of BOO	User should be able to read, optimize, and render Geo-specific Imagery over the entire planet from ECW, JPEG2K, and other imagery formats
78.	Data Vector data to be loaded smoothly on the map and visualized without any latency	Feature to be demonstrated in presence of BOO	User should be able to read, optimize, and render Vector data on the earth (roads, rivers, buildings, trees, etc.)
79.	Effects Particle based fog, haze, and Volumetric clouds for slant range accumulation visibility, lighting, and color effects	Feature to be demonstrated in presence of BOO.	User should be able to manipulate other weather conditions such as rain, fog etc
80.	Points Light points with support for light pools placed in real-time	Feature to be demonstrated in presence of BOO.	User should be able to add points on terrain and assign parameters to it on real time
81.	Stereo display The Integrated Graphic software should support Stereo Displays (active only) without any additional changes in models, terrain or software components.	Feature to be demonstrated in presence of BOO. BOO will check for active stereo only.	User should be able to Display active stereo without any additional changes in models, terrain or software components
	E. SOFTWARE FEATURE LIST FOR ADMINISTRATIVE SERVER		
82.	Administrative server module refers to the admin panel where multiple user ids can be created for syndicates and other users with respective access and rights.	Feature to be demonstrated in presence of BOO.	

S/No	QRs/Specification	Trial Directives	Result expected /desired
83.	Orbat – Hierarchy & Names (Own, Enemy & Friendly)	Feature to be demonstrated in presence of BOO.	User should be able to name own, enemy and friendly Orbat
84.	Orbat Creation- The orbat creation should allow for creation of multiple parties, hierarchies and details. The hierarchy should appear in a tree view thereby allowing for an easy creation and viewing. Option to load orbat with resources with men and weapons etc and associate with 2D and 3D symbols should also be provided	Feature to be demonstrated in presence of BOO. BOO will check Orbat creation up to core level.	User should be able to create multiple parties, hierarchies and details of own side and enemy side as well.
85.	Exercise Creation -The exercise server should also allow creating of exercise master and allow its configuration based on terrain & maps as well as assigning orbat to an exercise.	Feature to be demonstrated in presence of BOO. An exercise in any terrain to be demonstrated to BOO.	User should be able to create exercise master and allow its configuration based on terrain & maps as well as assigning orbat to an exercise.
86.	Backup-The software should allow backup of any exercise based on access control	Feature to be demonstrated in presence of BOO.	User should be able to back up the exercise based on access control.
	F. SOFTWARE FEATURE LIST FOR ADMINISTRATIVE SERVER/ SAND MODEL PREPARATION MODULE		
87.	Sync With the Exercise Server database and all necessary databases will be downloaded into this system	Feature to be demonstrated in presence of BOO.	
88.	Setting a New Exercise Should design a new exercise or select from an existing exercise. Should copy from an earlier exercise, save it as a new name and make changes to it. Should not modify an already conducted exercise or operation. Setting a new exercise should also involve selecting maps for the same.	Feature to be demonstrated in presence of BOO.	The instructor utilizing his instructor console shall be able to Select exercise area from Database. The instructor shall be able to mark enemy deployment on selected area. The instructor shall be able to doctor the terrain as the

S/No	QRs/Specification	Trial Directives	Result expected /desired
			requirement. The instructor shall be able to allocate Resources to the students for further exploitation. The instructor shall be able to Overlay DS Solution on the exercise. The instructor shall be able to check the solution submitted by students online.
89.	User Creation Support for configuring the terrain layer by selecting and adding differentdata sub-layers from the Sand Model Server.	Feature to be demonstrated in presence of BOO.	User should be able to create user name password. User should be able to Assign Orbat to syndicates.
90.	Deployment & Assignment Selecting one or more satellite imagery.	Feature to be demonstrated in presence of BOO.	User customisable.
91.	Instructions & Responses Selecting one or more digital-maps.	Feature to be demonstrated in presence of BOO.	User customisable.
92.	Overlays Selecting one or more rasterize vector Layers.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature.	User customisable.
93.	Route of Advance Support for importing different vector data layers from Sand ModelServer and associating sand model specific attributes with them. Roads, Country, State and District boundary Support for marking important natural features using the GUI including Rivers and canals Ponds , Forests and vegetation. Support for marking important man-made features using the GUI including; • Border Fencing.	Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature. Feature to be demonstrated in presence of BOO. BOO will also check the correctness of feature. Feature to be demonstrated in presence of BOO.	User should be able to select Automatic best route feature for cross country navigation omitting the no-go areas

S/No	QRs/Specification	Trial Directives	Result expected /desired
	• Roads. • Bridges. • Electric and Telephone poles.	BOO will also check the correctness of feature.	
	Support for marking and creating artificial structures that require terrain modification like DCBs and Canals using the GUI.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature. Instructor should be able to change responses submitted by the syndicates.	User should be able to analyse Line of sight, Weapon Range, View shed analysis User should be able to find highest point within an area
	Software should provide a GUI for specifying the profile for a given DCB/Canal, that can be modified interactively by the user before marking on the map.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature Instructor should be able to see the deployments made by the syndicates with 3D models.	
	Support for adding buildings and landmarks including:- • Places of Worship: Temple, Mosque, Church, Gurudwara. • Transportation: • Bus Stand, Railway Station, Airport, Sea Port. • Important Buildings: Hospital, Office, School. • Custom buildings:	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature Instructor should be able to see the deployments made by the syndicates with 3D models.	On clicking any point on 2D map 360 degree view could be obtained. User should be able to change the time and date of an ongoing exercise to the see the scenario at the given point of time.
	<u>Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system-</u> Click on the 2D map on the control order system and its simultaneous 3D display on the Image Generator ·360 degree view of any point clicked on the 2D map ·Interactive and dynamic change in date, time and weather conditions based on an exercise setting ·Introduction to the Sand Model ·Simultaneous animation of route of advance based on inputs of all syndicates that were created independently and its visualization from any view point	BOO to also check the correctness of the feature Scenario should change with date and time of exercise. Following features to be demonstrated to BOO	Instructor should be able to change the viewing angle on the fly and in real time Instructor should be able to

S/No	QRs/Specification	Trial Directives	Result expected /desired
	·Visualization of deployments made by the syndicates with available 3Dmodels 2D Map Toolsets- ·Zoom in-out, pan ·Grid referencing ·Automatic retrieval based on map hyperlink ·Calculate distance between points ·Drag and drop a weapon and based on attribute ·range display the same on the map ·Gun placement & trajectory algorithm feature ·Info button to extract information for all vital features like DCB, canal, roads, rivers etc with type, class, width, depth etc wherever feasible ·Moon table based on current/proposed dates and map Selection ·And all Standard GIS features and buildings available in standard 3D model formats. Support for adding hyperlinks, with associated metadata information not available in any of the other layers. The supported hyperlinks should include:- Text Hyperlink. PictureHyperlink Audio Hyperlink. Video Hyperlink	Zoom in-out, pan Grid referencing Automatic retrieval based on map hyperlink Calculate distance between points Drag and drop a weapon and based on attribute range display the same on the map Gun placement & trajectory algorithm feature	see the deployments made by the syndicates with 3D models. Instructor should be able use 2D Map Toolsets- ·Zoom in-out, pan ·Grid referencing ·Automatic retrieval based on map hyperlink ·Calculate distance between points ·Drag and drop a weapon and based on attribute ·range display the same on the map ·Gun placement & trajectory algorithm feature
	G. Software feature list for Syndicates		
94.	With the Exercise Server database and all necessary databases for the orbat that has been assigned should be accessed into his system and displayed	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	Syndicate can access exercise Server database and all necessary databases for the orbat that has been assigned. They can submit there responses using all the facility available in software
95.	Selecting an Exercise- Should be able to select an exercise that has been	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	

S/No	QRs/Specification	Trial Directives	Result expected /desired
	created by the control order		feature list.
96.	Should be able to load / assign / mark deployments from the allocated resources only	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
97.	Responses- Syndicates should be able to view instructions set by the Control Order and also respond to the same and upload the same onto the exercise server. This pane should allow for entering descriptive information as a response. Feature should also allow for hyper linking of text in the docking pane to maps.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
98.	Syndicate Responses Terrain Analysis, markings & noting	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
99.	Prepare and submit response as the exercise requirement	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
100.	Mark deployments and depict movement based on timeline	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
101.	Route of Advance The orbat (own, enemy and friendly) which has already been created with the administrative module should be available in a hierarchical tree format for an easy drag and drop onto the map for deployment and further movement with timelines. The further movement should be simple right click on the symbol displayed on the map.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
	Automatic best route feature for cross country navigation omitting the no-go areas	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
102.	Dynamic Changes Control order should be able to view changes made to deployment and route of advance in a near real time mode if made or initiated by the control order for his assigned orbat	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
103.	Grid Analysis Line of sight, Weapon Range, View shed analysis Find highest point within an area	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	Syndicate can access exercise Server database and all necessary databases for the

S/No	QRs/Specification	Trial Directives	Result expected /desired
	·Flexible query on grid file		orbat that has been assigned. They can submit there responses using all the facility available in software feature list.
104.	<u>Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system</u> Click on the 2D map on the control order system and its simultaneous 3D display on the Image Generator 360 degree view of any point clicked on the 2D map Interactive and dynamic Change in date, time and weather conditions based on an exercise setting ·Introduction to the Sand Model ·Simultaneous animation of route of advance based on inputs of all syndicates that were created independently and its visualization from any view point ·Visualization of deployments made by the syndicates with available 3D models ·However during the conduct of an exercise this feature may be disabled by the control order so that it does not conflict with the conduct of the exercise.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	
105.	<u>2D Map Tool sets</u> Zoom in-out, pan ·Grid referencing ·Automatic retrieval based on map hyperlink ·Calculate distance between points ·Drag and drop a weapon and based on attribute range display the same on the map ·Weapon placement & trajectory algorithm feature ·Info button to extract information for all vital features like DCB, canal, roads, rivers etc with type, class, width, depth etc wherever feasible ·Moon table based on current/proposed dates and map selection and all Standard GIS features.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	

S/No	QRs/Specification	Trial Directives	Result expected /desired
	H. SOFTWARE FEATURE LIST FOR SYNDICATES		
106.	Type Independent as well as an integrated component		
107.	No Menu Only Floating Tool Buttons The collaborative module is driven based on the current exercise that is set by the instructor/control order. Its driven by a floating button pad that can be easily moved from one location of the screen to another and shared between different users assembled around the table. Ease of use is the main feature desired at the collaborative table	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	User Should be able to easily move from one location of the screen to another and shared between different users assembled around the table.
108.	Interaction Touch screen interaction with the floating tool button to perform various functionalities associated with each button and interaction based on different gestures. Also interaction based on physical coded miniature model for a lively interaction and visual display.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	User Should be able to interact with floating tool button to perform various functionalities associated with each button and interaction based on different gestures through touch screen.
109.	Tool Button features · Zoom in – user should be able to zoom on the digital map with an outward movement on the touch screen	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to zoom on the digital map with an outward movement on the touch screen
	· Zoom in – user should be able to zoom in with inward movement on the touch screen	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to zoom in with inward movement on the touch screen
	· Detailing – user should be able to just mark with his fingers on the map the area he wish to detail and that area should zoom into	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to just mark with his fingers on the map the area
	Easy touch screen pan of map	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to zoom in with inward movement on the touch

S/No	QRs/Specification	Trial Directives	Result expected /desired
			screen
	Info tool to extract information on any vector dataset	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to extract information on any vector dataset
	· Click on any area of map and extract the military grid referencing	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to extract the military grid Referencing
	· Type in the military grid and the map should zoom onto that area/location	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to zoom onto that area/location with military grid.
	· Calculate distance on two or multiple clicks	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to Calculate distance on two or multiple clicks
	· Moon Table almanac	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to Moon Table almanac
	·Find height of any location and on continuous movement on the screen	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to find height of any location and on continuous movement on the screen
	· Line of sight with the to/from height increase/decrease required to make it visible	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to find line of sight with the to/from height increase/decrease required to make it visible
	·360 degree view shed analysis	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to analyse 360 degree view shed
	· Automatic view shed creation whenever any weapon is deployed from the database stored in the exercise sever	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to view shed creation whenever any weapon is deployed from the database stored in the exercise sever
	· Query the height table and the vector dataset to locate area for helipad, weapon siting etc	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to find height and the vector dataset to locate area for helipad, weapon siting etc
	·Weapon placement and trajectory analysis	Feature to be demonstrated to BOO. BOO to also	user should be able to analyse

S/No	QRs/Specification	Trial Directives	Result expected /desired
		check the correctness of the feature	weapon placement and trajectory
	· View responses from different syndicates	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to View responses from different syndicates
	· View deployment and overlays from different syndicates	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to View deployment and overlays from different syndicates
	· Overlay of one syndicate deployment on another would be possible so as to carry out an interactive discussion.	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to overlay one syndicate deployment on another would be possible so as to carry out an interactive discussion.
	all Standard GIS features	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to use all Standard GIS features
110.	Synchronization Dynamic display of real time scene through the Image Generator with controls available in the collaborative module:	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to customise as per requirement.
	Change of view location based on zoom etc	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to customise as per requirement.
	Change of view-points based on Military Grid referencing	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to customise as per requirement.
	Dynamic real time date and time with Sun and Moon modeled with the correct size and position and should move in accordance with a validated ephemeris model and sun and moon models	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to customise as per requirement.
	Animated sequence of a syndicate response (orbat deployment and route of advance plus overlays) based on dynamic real time date and time and weather parameters like - Clouds - Rain or Snow - Visibility	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	user should be able to customise as per requirement.

S/No	QRs/Specification	Trial Directives	Result expected /desired
	- Wind speed and directions		
	I. INTEGRATED MAP DATA & CONTENT for DSM		
111.	. Base data for the entire world at 25 meters resolution or better as the requirement of the end user ii. True colour satellite imagery, 3D Digital Elevation data at 25 meter or better resolution for all of India. iii. Processing and integration of all data procured from 3rd party organizations. High Resolution 1m or better satellite image for minimum 10 exercise areas of 10 km x 10 km (area will be specified during order finalization) iv. Digital Vector Map of India, scale 1:250000 or better, along the Border & data comprising of the following:- · Administrative boundaries · Water bodies · Town & Villages · Highways, roads etc · Railways and station etc v. Models & textures library Trees – About 10 variety found in the Himalayan Range About 100 varieties of commonly found trees in India. 100 types of Huts/Building in the Himalayan ranges and Urban Buildings (India, Tibet, China) Characters like Human, Police & Paramilitary. Army. Civilian Terrorist, Some animals etc Vehicles,Aircrafts, Helicopters Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground etc	Feature to be demonstrated to BOO. BOO to also check the correctness of the feature	Should be able to get following information Base data for the entire world at 25 meters resolution or better as the requirement of the end

S/No	QRs/Specification	Trial Directives	Result expected /desired
	J. PROJECTION SYSTEM - 3D ACTIVE STEREO PROJECTOR		
112.	**i.** Size Display Technology : Latest 3D Active Stereo Projector with Laser / Laser Phosphor illumination	For all 3D Active Stereo Projector specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	The 3D Active Stereo Projector will project the high quality 3D image of an exercise area.
	ii. Light Output Brightness: 11500 +/- 10% ANSI Lumens or more		
	iii. Uniformity Brightness Uniformity : 90% or more		
	iv. Contrast ratio Contrast Ratio: 1200:1 sequential with dynamic contrast ratio of 8000:1 or better		
	v. Display Technology Resolution: Native resolution of minimum 2560 x 1600		
	vi. 3D Capability: Active Stereoscopic 3D @ 120Hz Capable of accepting 3D input sources at 2716 x 1600 @ 120 Hz		
	vii. Refresh Rate Input Signal Compatibility: Single cable Frame-sequential Active 3D Source upto 2560x1600@120Hz		
	viii. Image Processing The projector should be capable of accepting single cable frame- sequential Active 3D input at min 2560x1600@120Hz (together with embedded 3D stereo sync) over DP1.2 port		
	ix. Input Signal Compatibility Inputs : Min 2x DP1.2, each capable of		

S/No	QRs/Specification	Trial Directives'	Result expected /desired
	accepting Active 3D Stereo input sources at WQXGA @120 Hz over single DP cable – 01 x HDMI 2.0, 2 x DL DVI		
	x. Mandatory Features : Built-in Geometry Correction, blending, color correction & brightness control/matching	For all 3D Active Stereo Projector specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory	The 3D Active Stereo Projector will project the high quality 3D image of an exercise area.
	xi. Light Source Lifetime - Upto 35000 hrs or more		
	xii. <u>Inputs, Control and Networking</u> Laser / Laser Phosphor illumination		
	xiii. The Projector should be manufactured at brand's own Production facility. Re branded or Projectors manufactured at any 3rd party company which are not owned by the ProjectorBrand are not allowed.		
	xiv. Bidders shall provide evidence of name & location of manufacturing facility by means of BIS/CB certifications issued to the Projector manufacturer for product certification, by applicable certification agencies/authorities, with details of manufacturing facility/factory mentioned in the certificate. Applicable BIS or CB certificate shall be submitted with the technical bid document		
	xv. Tender specific authorization from OEM of projector has to be submitted by the bidder. If OEM has an Indian office, then authorization from the Indian office of the OEM should also be submitted		
	xvi. <u>Features</u> Comprehensive Color Adjustment		

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Intelligent Lens System for zoom, focus, horizontal and vertical offset		
	xvii. Dynamic iris		
	xviii. 99 Channel Memories		
	xix. Auto Setup		
	xx. Digital Keystone Correction		
	xxi. Dust sealed engine. filter-free design		
	xxii. Motorized yellow notch filter		
	xxiii. 3D upgradable		
	xxiv. Lens Mount Lens has to be decided as the room dimension for placement of projector either near to the screen or end of the oppposite wall of screen for easy maintenance. It should not fall right above the physical sand model in the middle		
	xxv. Lamp These equipments are not required in new proposed DSM	For all 3D Active Stereo Projector specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory	The 3D Active Stereo Projector will project the high quality 3D image of an exercise area.
	xxvi. Power Requirements 100-240 VAC 50/60 Hz operating voltage		
	xxvii. Operating Environment Temp: 40 to 104°F (5 to 40 °C)		
	xxviii. Humidity 20-80 non-condensing		
	xxix. Regulatory Approvals Product should conforms to BIS standards, safety, health and environment concerns.		
113.	EMITTER		
	Type Extra Long Range (RF based)	For emitter BOO will physically check all these parameter mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL	Emitter to provide support to 3D glasses with MWP.

S/No	QRs/Specification	Trial Directives	Result expected /desired
		approved laboratory or ILAC approved laboratory.	
114.	3D ACTIVE GLASSES		
	Type Extremely Light Weight / Full 120 Hz refresh / Long Lasting charging /USB charged / charger to be supplied with glasses.	To be physically check by BOO.	Glasses should capable of providing support for 3D vision.
115.	Flexible front projection screen		
	Type Front projection with fixed frame/mounting structure without any waviness in screen	To be physically check by BOO.	The 3D image will be projected over Front projection screen without waviness in screen.
	Gain 1 - 1.2 or better	To be physically check by BOO.	
	Screen Size 14 feet X 8.75 feet (aspect ratio of 16:10 same as projector) or more. Size of the screen to be decided as the room size and seating	To be physically check by BOO.	
116.	Ceiling Mount Kit		
	Finishing Fine Steel Finish	To be physically check by BOO.	Should provide support for 3D projector installation
	Utility To attach a single projector using the ceiling mount		
117.	IMAGE GENERATOR		
	Proposed Specifications	For all IMAGE GENERATOR hardware specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	Must align with specifications mentioned in QR
	Processor Processors: Intel Xeon quadcore or octacore processor		Must align with specifications mentioned in QR
	Liquid Cooling CPUs should have the option of Liquid Cooling		Must align with specifications mentioned in QR
	Chipset Latest compatible chip set		Must align with specifications mentioned in QR
	RAM		Must align with specifications

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Minimum 32 GB DDR4 or better RDIMM Memory System should support upto 192 GB or more of DDR 3 ECC memory with minimum 12 or more memory slots.		mentioned in QR
	Integrated slots Not required		Must align with specifications mentioned in QR
	Drive Controllers Integrated 6 channel SATA 3Gbps controller At least 2SATA ports should be eSATA capable. and optional eSATA Connector kit should be available		Must align with specifications mentioned in QR
	Keyboard Standard keyboard, optical scroll mouse		Must align with specifications mentioned in QR
	HDD Data Storage Capacity: 8 TB or higher System should support SFF SAS drives.		Must align with specifications mentioned in QR
	SAS controller Optional additional should provide Hot-spare drive capability		Must align with specifications mentioned in QR
	Optical Drive		Must align with specifications mentioned in QR
	Graphics Card Graphics: nVidia Quadro professional 8GB graphics card		Must align with specifications mentioned in QR
	Monitor 21.5" High Resolution Monitor (1920 x 1080), Response Time 8Ms	For all IMAGE GENERATOR hardware specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	Must align with specifications mentioned in QR
	Communications Gigabit Ethernet Integrated		Must align with specifications mentioned in QR
	Operating System Latest windows operating system		Must align with specifications mentioned in QR
	Form factor with tool free design		Must align with specifications

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Minitower with toolless entry and maintenance		mentioned in QR
	System should have integrated chassis handles		Must align with specifications mentioned in QR
	Chassis should be modular-built, with cable-less Power supply and components.		Must align with specifications mentioned in QR
	Screw-less disk mounting with Acoustic dampening rails and		Must align with specifications mentioned in QR
	Tool free PCI card installation features. System should feature active Acoustic Reduction. with noise level below 5 bels, CPU, Memory and chipset should have separate fans for cooling		Must align with specifications mentioned in QR
	Power Supply 1100 WATTS Continuous power supply or better		Must align with specifications mentioned in QR
	Full ranging input and APFC		Must align with specifications mentioned in QR
	Power Supply should be capable of self - testing without connecting to the motherboards		Must align with specifications mentioned in QR
	Surge tolerance upto 2000V		Must align with specifications mentioned in QR
	89% efficient		Must align with specifications mentioned in QR
	EPEAT Gold certification for the system model		Must align with specifications mentioned in QR
	K. ADMINISTRATIVE SYSTEM: EXERCISE SERVER HARDWARE		
118.	Operating system The server should support industry leading operating systems including Windows Server, Linux		
	Processors Latest Processors		
	Chipset 4+A442:A454 Latest compatible chipset		

S/No	QRs/Specification	Trial Directives	Result expected /desired
	minimum 16GB DDR3 registered (RDIMM) or unbuffered (UDIMM) memory, scalable upto 128 GB	For all ADMINISTRATIVE SYSTEM: EXERCISE SERVER HARDWARE specification BOO will physically check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	The Administrative serve will provide admin function, Data processing content creation. I will act as secondary server
	Network Offers LAN on motherboard capable of Gigabit speed		
	Support for 10/100/1000 networks		
	Storage On board controller capable of support RAID levels		
	Latest SATA Drive		
	DVD ROM Drive		
	Available media bay for tape drives		
	Management Embedded Remote Systems Management capable of providing Virtual KVM Virtual Media Supports industry standard compliance including IPMI2.0. SMASH.CLP.		
	Expansion slots More than 3 expansion slots available, including PCIe based		
	Interface Interface available for VGA. PS/2 and USB		
	Power supply Should have support for Redundant power supply		
	Remote - Option for remote		
	Management management card Industry Standard Compliance Support for ACPI, PC 2.3, PXE support, Wake on LAN, Microsoft Form Factor Base tower model with the option to be rack converted RAID		

S/No	QRs/Specification	Trial Directives	Result expected /desired
	RAID Level 1		
	L. CONTROL ORDER SYSTEM GRAPHIC WORKSTATION		
119.	Operating system Installed Processors Intel Core i7 Processor latest generation or better	For all CONTROL ORDER SYSTEM GRAPHIC WORKSTATION Specification BOO will physically check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	CONTROL ORDER SYSTEM will provide administrator to create sand model exercises.
	Processor type Latest processor		
	Memory Memory 16 GB or higher ,Data Storage Capacity 1TB or higher		
	Hard disk drive speed Audio Integrated High Definition Audio card		
	DVD Drive Latest SATA drive		
	Graphic sub system Graphics nVidia graphics card with minimum 2GB memory Audio Integrated High Definition Audio card		
	Monitor HD with multi-touch monitor		
	Display support: Dual Link; DVI-I Maximum Display Resolution Digital @ 60Hz 2560x1600 2 digital outputs		
	Supports OpenGL, direct X , Shader Model		
	CUDA Cores 192		
	Memory bandwidth 41.6 GB per sec		
	Network interface Gigabit Ethernet Integrated		
	Keyboard Standard keyboard, optical scroll mouse		
	Display System Monitor HD with multi-touch monitor		
	Access Control For USBs and DVD Drives		

<table>
<tr><th>S/No</th><th>QRs/Specification</th><th>Trial Directives</th><th>Result expected /desired</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="3">L. CONTROL ORDER SYSTEM GRAPHIC WORKSTATION</td></tr>
<tr><td>120.</td><td>SYNDICATE RESPONSE SYSTEM</td><td></td><td></td></tr>
<tr><td></td><td>
<table>
<tr><td>Size:</td><td>12.9" or more</td></tr>
<tr><td>Resolution:</td><td>2732x2048 pixel resolution at 264 pixelsper inch or more</td></tr>
<tr><td>Display</td><td>LED backlit with multi touch display withIPS Technology</td></tr>
<tr><td></td><td>Liquid Retina XDR Display</td></tr>
<tr><td>Chip</td><td>MI Chip, 8 core CPU</td></tr>
<tr><td>RAM / storage</td><td>8GB RAM/ 128GB storage or more</td></tr>
<tr><td>Operating System</td><td>IOS</td></tr>
<tr><td>Stylus</td><td>Stylus Pen to be provided</td></tr>
</table>
</td><td>For all Tablet hardware specification BOO will physically check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.</td><td>Tablet will provide trainees to submit their responses to the problem statement given</td></tr>
<tr><td>121.</td><td>NETWORKING</td><td></td><td></td></tr>
<tr><td></td><td>Point Standards & Functions
IEEE 802.3 -10BASE5/3a-10BASE2/3i10BASE-F/3i-10BASE-T
Number of Ports
24 port gigabit network switch or better
Protocol
CSMACD
Data Transfer Rates
i. Ethernet
ii. 10 MBPS (half duplex)
iii. 20Mbps (full-duplex)
iv. Fast Ethernet
v. 100 mbps (half duplex)</td><td>For all networking parameters BOO will check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.</td><td>User should be capable of transmitting data at high speeds, with current Ethernet standards supporting speeds of up to 100 Gbps.

User can use with a wide range of devices and operating systems. It can also be easily scaled to accommodate a growing number of users and devices.</td></tr>
</table>

S/No	QRs/Specification	Trial Directives	Result expected /desired
	vi. 200 mbps (full duplex)		
	vii. Gigabit Ethernet		
	viii. 2000 mbps (full duplex)		
	Topoplogy Star, Mesh		
	Network Cables Cat 6 (100 mtr max) Power/ Electrical Cable : Main power line with proper earthing will be provided within a vicinity of 10 m from the sand modelroom		
	Full half Duplex i. Full/half duplex far 10/100 Mbps speeds		
	ii. Full duplex for Gigabit speed		
	Media Interface Exchange Auto MDI/MDIX adjustment for all twisted-pair ports		
	LED Indicators Power CPU (per device) Link/Act. 10OMbps Speed (per 10/100 BASE- TX port) Link Act, 10/100Mbps Speed, 100/1000 Mbps Speed (Per10/100/1000 BASE-T port) Fx Link. Link Act, 100/10O0 Mbps Speed per SFP slot		
	L2 Features i. IGMP snooping: supports 64 multicast groups	For all networking parameters BOO will check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	User should be able communicate with each other seamlessly to devices from different manufacturers to communicate with each other seamlessly. User should be capable of transmitting data at high speeds, with current Ethernet standards supporting speeds of up to 100 Gbps.
	ii. Default flooding for non-joined multicast traffic		
	iii. 802.1D Spanning Tree		
	iv. Port trunk (Link Aggregation): up to 6 groups per device, up to 8 ports per group		
	LAN i. 802.1 Q VLAN standard (VLAN Tagging)		
	ii. upto 256 static VLAN groups		
	Quality of Service (QoS) i. Upto 4 queues per port		
	ii. Supports WRR mode in queue handling		

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Security i. 802.1x port-based access control		
	ii. Broadcast Storm Control: threshold of SK, Io,32K. 64K, 12SK. iii. 5I2K, [1024K.2048K, 96K_hytesper second		
	Safeguard_Engine to preteen CPU fem breast'muliastnezsflooding		
	Management i. Web-based GUI or Smart Console Utility		
	ii. SNMP support		
	iii. DHCP client		
	iv. Trap setting for destination IP, system events. fiber port events, twisted-pair port events		
	v. Port access control		
	vi. Web-based configuration backup/restoration		
	vii. Web-based firmware backup upload		
	viii. Firmware upgrade using Smart Console Utility		
	ix. Reboot		
	MIB i. RFC 1213 MIB-II		
	ii. Enterprise Private MIB		
	Switch Capacity 12.8Gbps	For all networking parameters BOO will check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory	User can use with a wide range of devices and operating systems. It can also be easily scaled to accommodate a growing number of users and devices. User should be able communicate with each other seamlessly to devices from different manufacturers to
	Transmission Method Store-and-forward		
	MAC Address Table 8K entries per device		
	MAC Address Update i. Up to 255 static MAC entries		
	ii. Enable disable and earning of MAC addresses		
	Packet Filtering Forwarding Rates Maximum 1488095 pps pet port		
	RAM buffer		

S/No	QRs/Specification	Trial Directives	Result expected /desired
	128 K Bytes & more per device		communicate with each other seamlessly.
	AC Input 100 to 240 VAC 50 60Hz internal universal power supply		
	Power Consumption 18.35 watts (max.)		
	Heat Dissipation 62.57 BTU/hr		
	Operating Temperature 0-40 C	For all networking parameters BOO will check all these parameter in the entire frequency range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory	User can use with a wide range of devices and operating systems. It can also be easily scaled to accommodate a growing number of users and devices. User should be able communicate with each other seamlessly to devices from different manufacturers to communicate with each other seamlessly.
	Storage Temperature -10 - 70 C (12 - 158 F)		
	Storage Humidity 5% to 90% non-condensing		
	Emission (EMI) i. CE Class A		
	ii. VCCI Class A		
	iii. FCC Class A		
	Safety CUL		
122.	Rack		
	A suitable aluminium rack for holding all hardware equipment. i. There should be provision for at least 1 U blank plate spacing between two adjacent equipment so as to provide sufficient ventilation. ii. Fan at top of each rack for heat dissipation.power supply panel with MCB at bottom iii. Front transparent/open door and rear metallic door with locking facility v. Adequate power supply socket for different equipment.	BOO will physically check the material of rack and ensure the rack is able to host all hardware equipment.	Rack should be such that it can withstand load of hardware equipment and can cover it from each side.

S/No	QRs/Specification	Trial Directives	Result expected /desired
123.	CABLING AND CONNECTORS		
	Type of wires Cabling and Connectors. Cables and connectors are required to be of very high quality as they transport active stereo video and transmission should not result in any loss to image quality. Cabling should include- Ethernet cabling using high-quality CAT6 cables and network switching equipment, as required, based on SMR layout.	For all CAT6 UTP cable parameters BOO will check all these parameter in the entire range mentioned in the QR with help of standard testing instrument, If the standard testing equipment are not available then firm must produce certificate of any government testing lab or NABL approved laboratory or ILAC approved laboratory.	The networking hardware should be able to transmit data up to 10 Gbps, which is ten times faster than Cate cables
	Jacket i. Material - polymer		
	ii. Thickness -		
	iii. Diameter-1.5 mm minimum		
	Cross i. Material		
	ii. Construction		
124.	UPS (10 NOS)		
	Rating	To be physically checked by BOO.	Must be as per QRs Specification
	Capacity in VA Load 10 KVA	To be physically checked by BOO.	Must be as per QRs Specification
	Capacity in WATTS Minimum 8000 watts.	To be physically checked by BOO.	Must be as per QRs Specification
	Rated Output Voltage 230V (1-Phase)	To be physically checked by BOO.	Must be as pesr QRs Specification
	Input	To be physically checked by BOO.	Must be as per QRs Specification
	Nominal Input Voltage 380 / 400 / 415; 3 Phase , N	To be physically checked by BOO.	Must be as per QRs Specification
	Input Voltage Range 160 - 280 V	To be physically checked by BOO.	Must be as per QRs Specification
	Input Frequency	To be physically checked by BOO.	Must be as per QRs

S/No	QRs/Specification	Trial Directives	Result expected /desired
	50 Hz +/- 5 Hz auto sensing		Specification
	No of Phases Three , single	To be physically checked by BOO.	Must be as per QRs Specification
	Input Connections 4 wire	To be physically checked by BOO.	Must be as per QRs Specification
	Output	To be physically checked by BOO.	Must be as per QRs Specification
	Output Power Capacity 8000 Watts 10 VA	To be physically checked by BOO.	Must be as per QRs Specification
	Nominal Output Voltage 380 / 400 / 415 (+/- 1%) static , 5 % Dynamic	To be physically checked by BOO.	Must be as per QRs Specification
	Voltage Regulation 230 ± 2%	To be physically checked by BOO.	Must be as per QRs Specification
	Output Frequency 50 / 60 Hz +/- 0.05	To be physically checked by BOO.	Must be as per QRs Specification
	Waveform Type sine wave	To be physically checked by BOO.	Must be as per QRs Specification
	Output Voltage Distortion Less Than 3%	To be physically checked by BOO.	Must be as per QRs Specification
	Crest Factor 3:1	To be physically checked by BOO.	Must be as per QRs Specification
	Output Connections	To be physically checked by BOO.	Must be as per QRs Specification
	Efficiency	To be physically checked by BOO.	Must be as per QRs Specification
	Efficiency at Full Load Upto >= 93 %	To be physically checked by BOO.	Must be as per QRs Specification
	Interface Port Latest	To be physically checked by BOO.	Must be as per QRs Specification
	Control Panel LED status display with load and battery bar-graphs and On Line : On Battery : Replace Battery : Overload and Bypass Indicators	To be physically checked by BOO.	Must be as per QRs Specification

S/No	QRs/Specification	Trial Directives	Result expected /desired
	Surge Energy Rating 1265 Jules or better	To be physically checked by BOO.	Must be as per QRs Specification
	Surge Protections Full time multi-pole noise filtering: 0.3% IEEE surge let-through. Response time	To be physically checked by BOO.	Must be as per QRs Specification
	Operating Environment 0 - 40 C	To be physically checked by BOO.	Must be as per QRs Specification
	Operating Elevation 0-3000 meters	To be physically checked by BOO.	Must be as per QRs Specification
	Online Thermal Dissipation > 1100 BTU / hr	To be physically checked by BOO.	Must be as per QRs Specification
	By Pass 380 / 400 / 415	To be physically checked by BOO.	Must be as per QRs Specification
	Batteries 60 mins backup	To be physically checked by BOO.	Must be as per QRs Specification
	Quality standards BIS compliance	To be physically checked by BOO.	Must be as per QRs Specification
	M. Non Functional Requirements		
125.	i. Security The solution must provide an end-to-end security model that protects applications, services, data and the infrastructure from malicious attacks or theft from both external and internal users. The solution should allow features for storing data in encrypted format in the database. In addition, the solution must provide fine grained authorization and access control mechanisms to ensure that sensitive and confidential information is not accessible to non-authorized persons.	To be checked by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	The whole System to be secure and all the data to be 100 percent protected. Should not be connected to any online network. The software should be proven to be highly scalable and capable of delivering high-performance as and when the data volumes increase. It is required that the
	iii. Availability The architecture should be proven to be highly	To be checked by BOO and a certificate in this	

S/No	QRs/Specification	Trial Directives	Result expected /desired
	scalable and capable of delivering high-performance as and when the data volumes increase. It is required that the hardware, software and application and deployment architecture should provide for Scale-Up and Scale out on the addition of multiple syndicate workstations, database servers, and all other solution components.	regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	hardware, software and application and deployment architecture should provide for Scale-Up and Scale out on the addition of multiple syndicate workstations, database servers, and all other solution components
	iv. Backup and Recovery It is required to implement the Storage Solution to address the Data backup/storage and retrieval requirements of the Project.	To be checked by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	
	v. Extension/ Flexibility Extensibility/Flexibility encompasses the ease of extending the architecture to include new functions and technologies in the future. Since this is a defence related project, it is required that the software being deployed shouldn't need or be connected to internet and there shouldn't be any need for any third-party software licenses. The vendor should be in a position to customize and extend the system as per the user requirements at any point of the time in the future.	To be checked by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	
	vi. Usability. The application should be easy to use with minimum data entry by the end users.	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	
	vii. Portability. System will be developed using industry standards framework/ open standards that will facilitate the coexistence and inter-changeability of multiple hardware and software technologies, tools, protocols, and interfaces	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	
	viii. Interoperability System should support the application/ data/ information level integration with other GIS systems based	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	

S/No	QRs/Specification	Trial Directives	Result expected /desired
	ix. Integration & Services Warranty and support for 24 months post Installation. ATS for Software, networking, cabling, upgrades and integration.	To be checked physically by BOO and a certificate in this regard may be obtained from OEM. Authenticity of certificate to be verified by BOO.	

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Approved /Not approved

Director General
Border Security Force