

F.No. P-63013/15/2013-Ord/BSF/MHA-Prov-I 757
Bharat Sarkar/Government of India
Griha Mantralaya/Ministry of Home Affairs
PM Division

26, Man Singh Road, Jaisalmer House
New Delhi, Dated 6th April, 2015

To,

DsG: AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject: QRs and Trial Directive for Digital Sand Model.

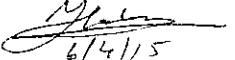
Sir,

The QRs and Trial Directives in respect of Digital Sand Model as per Annexure have been accepted by the Competent Authority in MHA.

2. The CAPFs concerned will be accountable for correctness of the QRs/Trial Directives
3. Henceforth, all the CAPFs should procure the above item required by them strictly as per the laid down Technical Specifications/QRs.

Yours faithfully,


Encl: As above


6/4/15
(M.K. Chahar)

Under Secretary to the Govt of India
Tel: 23381278

Copy forwarded for necessary action to :-

✓ The Section Officer (IT), MHA: It is requested to host the QRs and Trial Directives (soft copy attached) on the MHA website (under the page of Organizational Set up- Police Modernization Division- Qualitative Requirement under Misc. Equipments.


(R.K. Soni)
Section Officer (Prov-I)

Copy to: DDG (Procurement), MHA.

DIRECTOR GENERAL BORDER SECURITY FORCE
PROVISIONING DIRECTORATE (GRD SEC)

The Sub-group of Technical Experts on Training Equipments constituted by MHA vide their letter No. IV-24011/12/2011-Prov-I dated 13 Jun 2012, No. IV-24011/12/2011-Prov-I dated 28 Dec 2012 & UO No. IV-24011/12/2011-Prov-I- 350 dated 27 Jun 2013 held its meeting at BSF Headquarters on 03 Sep 2013, 30 Sep 2013, 17 Jan 2014, 27 Jan 2014, 09 Feb 2014, 12th March 2014 and 12th May 2014 to finalized the Qualitative Requirement of 'Digital Sand Model'.

After detailed deliberations the referred Sub-group has finalized the QRs of 'Digital Sand Model' which are as under:-

QUALITATIVE REQUIREMENT OF DIGITAL SAND MODEL
DATA WALL/PROJECTION SYSTEM

3D DATA WALL SPECIFICATIONS

Features	Specifications
Display Technology	Panel Size:-Min 55 Inch (54.64 Inch) Diagonal. LED IPS Panel
Brightness and Contrast	<ul style="list-style-type: none"> • 150 cd/ m2 in 3D • ANSI Contrast Ratio of 1400:1 or better • Dynamic Contrast Ratio > 5,00,000:1
Pixel Resolution & 3d technology	<ul style="list-style-type: none"> • Native resolution 1920 x 1080 Full HD (@ 60 Hz • Passive 3d
Panel Size	• 55" Diagonal or Better with 16:9 aspect Ratio
Bezel - Panel to Panel Gap	• 5.5 mm or less
Tni	• 110° C or more
Viewing angel	• 178°
Response Time	• 9ms or less
Surface Treatment	<ul style="list-style-type: none"> • Hard coating , • Anti Reflection Treatment of front polarizer • Reflection less than 5%
Life Time	• Min 60000 Hrs
Inputs, Control & Networking	<ul style="list-style-type: none"> • 1 x HDMI, 1 x DVI, 1 x Display Port, 1 x Component AV • 1 x USB • 1 x RJ 45, 1 x RS 232 • 1 x Audio
Output	• 1 x DVI, 1x Composite, 1x RGB
Audio Speakers	• Stereo 2 x 10 W RMS
Accessories	<ul style="list-style-type: none"> • Remote Control • User Manual • Cabling as Necessary • Polarized Glasses as required
Orientation	• Landscape and Portrait
VIDEO: PC)	• Input Resolution:- (RGB, HDMI, DVI-D)

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	<ul style="list-style-type: none"> • Recording Resolution: 1920 x 1080 @ 60 Hz:- (RGB, HDMI, DVI-D) • H Scanning Frequencies 30~68.5 Hz:- (RGB, HDMI, DVI-D) • V Scanning Frequencies 56~75 Hz:- (RGB), 56 Hz~63 (HDMI, DVI-D) • Pixel Freq:-148.5Mhz
Input Rear	<ul style="list-style-type: none"> • Digital : HDMI (1), DV(1) Display Port with HDCP for all input • Analog:-Component (1), AV (1) RGB (1) • Audio:-PC/AV/Component audio in (1) • USB:-USB(2)
Operational TEMPERATURE :-	<ul style="list-style-type: none"> • 0°C - 40°C
Operational Humidity	<ul style="list-style-type: none"> • 10% -80%
Std Certification	<ul style="list-style-type: none"> • Safety • EMC • Erp/ES

3D Multi Window Processor (MWP)

The MWP hardware should be able to provide platform with capability to create one large single seamless display on any operating systems like Windows, and Linux. It should allow the user to treat the multi display environment as a single large screen workplace, allowing easier and better interpretation of data on a variety of applications, transparently. This should also allow directly running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling. The hardware should be modular and should allow scaling of inputs as required in future by adding expansion chassis. The supported processor should have option able to play Passive stereo on display wall. The processor should also allow using a single projector in active Stereo up-to 1920 x 1200 @ 120 hz.

1.1.1 Multi Window Processor Hardware Qty.- 01

S.No.	Specification
1.	1 TB or more Storage Space – For Video Archival
2.	Intel 8 Core Xeon 3.0 GHz or Better
3.	Option for 2/4/6/8/12 Dual DVI/Display Port Outputs (Each supporting Active 3d resolution upto 1920 x 1200 @120 Hz) as well as Passive Stereo Resolutions upto 1920 x 1200 @ 60 Hz.
4.	2 DVI/ HDMI Inputs (Each support resolution upto 1920 x 1080 @ 60 Hz)
5.	2 Composite Video/VGA Inputs
6.	16 GB of System Memory or more
7.	2 or More GB LAN Ports
8.	1 Wireless Keyboard, 1 Wireless Optical Mouse
9.	Operating system Windows 7 64 bit Operating System or higher.
10.	Rack Mount Kit
11.	Conversion Cables for Workstation Inputs

1.1.2 Multi Window Processor Software Qty.- 01

Control software is required to achieve comprehensive and efficient use of all the hardware functionality. The controller software should be robust and 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 to connect to the hardware.

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S.No.	Specification
1.	Auto-detection of various external input video sources connected to the MWP
2.	Drag-and-drop user-interface to move active input video sources to the main display wall.
3.	Naming and specifying position size of various sources on the main display wall
4.	Support for controlling all MWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
5.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
6.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the MWP. It should be possible to control the remote applications by executing local mouse keyboard events on the MWP hardware on the remote systems.
7.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
8.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/ Touch Table.
9.	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.
10.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval.
11.	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.
12.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
13.	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.
14.	Support for cloning of video sources on the display wall
15.	Support for specifying a border width and color for video sources displayed on the wall
16.	Support for color correction and applying various image filters on the video sources
17.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
18.	Support for Contrast and Brightness Enhancement on input video sources
19.	Support for overlaying one video source over another and doing masking operation
20.	Support for locking aspect ratio on scaled video sources

Digital Sand Model Room Software Specifications (Projection System)Broad software specifications of Digital Sand Model Room :-

Features	Specifications
Digital sand model	<p>The digital sand model room solution should include the complete range of software required to create digital sand models and conduct sand model exercises effectively. The Vendor has to provide the source code for the complete customized application apart from the system binaries and operating system to the user.</p> <p>The software should be OGC compliant and able to integrate with other OGC compliant GIS products which are available in the Software Market.</p> <p>The vendor must submit the OGC compliance certificate for the following:-</p> <ul style="list-style-type: none"> i) WMS-Web Map Service ii) WCS – Web Coverage Service iii) WFS – Web feature Service iv) WFS-T – Web Feature Service (Transactional)
Rendering	<ol style="list-style-type: none"> 1. The Image Generator should generate 3D terrain in real time 60Hz - 120 Hz (stereo mode) on the fly (Direct from Source 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. This is important so that the user is able to replace old satellite images/elevation data without to go through the creation process which is time consuming and requires continuous training with replacement in manpower. 2. The software should be upgradable (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.
Modular Architecture	<ol style="list-style-type: none"> 1. The hardware/software solution should be modular in nature allowing more syndicates to be added or extended 2. Client-Server technology 3. All the clients (instructor, syndicates & collaborative) should be able to manoeuvre or control the Image Generator (3D display) using their own hardware/software through open source protocols over IP networks
GIS Features for the Instructor & Syndicates	<ol style="list-style-type: none"> 1. Creation of overlays using GIS including commonly used military symbols. Feature to send overlay to other syndicates and control order should be there 2. Easy feature & ability to mark Route of Advance based on drag and drop from hierarchical orbat tree 3. Line of sight analysis 4. View shed analysis 5. Find highest point within an area 6. Query to find area above a particular height 7. Integrated Ms Office Word/Pdf file within the GIS for explanation, narration with hyperlink to maps etc 8. Gun placement & trajectory algorithm to identify effective ranges and hit locations 9. Integration of sun & moon almanac 10. Automatic best route feature for cross country navigation omitting the no-go areas 11. GPS Integration

Integrated Map Data & Content	<ol style="list-style-type: none"> 1. Base data for the entire India at 30 meters resolution or better as per the requirement of the end user. 2. The package should have terrain based True colour balanced satellite imagery at 30 meters of elevation data for entire India and 200 Kms beyond International Border with India. 3. Two high resolution terrain or more (as per requirement of the users) of 10 km x 10 km (area will be specified during order finalization) with elevation data of 30 meters or better spacing with appropriate 3D models for the same 4. Digital Vector Map of India, scale 1:250000 or better, data comprising of the following:- <ul style="list-style-type: none"> • Administrative boundaries • Town & Villages • Highways, roads etc • Railways and station etc 5. Models & textures library- <ul style="list-style-type: none"> • 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
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Detailed Feature List of the software for the Digital Sand Model Room

1. Software Feature List for Creating Content:

Requirement: Single Deployment

Features	Specifications
	<p>All the DGN tags and fields should be imported properly as per Indian Army DGN files.</p> <ul style="list-style-type: none"> • Support for the following formats for vector data: <ul style="list-style-type: none"> - ESRI Shape file - Micro station DGN file - IHO S-57 (ENC) <p>Support for data files in various coordinate systems and conversions to a uniform coordinate system.</p>
Raster	Capability to open Raster (Topo Sheet or Satellite Map)
Dictionary	The module should have Data Dictionary with important map features as per Survey of India/CAMS
Other features in dictionary	The data dictionary amongst map attributes has well defined cartographic and military symbols, font styles and linkage to 3D symbols in open flight format, wherever possible
Digitization	On a hierarchical drop down use should be just able to digitize the predefined map feature without any extra effort
Doctoring of Terrain	The user should be able to doctor a terrain to add features like DCB or dunes etc
2D to 3D	The software should assist in preparing necessary files and map layers including xml files for real time 3D generation at the Image Generator end
Library	<p>The module should have a library of 3D Models & textures:</p> <ul style="list-style-type: none"> • 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,

	<p>Tibet, China)</p> <ul style="list-style-type: none"> • Characters like Human, Police & Paramilitary, Army, Civilian, Terrorist, Some animals etc • Vehicles, Aircrafts, Helicopters • Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground etc
Military symbols	All regularly used military symbols should be available in 2D format
File formats	Content creation module should work on dated files, geotiff and popular GIS & open source file formats
O/p	Feature to compress the imagery in compressed .ecw file format and vectors in popular GIS formats

2. **Software Feature List for 3D Visualization Rendering: The software should be simple and render fast (60Hz)**

Requirement: Single Deployment

Features	Specifications
Visualization feature	<ul style="list-style-type: none"> • Support for visualization of geospatial world as a single 3D terrain (similar to Google earth) • Vector layers should be visualized by draping in 3D over the underlying terrain. • Place-marks should be displayed at the using screen oriented text located at accurate positions in 3D. • Landmarks should be displayed at the correct location on the terrain as 3D models along with associated information. • Celestial bodies including sun, Moon and Stars should be displayed at correct locations in 3D. • Weather conditions including clouds, rain, snow and fog should be displayed realistically along with the rest of the 3D database. • Natural features such as rivers and ponds should be displayed in 3D as well as 2D, the features should be draped over the 3D terrain. • Manmade features should be displayed in 3D as well as using their corresponding 2D symbols. • Hyperlinks should be displayed at the accurate locations using intuitive symbols. • Support for guaranteed real time performance with arbitrarily large size data sets to allow interactive sand model creation. • Support for display of latitude, longitude and height above mean sea level, under the mouse pointer. • Support for MGRS coordinates under mouse pointer. • Support for tour recording and playback. User should be able to record topographic tour, building inside tour. • Support for hyper-linking recorded tours with narrative presentation.
Rendering technology	The Image Generator should generate 3D terrain in real time (60Hz for passive and 120 Hz for Active Display) on the fly (Direct from Source 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.
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.
Handling	No requirement to create multiple level of details (representations) of the 3-D models

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	and be able to handle the same in real time
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
2d footprints into 3d buildings	Capability to extrude millions of 2-D footprints into 3-D buildings with textures and scattered rooftop features from shape vector files
Environment conditions	The ability of environment conditions, illumination and special light feature to be provided. Support for configuring the environmental parameters including Celestial bodies like Sun, Moon and Stars.
Atmospheric conditions	like clouds, fog, haze, visibility, rain, snow to be simulated including 3D volumetric clouds
Time/day	Any time of Day/year should be able to commanded by the control order/instructor with a resolution of one second
Ephemeris model and constellation map	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
Sensor Simulation	Capability for simple sensor simulations for FLIR & Night Vision (Optional)
Conditions	Time-of-day, Weather and Atmospheric Simulation, and oceans
Elevation data	Analyzes and colorizes elevation data in real-time for Slope, Elevation, and Contours
Language control	Interactively modify the XML control language graphically to change how the 3-D scene is represented from the source data
Attribute data	Analyze attribution data on ESRI shape data in real-time to colorize, scale, and remove objects
Formats	Read, optimize, and render Geocentric Round Earth from DTED, JPEG2K, and other elevation formats
Geo specific imagery	Read, optimize, and render Geo-specific Imagery over the entire planet from ECW, JPEG2K, and other imagery formats
Data	Read, optimize, and render Vector data on the earth (roads, rivers, buildings, trees, etc.)
Shaders	Use shaders for realistic particle simulation effects such as control of smoke, contrails, wakes, brownout, dust clouds, explosions, and other animations
Effects	Particle based fog, haze, and Volumetric clouds for slant range accumulation visibility, lighting, and color effects
Points	Light points with support for light pools placed in real-time
Stereo display	The IG software should support Stereo Displays (passive and active) without any additional changes in models, terrain or software components

3. Software Feature List for Administrative Server

Requirement: Single Deployment

Features	Specifications
Master Creation	The administrative module should provide menus (in docking pane) for creation of masters of various types: Orbat - Hierarchy & Names (Own, Enemy &>Friendly), Communication, Jammers, Sensors, Weapons, Data Processor, Weapon Systems, Munitions, & Platforms
Repository of Maps & Terrain	The Exercise Server should also act as a repository of maps and terrain as a secondary storage
Security & Administrative Features	User authentication, creations of users, password, data access permissions etc
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

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	viewing. Option to load orbat with resources with men and weapons etc and associate with 2D and 3D symbols should also be provided
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.
Backup	The software should allow backup of any exercise based on access control

4. Software Feature List for Control Order or Instructor System

Requirement: Single Deployment

Features	Specifications
Sync	With the Exercise Server database and all necessary databases will be downloaded into his system
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.
User Creation	>Users (no. name and password) >Assigning of Orbat to syndicates
Deployment & Assignment	The software should allow the initial deployment of orbat and its assignment to different syndicates/users. And this in turn should mean that the syndicates should or will not be able to see the resources that have been assigned to them and those that are global.
Instructions & Responses	This pane should allow for entering descriptive information for the exercise and the instructions to the syndicates. Feature should also allow for hyper linking of text in the docking pane to maps for easy retrieval and referencing by syndicates. Control order should also be able to copy and paste from a normal ms office word file. The control order should also be able to view responses from each syndicate in an adjoining tab and based on a drop down list of syndicates
Overlays	The software should include commonly used military symbols in bitmap format and the user should be able to mark these as an overlay together with vector features (point, line, polygons and text). The software should allow for overlays to be send to all or selected syndicates. Control order can view overlays from all syndicates
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 and a click on next position for its movement. Automatic best route feature for cross country navigation omitting the no-go areas
Dynamic Changes	Control order should be able to view changes made to deployment and route of advance in a near real time mode.
Grid Analysis	<ul style="list-style-type: none"> • Line of sight, Weapon Range, View shed analysis • Find highest point within an area • Flexible query on grid file
Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system	<ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> were created independently and its visualization from any view point Visualization of deployments made by the syndicates with available 3D models
2D Map Toolsets	<ul style="list-style-type: none"> 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

5. Software Feature List for Syndicates

Requirement: Six (6) Deployments

Features	Specifications
Sync	With the Exercise Server database and all necessary databases for the orbat that has been assigned should be downloaded into his system and displayed
Selecting an Exercise	Should be able to select an exercise that has been created by the control order
Deployment	The software should allow syndicate to deploy its own orbat and load configure the assigned resource etc
Response	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 for emphasising by the syndicate.
Syndicate Responses	<ul style="list-style-type: none"> >Terrain Analysis, markings & noting >Responses as per each topic, requirement and question put forward by the Instructor with hyper link on the map, pictures etc >Deployment of own resources based on enemy's known and appreciated deployment dispositions on the digital map together with time lines and notes >The syndicate module allows for an integrated and interactive view of instructor narrative and requirements both in terms of a narration as well as hyperlink on map.
Overlays	The software should include commonly used military symbols in bitmap format and the user should be able to mark these as an overlay together with vector features (point, line, polygons and text). The software should allow for overlays to be send to all or selected users
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 and a click on next position for its movement.

	Automatic best route feature for cross country navigation omitting the no-go areas
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
Grid Analysis	<ul style="list-style-type: none"> • Line of sight, Weapon Range, View shed analysis • Find highest point within an area • Flexible query on grid file
Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system	<ul style="list-style-type: none"> • 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.
2D Map Toolsets	<ul style="list-style-type: none"> • 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

6. Software Feature List for Collaborative System

Requirement: Single Deployment

Features	Specifications
Type	Independent as well as an integrated component
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
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.
Tool Button	<ul style="list-style-type: none"> • Zoom in – user should be able to zoom on the digital map with an outward

Features	<p>movement on the touch screen</p> <ul style="list-style-type: none"> • Zoom in - 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 • Easy touch screen pan of map • Info tool to extract information on any vector dataset • Click on any area of map and extract the military grid referencing • Type in the military grid and the map should zoom onto that area/location • Calculate distance on two or multiple clicks • Moon Table almanac • 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 • 360 degree view shed analysis • Automatic view shed creation whenever any weapon id 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 • Weapon placement and trajectory analysis • View responses from different syndicates • 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. • And all Standard GIS features
Synchronization	<p>Dynamic display of real time scene through the Image Generator with controls available in the collaborative module:</p> <ul style="list-style-type: none"> • Change of view location based on zoom etc • Change of view-points based on Military Grid referencing • 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 • Animated sequence of a syndicate response (orbit deployment and route of advance plus overlays) based on dynamic real time date and time and weather parameters like <ul style="list-style-type: none"> >Clouds >Rain or Snow >Visibility >Wind speed and directions

7. Map Data & Content for the Digital Sand Model

Requirement: Single Deployment

Features	Specifications
Integrated Map Data & Content	<ol style="list-style-type: none"> 1. Base data for the entire world at 30 meters resolution or better as per the requirement of the end user. 2. The package should have terrain based True colour balanced satellite imagery at 30 meters of elevation data for entire India and 200 Kms beyond International Border with India. 3. Two or more high resolution terrain (as per requirement of the end users) of 10 km x 10 km (area will be specified during order finalization) with elevation data of 30 meters or better spacing with appropriate 3D models for the same

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	<p>4. Digital Vector Map of India, scale 1:250,000 or better, along the border & data comprising of the following:-</p> <ul style="list-style-type: none"> • Administrative boundaries • Water bodies • Town & Villages • Highways, roads etc • Railways and station etc <p>5. Models & textures library</p> <ul style="list-style-type: none"> • 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
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APPX-'B'

Digital Sand Model Room Hardware Specifications

SNo	Item	Attached As
1	Projection System	Appendix.I"
(a)	3D active Stereo Projector	
(b)	Emitters	
(c)	3D active glasses	
(d)	Flexible front projection screen	
(e)	Ceiling Mount Kit	
2	DSM Content Creator System	Appendix.II"
(a)	Content Creator Hardware	
3	Image Generator	Appendix.III"
(a)	Image Generator	
4	Administrative System	Appendix.IV"
(a)	Exercise Server Hardware	
5	Control order System	Appendix.V"
(a)	Graphic work station	
6	Syndicate Response System	Appendix.VI"
(a)	Graphic work station	
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9	Rack	Appendix.IX"
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(c)	Patch cords/connectors	
10	UPS	Appendix.X"

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1. Projection System

1a 3D active stereo projector

Features	Specifications
Size	Small Chasis, (LxWxH):22.1x19.7x10.2" and less weight(25 kg)
Light Output	Dual Lamp: 7500 ANSI lumens or better
Uniformity	At least 90% brightness uniformity across the screen
Contrast ratio	2500-10,000:1 using dynamic settings
Display Technology	1-chip/3 Chip or better. Note:-User to define requirement of chip during the process of tender.
Resolution	1920x1200 resolution or better @ 120Hz.
Refresh Rate	120 Hz Refresh Rate for flicker free stereo.
Image Processing	12 bit providing broad colour spectrum and wider signal input capability.
Input Signal Compatibility	Upto 60 Hz input for both stereo and mono content. HDTV formats VGA through to QXGA (2048x1536) All current HDTV/DTV formats. Multi-standard video decoder. Horizontal and vertical scaling, all inputs.
Inputs, Control and Networking	RS 232 In/Out RS 422 In Ethernet (10/100) USB Device GPIO (RS 2329 Pin male connector) Built-in back lit LCD keypad Remote Control (with optional wired XLR connection)
Features	Comprehensive Color Adjustment Intelligent Lens System for zoom, focus, horizontal and vertical offset Dynamic Iris 99 Channel Memories Auto Setup Digital Keystone Correction Dust sealed engine, filter-free design Motorized yellow notch filter 3D upgradable
Lens Mount	Dust Sealed 1-chip or 3-chip DMD light engine Motorized horizontal and vertical offset Tool-free lens insertion system Tilt adjustment Built-in light shutter
Lamp	Minimum Dual 200 WPVIP High Power: 2000 hrs @ 200W Minimum Low Power: 3000 hrs @ 150W Minimum
Power Requirements	100-240 VAC 50/60 Hz operating voltage 8.7A @ 100V operating current
Operating Environment	Temp: 40 to 104°F(5to40°C)
Humidity	20-80% non-condensing

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Regulatory approvals	UL, CSA, IEC 50.950(3 rd edition) FCC Class A, CE, CCC This product conforms to all relevant European directives, standards, safety, health and environmental concerns RoHS, WEEE
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1b. Emitters

Features	Specifications
Type	Active Stereo with extra long range

1c. 3D active Glasses-

Features	Specifications
Type	Wireless Active Stereo LCD Shutter Eyewear's, extremely light weight, full 120 Hz refresh support

1d. Flexible front projection Screen :-

Features	Specifications
Type	Flexible, Front projection flat Screen with mounting structure.
Gain	Min 1.3
Screen Size	16ft X 10ft (visible image size)

1e. Ceiling Mount Kit :-

Features	Specifications
Finishing	Fine Steel finish
Utility	To attach a single projector using the ceiling mount

Appendix 'II'

2. DSM Content Creator System

2 a) Content Creator Hardware

Features	Specifications
Operating system Installed	Window splat forms 64Bit
Processor type	Latest Processor
Memory	Minimum 8GB DDR3-1333 ECCRAM
Hard disk drive Speed	2x1TB SATA 3Gb/s NCQ 7200
DVD Drive	HP 16X DVD+-RW Super Multi SATA1 st Drive

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Graphic sub system Name	<ul style="list-style-type: none"> o NVIDIA or better Quadro GPU 2000D (1GB) o Frame Buffer: 1GB GDDR5 o Display support: Dual Link DVI-I-2: Maximum Display Resolution Digital @ 60Hz 2560 x 1600 ; 2 Digital Outputs o Support of Open GL, Direct X, Shader Model o CUDA Cores 192 o Memory Bandwidth 41.6GB/sec
Network interface	Integrated 10/100/1000 Base T network interface
Keyboard	Standard keyboard, optical scroll mouse
Display System	21.5" High Resolution Monitor (1920x1080), Response Time 8 ms
Access Control	For USB's & DVD Drives

Appendix III

3. Image Generator

3a. Image Generator Workstation:-

Features	Specifications
Processor	Latest Processor.
Liquid Cooling	CPU's should have the option of Liquid Cooling
Chipset	Latest compatible chip set.
RAM	Minimum 16 GB DDR3 RDIMM Memory System should support upto 192 GB of DDR 3 ECC memory with minimum 12 memory slots.
Integrated slots	All memory slots should be integrated onto the motherboard without any Additional cards.
Drive Controllers	Integrated 6 channel SATA 3Gb/s controller
SATA ports	At least 2 SATA ports should be eSATA capable, and optional eSATA Connector kit should be available
Chipset	Latest compatible chip set.
Keyboard	Standard keyboard, optical scroll mouse
HDD	Total 2X 1 TB HDD System should support upto 6 internal drives. System should support SFF SAS drives.
SAS controller	Optional additional should provide Hot-spare drive capability
Optical Drive	DVD+/-RW Double Layer Super Multi (SATA) with Light Scribe Direct Disc Labeling in Windows and Linux.
Graphics Card	<ul style="list-style-type: none"> o NVIDIA or better Quadro GPU 6000 (6GB) PCI Express Graphics card. o Frame Buffer 6 GB GDDR5 o Display support: Dual Link DVI-I-1; Display Port-2, Stereo (3pin-mini-din) –Yes: Maximum Display Resolution Digital @ 60Hz 2560 x 1600; 2 Active Display Channel o Support of OpenGL, DirectX, Shader Model, SLI Frame Rendering Support, G-Sync Option o Gigaflops (Single Precision) 1030.4 o Gigaflops (Double Precision) 515.2 o Memory Band width 144GB/sec
Monitor	21.5" High Resolution Monitor (1920 x 1080), Response Time 8 ms

Communications	Integrated Dual Broadcom 5764 LAN with InLine on TPM 1.2 Controller Additional Network controller with support for DASH OOB Management features.
Operating System	Windows platform 64 Bit
Form Factor with Tool free design	Minitower with tool-less entry and maintenance. System should have integrated chassis handles. Chassis should be modular-built, with cable-less Power supply and components. Screw-less disk mounting with Acoustic dampening rails and 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.
Power Supply	1100 WATTS Continuous Power Supply (or better): -Full ranging input and APFC -Power supply should be capable of self-testing without connecting to the mother board. -Surge tolerance upto 2000 V -89% efficient -EPEAT Gold certification for the system model.

Appendix 'IV'4. Administrative system4a. Exercise Server Hardware

Features	Specifications
Operating system	The server should support industry-leading Operating System platforms including Windows Server, Linux and Novell NetWare
Processors	Latest processor.
Chipset	Latest compatible chipset.
Memory	Minimum 8 GB DDR3 Registered (RDIMM) or Un buffered (UDIMM) memory, Scalable upto 48GB.
Network	Offers Lan-on-motherboard capable of Gigabit speed. Support for 10, 100/1000 networks
Storage	On board controller capable of support RAID levels 4* 1TB SATA Hard Drive@ 7200rpm 3.5", scalable upto 8 Disk 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	Inter face available for VGA, PS/2 and USB
Power supply	Should have support for Redundant power supply
Remote Management	Option for remote management card

Industry Standard compliance	Support for ACPI, PC12.3, PXE support, Wake-on-LAN, Microsoft® Logo certifications
Form Factor	Base Tower model, with the option to be rack converted
RAID	Raid Level 1

Appendix 'V'**5. Control Order System****5a. Graphic work station**

Features	Specifications
Operating system Installed	Windows platform 64 Bit or other better version of operating system
Processor type	Latest processor.
Memory	Minimum 8GB DDR3-1333ECCRAM
Hard disk drive Speed	Minimum 1TB SATA 3Gb/sNCQ7200
DVD Drive	16 XDVD+-RW Super Multi SATA1 st Drive
Graphic sub system Name	<ul style="list-style-type: none"> o NVIDIA or better Quadro GPU 2000 D (1GB) o Frame Buffer 1GB GDDR 5 o Display support : Dual Link DVI-I-2: Maximum Display Resolution Digital @ 60Hz2560x1600;2 Digital Outputs o Support of Open GL, Direct X, Shader Model o CUDA Cores 192 o Memory Band width 41.6GB/sec
Network interface	Integrated 10/100/1000 Base T network interface
Keyboard	Standard key board, optical scroll mouse
Display System	21.5" High Resolution Monitor (1920 x 1080), Response Time 8 ms
Access Control	For USB's & DVD Drives

Appendix 'VI'**6. Syndicate Response System****6a. Graphic work station**

Features	Specifications
Operating system Installed	Windows platform 64 Bit or other better version of operating system
Processor type	Latest processor.
Memory	Minimum 8GB DDR 3-1333ECC RAM
Hard disk drive Speed	Minimum 1TB SATA 3Gb/sNCQ7200
DVD Drive	16XDVD+-RW Super Multi SATA1 st Drive

Graphic sub system Name	<ul style="list-style-type: none"> o NVIDIA or better Quadro GPU 2000 D (1GB) o Frame Buffer 1GB GDDR 5 o Display support: Dual Link DVI-I-2: Maximum Display Resolution Digital @ 60Hz 2560x1600, 2 Digital Outputs o Support of Open GL, Direct X, Shader Model o CUDA Cores 192 o Memory Band width 41.6GB/sec
Network interface	Integrated 10/100/1000 Base T network interface
Keyboard	Standard key board, optical scroll mouse
Display System	21.5" High Resolution Monitor (1920x1080), Response Time 8 ms
Access Control	For USB's & DVD Drives.

Appendix 'VII'

7. Collaborative Response System

7A. Collaborative Hardware Technology

Features	Specifications
Technology	Features to recognize fingers, hands, and objects placed on the screen, including more than 30 simultaneous touch points.
Microsoft Surface Support	The software should allow for connecting user (with multi-touch) with digital maps and devices with pre-programmed and simulated actions
Form Factor	Thin form factor with multiple configuration like wall hanging or horizontal deployment
Screen (Diagonal) Size	40"
Resolution	1920 x 1080
Brightness	300cd/m2
Contrast Ratio	2000:1
Pixel Pitch	0.46125mm (H) x 0.46125 (V)
Power Consumption	230W (Max)
Embedded System	Embedded or separate AMD /Intel processor paired with the AMD Nvidia GPU featuring Radeon HD 6700M Series GPU featuring support to deliver significant processing horsepower and outstanding graphics capability.

Appendix 'VIII'

8. Networking

Features	Specifications
Port Standards & Functions	IEEE 802.3 10BASE-T Ethernet (twisted-pair copper) IEEE 802.3u 100BASE-TX Fast-8Gbps Ethernet (twisted-pair copper) IEEE 802.3ab 1000BASE-T Gigabit Ethernet (twisted-pair copper) IEEE 802.3z Gigabit Ethernet (fiber) ANSI/IEEE 802.3 NWay auto-negotiation IEEE 802.3x Flow Control Port mirroring
Number of Ports	24 10/100BASE-TX ports, 2 10/100/1000 BASE-T ports, 2 combo 10/100/1000BASE-T SFP ports *
Protocol	CSMA/CD
Data Transfer Rates	Ethernet: 10Mbps (half-duplex)

	20Mbps (full-duplex) Fast Ethernet:
	100Mbps (half-duplex)
	200Mbps (full-duplex)
	Gigabit Ethernet:
	2000Mbps (full duplex)
Topology:	Star/Mesh
Network Cables	UTP Cat. 5, Cat. 5e (100 m max.) EIA/TIA-568 100-ohm STP (100 m max.)
Full/half Duplex	Full/half duplex for 10/100Mbps speeds 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. 100Mbps Speed (per 10/100/BASE-TX port) Link Act. 10/100Mbps Speed. 100/1000Mbps Speed (Per10/100/1000BASE-T port) FX Link. Link Act. 100/1000Mbps Speed (per SFP slot)
L2 Features	IGMP snooping: supports 64 multicast groups Default flooding for non-joined multicast traffic 802.1D Spanning Tree Port trunk (Link Aggregation): up to 6 groups per device, up to 8 ports per group
LAN	802.1Q VLAN standard (VLAN Tagging) Up to 256 static VLAN groups
Quality of Service (QoS)	802.1p Priority Queues standard Up to 4 queues per port Supports WRR mode in queue handling
Security	802.1x port-based access control Broadcast Storm Control: threshold of 8K, 16K, 32K, 64K, 128K, 512K, 1024K, 2048K, 4096K bytes per second Safeguard Engine to protect CPU from broadcast/multicast/unicast flooding
Management	Web-based GUI or Smart Console Utility SNMP support DHCP client Trap setting for destination IP, system events, fiber port events, twisted-pair port events Port access control Web-based configuration backup/restoration Web-based firmware backup/upload Firmware upgrade using Smart Console Utility Reboot
MIB	RFC 1213 MIB-II Enterprise Private MIB
Switch Capacity	12.8Gbps
Transmission Method	Store-and-forward
MAC Address Table	8K entries per device
MAC Address Update	Up to 256 static MAC entries Enable/disable auto-learning of MAC addresses

Packet Filtering/Forwarding Rates	Maximum 1,488,095 pps per port
RAM Buffer	128KBytes & more per device
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
Storage Temperature	-10 - 70 C (12 -158 F)
Storage Humidity	5% to 90% non-condensing
Emission (EMI)	CE Class A VCCI Class A FCC Class A
Safety	CUL

9. Rack

9a) Description

Features	Description
Size	19U Mountable
Front Door	Lockable Transparent Glass Door
Fan	2 Nos 90 cfm, 230V Fans fitted over a sliding module.
Cable Manager	2 Nos Rack mountable non-metallic power socket strip with witch and fuse. 5 Nos (Minimum) 5A Sockets per strip
Cantilever Shelf	2 Nos 19" 1U Horizontal Cable Manager.
Mounting Hardware	2 Nos 19" 1U Vertical Cable Manager.
Size	2 Nos
Front Door	Front Panel Mounting Hardware

9b. CAT 6 UTP cable

Features	Description
No. of wires	4 pairs
Conductor	Material
	Thickness
	Diameter
Insulation	Direction
	Pitch Ref.

Inner Layer	Direction
	Pitch Ref.
Rip Cord	Material
Jacket	Material
	Thickness
	Diameter
Cross	Material
	Construction

9c. Patch cords/connectors

Features	Description
As required	As required

Appendix 'X'

10. UPS


Features	Specifications
Rating	
Capacity in VA	10 KVA
Capacity in WATTS	4200 Watts.
Rated Output Voltage	230V (I-Phase)
Input	
Nominal Input Voltage	380/ 400/ 415
Input Voltage Range	160 - 280V
Input Frequency	50 Hz \pm 5 Hz (auto sensing)
No of Phases	Three
Input Connections	4 wire
Output	
Output Power Capacity	4200 Watts / 10 kVA
Nominal Output Voltage	380/ 400/ 415 (\pm 1%)
Voltage Regulation	230V \pm 2%
Output Frequency	50.60 Hz \pm 0.05
Waveform	Type sine wave
Output Voltage Distortion	Less than 3%
Crest Factor	3:1
Output Connections	(8.0) IEC 320 C13, (2.0) IEC 320 C19, (6.0) IEC Jumpers
Efficiency	
Efficiency at Full Load	Upto \geq 93%
Interface Port	DB-9 RS-232, Smart-Slot
Control Panel	LED status display with load and battery bar-graphs and On Line : On Battery : Replace Battery : Overload and Bypass Indicators
Surge energy rating	480 Joules


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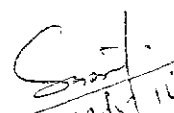
Surge Protections	Full time multi-pole noise filtering: 0.3% IEEE surge let-through: response time (< 3% Ph/Ph) : meets UL 1449
Operating Environment	0 - 40 ° C
Operating Elevation	0-3000 meters
Online Thermal Dissipation	>1100 BTU/hr
By Pass	330 400 415 (+ 1%) (input)
Batteries	60 mins backup
Quality standards	ISO 9001-2000 certified to Safety Standards and EMC standard as per IEC standards


Note -

1. The requirement of 3 D Data wall or Projection system is to be decided by the user.


 (B.C. Jaiswal) DIG, SIB BSF

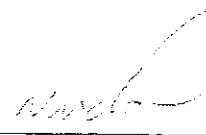

 S.K. Saha, JIC BSF

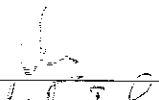

 Smit Gupta, PSO(E), BSF



 Rajesh Ekka, Dy-DIG BSF

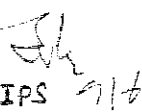

 Rajesh Kumar, AC, BSF


 R. P. Bhatt, JAO, SIB


 Alok Awasthi, DC, CRPF


 Maj. Sahod. V. Rane, NSG


 Manoj Kumar, Dy-DIG, SIB

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