

Final ORS/Technical Specifications of Integrated GIS Project including Software and Hardware


on 23/02/2016


SERVER


Sl. No	Particulars	Description
1.		The GIS server should be based on a Services Oriented Architecture (SOA).
2.		Should support JAVA/VB SCRIPT, .Net etc and other latest technologies.
3.		OGC certification and capability to serve and consume OGC complied web services including WMS, WFS, WCS and WFS(T).
4.		Should be based on 64 bit architecture or better.
5.	Architecture, Interoperability and Integration	Should support Windows / Linux / Sun Solaris platform.
6.		Should be able to support broad range of clients including browsers, desktops, Mobile Handsets.
7.		Should supports unlimited Desktop client connection. Desktop GIS applications with the capability to consume WMS, WFS, WFS services should be able to connect and use data from the server.
8.		Server Should support Oracle, SQL, Postgres and from any of these open source and COTS databases: DB2, Informix, Windows Azure SQL Database, IBM Netezza, Tera data, MySQL. (Any DB License as required should be provided by vendor)
9.		The server should support handling, management loading of the following GIS formats: <ul style="list-style-type: none"> - Raster Formats like Tiff, Geotiff, IMG, JPEG, WMS, and other standard formats. - Vector formats like shape files, kml, dgn, WFS, WFS-T and other standard formats - Elevation formats like DTM, DTED, Geotiff, WMS and other standard formats. - Formats for symbols and annotations like png, jpeg, bmp, flt, collada and other standard formats Should support unlimited number of Editing and viewing clients. It should support multuser editing. Should have browser-based access for viewing & editing of Geo-Spatial Data. Should be capable of maintaining data history, version management and conflict detection/resolution. Should have geo-processing framework, geo-processing tools, core analysis functionalities, spatial and statistics analysis functionalities. Should have centrally managed data, models, tools, maps and applications. Should have the capability to link documents like Adobe pdf, word/power-point JPEG, GIF, PNG, DTED and TIFF files etc to map features GPS data/Personal Tracking/UAV integration capability with Synchronization from the field. Should support database check in-check out/replication functionalities hence maintaining the parent child relationship of Master Database. Should have open access to extensive GIS capabilities so as to enable organizations to publish and share geographic data(2D&3D) maps, analysis tools, Manipulate data, 3D models etc.
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15.	GIS Server Features	
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19.	The server should have in built map caching capability.
20.	Application Server must support network analysis and perform Routing analysis, Service Area; Analysis, O/D Cost Matrix, Tracking Analysis.
21.	It should provide imagery access quickly after acquisition with dynamic mosaicing and on-the-fly processing.
22.	It should provide fast, server-based processing, enabling on-the-fly creation of multiple image products from a single source.
23.	It should minimize data duplication while maximizing the amount of imagery products that can be created because image processing and serving has been combined.
24.	Should have option to include connectors for common data streams including in-vehicle GPS Devices, mobile devices and social media providers.
25.	Geo Fence areas of interest using existing feature data to detect the spatial proximity of Events.
26.	Should have options of sending Alerts across multiple channels such as e-mails, texts, and Instant messages.
27.	Should support standard Web server/application server.
28.	Should have Web Application Functionalities like pan, zoom, identifying features on a map, feature based hyperlink, measure distance, map-tips, interactive north arrow, magnification window, overview window, find place, query attribute, search attribute, editing and geo processing task.
29.	Should have Web Editing Application Functionalities like simultaneous Feature class editing, isolated editing in separate versions, Undo/Redo operations, conflict detection, snapping by layer, snapping to new geometry, set table snapping, modify, merge, split features, specify an Exact X, Y location, modify and create attribute values, maintain attribute values through defined rules(Domain), any custom component based Tool for editing.
30.	The software should allow visualization of data in 2D, 3D in web as well as desktop application.
31.	The software should allow hosting prerecorded video content from CCTV, UAV feeds, sensors etc and accessible through web, desktop or mobile applications
32.	The application should support LDAP (Light weight Directory Access Protocol) or Active directory based authentication. <ul style="list-style-type: none"> - Control user access and credentials to data by assigning roles. - Hide data completely, prevent manipulation, or allow editing, based on role compartmentalize data based on accessibility. - Define which groups of users can view and access data through Discretionary Access Control (DAC). - Logging records all transactions including log-ins, searches, downloads, uploads, edits, and deletions.
33.	Should support Single sign-on, authentication module.
34.	Should support SSL 256 bit encryption or better and signed certificates to ensure complete security from browser to server.
35.	Should enable a secure, private sharing of confidential data that can be deployed on private network to promote collaboration on maps and applications within the organization.
36.	Support to Connect securely Operate the Web application over a Hypertext Transfer Protocol Secure (HTTPS) Connection. Optional Lockdown mode to remove anonymous access and require all users to log in.







WEB APPLICATION

(6)

37.	Connect to GIS Server and Access its functionality	
38.	The Web GIS user interface would need to be configured as per user requirement	
39.	Support for GIS Map, Vector, 2d, 3D Symbology display from server. i) City models with extruded building and other features in proper texturing. ii) Can map and manage airports and assets for planning and execution. iii) Facility to views, planning & analyze 3D objects (Airport / Railway) iv) Efficiently create, maintain and publish aeronautical charts also easily manage, visualize and analyze transportation networks.	
40.	Send and Receive GIS as well as Non GIS data.	
41.	i) Allow tree based view of multiple raster and vector layers from GIS Server or other WMS/WFS sources, and change visibility. ii) Allow custom grouping of layers, and colorize based on layer type. iii) Support for search and filter of data based on attribute or buffer based search. iv) Support for playback of time series data.	
42.	Support for Pan, Tilt, Zoom with display of Map and GIS data in 2D as well as 3D in web browser.	
43.	Web Application i) Support for display of position under mouse. Support for calculating Distance, Area calculations and point to point navigation. ii) View image as if it were locally on your system iii) Displays the optimal presentation of the image automatically iv) Dynamically adjust imagery brightness, contrast, and sharpness in the browser as desired v) Draw lines, polygons, circles, and buffers vi) Insert icons in many shapes and sizes (e.g., tanks, planes, markers) vii) Enter text annotations viii) Measure geographic coordinates using sensor model geometry, not approximations ix) Underlying terrain used if available for geospatially correct measurements x) Measure distances and height calculations using sensor model xi) Color-code every annotation and entry	
44.	Interface for: xii) Collaborate via chat and jointly edit products in real-time	

	<ul style="list-style-type: none"> - Update the attribute metadata for a product - Change or add geospatial footprints - Perform batch updates
45.	<p>Support for downloading GIS data for offline usage.</p>
46.	<p>Interface and Support for:</p> <ul style="list-style-type: none"> i) Detailed information about every data processing job ii) Control processing via Cancel Start, Schedule options iii) Status indicates when jobs complete iv) Continue working while jobs run
47.	<p>Provide a Cataloging tool for creation of catalog database locally or on Database like Oracle or MS SQL for efficient access, management and organization of raster, feature, projects and other geographic assets. In the Cataloging tool the user should be able to, Manage geographic data.</p> <p>Catalog/Store raster, feature, and project information</p> <p>Maintain detailed information including type, dimension, dates, tags, metadata, and custom data.</p> <p>Search and find the standard geographical data you require for a project, using various text and geographic properties.</p> <p>Work collaboratively, contributing all updates to a common repository.</p> <p>Automatically scan and catalog entire folders.</p> <p>Store connections to various data sources.</p> <p>Catalog's data sources can be located on a local disk, on the network, on Oracle or on an SQL Server.</p> <p>On the Client there should be an ability to connect (only) – Catalog layers should be located into the project.</p> <p>In the project editor and or all modifications to the project are to be automatically need to be updated in the catalog every time the project is saved.</p> <p>Should have the facility of Activating/Deactivating User Authentication, Adding and Editing Users, Permissions setting to view, modify, manage catalog.</p> <p>Activate or deactivate user authentication turn on or off user name and password authentication when connecting to the catalog.</p> <p>Manage catalog users- Add or delete users or assign different permissions</p> <p>Add/Modify custom fields- Add custom field to each layer's property sheet in the catalog for use later in the Query.</p> <p>Broken Links: Catalog should generate a list of all catalog layers whose link to the data source is broken. This happens when a data source is moved, renamed or deleted, or a network drive is inaccessible. If you know the new locations of the data source, you can repair the broken link.</p> <p>Catalog client service for the web(CSW)</p> <p>You can select multiple layers and multi edit their properties. This saved the time of editing each layer separately and ensures that all the layers have the required identical properties.</p> <p>Software should search the catalog by either or both the following:-</p>

Data Management Features

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(16)

	By Geographic region/Coordinates
	By Search Query

MOBILE APPLICATION


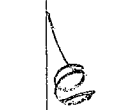
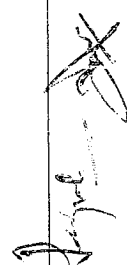
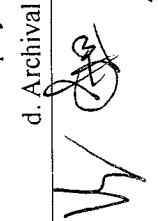

48.	The mobile application user interface has to be customized as per user requirement.
49.	Support for the smart phones and tablet devices with GPS Support Support for:- Map Display and Query on attribute from GIS Server. Obtain up-to-date imagery and documents from a connected Web Server on your device Search your data by times and dates, keywords, types, and geospatial location. Reporting back Create reports while in the field. Send geo tagged pictures from device to GIS server

DESKTOP APPLICATION

50.	The desktop application user interface has to be customized as per user requirement.
51.	Should be able to connect to GIS server to access functionality, access and publish data. Should be able to load, edit and manage local datasets as well as from GIS server using WMS, WFS, WF-T protocols.
52.	Support for automatic conversion and registration of geo tagged images and vector files on terrain data. - Convert one raster format to another. - Convert one vector format to another. - Facility to take screenshot and video capture of selected area. - Optimization of datasets; for faster loading.
53.	<p>Display And Interaction</p> <p>a) Map Interaction</p> <p> i) Pan, Zoom, Tilt</p> <p> ii) Lat Long Under Mouse</p> <p> iii) Geo Jump</p> <p>b) Map display</p>

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		<ul style="list-style-type: none"> i) Tabular Data and 2D/3D Graph Viewing ii) Raster Data display iii) Vector Data Display iv) 3D Elevation surface display v) Time animation and temporal Data vi) Layer Reordering vii) Scale-Dependent Display
54.	<p>Data Creation and Management Options</p>	<ul style="list-style-type: none"> c) Print to PDF, Printer. a) Vector Data Editing <ul style="list-style-type: none"> a. Define and Edit Point Features, Colors, Styles and custom Attributes b. Define and Edit Line Features, Color ,Styles and custom Attributes c. Define and Edit Polygon Features, Color, Styles and custom Attributes b) Raster Editing <ul style="list-style-type: none"> a. Change Geo tagging b. Edit Raster Layer Order c. Contrast Adjustment d. Optimize Image e. Specify Transformation methods f. Specify Spatial reference information c) Ability to add 2D, 3D and dynamic objects to the terrain. <ul style="list-style-type: none"> a. Video on Terrain b. Video Billboard c. 2D/3D symbol animation on user defined Route d) Create 3D/2D fence wall from shape/line features. e) Annotations and Marking for Text, 2D , 3D Symbols and Annotations f) Data Management Interface <ul style="list-style-type: none"> a. Sharing Publishing and sharing data, analysis results with multiple users b. Administration and Versioning c. Display and Query d. Archival and Retrieval

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		e. Manage replicas for Spatial referencing image data (geo referencing)
55.	3D Window Viewing Option	<ul style="list-style-type: none"> Tree View for Layers Geo Jump to selected layer/Element Raster Layer Opacity Change Field of view Manage Environmental effects Fog, Snow, Rain Direction, Tilt and Roll Angles Flythrough and Walkthrough on Terrain and Indoor Views Shadow, Time of Day, Fog, Clouds and Precipitation Effects
56.	Indian Military Grid and Symbols	<ul style="list-style-type: none"> Should provide complete Indian Military Symbolology Read and display geo-referenced raster maps in TIF format, with both latitude and Longitude and Easting & Northing (4/6/8/10) digit displayed Dynamic reading of correct values of easting & northing (Grid Ref.) EN in (4/6/8/10) digits. Read the MIL co-ordinates and flat attribute date pertaining to the DGN maps which comes from CAMS as Oracle Dump.
57.	Presentation/ Briefing Tool for desktop	<ul style="list-style-type: none"> Users should be able to perform the following operations with controllable parameters: <ul style="list-style-type: none"> Time/preset button based switching of Visibility of any raster/vector layers Time/preset button based camera flythrough/walkthrough along a path Time/preset button based Information popup Time Spanning using fast and slow playback speed
58.	Publishing of the Projects	<ul style="list-style-type: none"> User should be able to define projects and download raster/vector data with attributes for offline usage. User should be able to work on offline raster/vector datasets with attributes and should be able to load on server when online.
59.	GIS Analysis	<ul style="list-style-type: none"> Default Analysis: <ul style="list-style-type: none"> - Attribute based GIS Queries; buffer based queries on the buffer zone - Line of Sight - Slope Aspect - Elevation Profile - Contour Generation - Distance, area measurement aerial and on ground - Gun Range - And others standard Analysis 3D Result Plotting:- <ul style="list-style-type: none"> - Incidents, attribute based queries results as heat map, points, bar graphs etc.

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IMAGE PROCESSING APPLICATIONS

1.	Data Format Support	<p>The software should support standard GIS formats including TIFF, GEOTIFF etc.</p> <ul style="list-style-type: none"> - Raster cell Data viewing - Raster Formats and encoding conversion from one format to another - Region of Interest extraction, bands stacking or splitting - Linear and non-linear filtering - Color-mapping and adjustment including hue, saturation and contrast adjustments
2.	Raster Operations	<ul style="list-style-type: none"> - The software should allow generating optimized versions for large raster files - The software should allow geo-registration of Raster images using GCP/Control Points - Accuracy refinement based on ground control points - Ortho-rectification (sensor to ground) - Pan-sharpening
3.	Data Preprocessing	<ul style="list-style-type: none"> - Should Support Feature Extraction Options
4.	Feature Extraction Options	<ul style="list-style-type: none"> - Multi-threaded Supervised and unsupervised image classifier algorithms such as K-Means or Self Organizing Maps etc. - Confusion matrix computation with respect to reference or ground truth data - Classification map regularization - Fusion of several classification maps - Object Based Image Classification
5.	Image Classification Mechanisms	<ul style="list-style-type: none"> - Conversion between labeled raster and GIS vector file - Raster to Vector Conversion
6.	Image Segmentation	<ul style="list-style-type: none"> - Local metric based change detection framework - Change-detection by supervised classification - Visual Comparison tools to slide, blend, flicker multiple image data sets
7.	Change Detection	

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Being an integrated GIS Solution, following Hardware will require to Host service and to access at client side

⇒ Hardware part

SL NO	REQUIREMENT
01	Application Server with Operating system.
02	Database Server- With OS and Database software
03	SAN (Storage device) with replication software for DR
04	Router
05	Core switches at DC/DR
06	Distribution switches at DC/DR
07	Application load balancer
08	IPS/Firewall/UTM / ENCRYPTION DEVICE
09	GIS Software with proposed QR

Note:- Hardware configuration will be decided by the user organization at the time of tender and licensing also decided by user organization

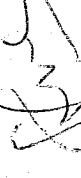
REQUIREMENT

- A) Desktop (Standard) with following features
 - || 3D analysis features
 - || Spatial analysis features
 - || Full motion video playback functionality
 - || Network analysis features
 - || Data interoperability
- B) GIS Server (Enterprise) with following extensions :-
 - || Portal for GIS Server for serving data and geo processing


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C) Image Processing Software	As part of solution as per user organization
D) Customized Web GIS Applications as follows:- Customized Application on GIS desktop Customized Web Application Customized Mobile Application	As part of solution as per user organization
E) Training on GIS and integration with existing ERP Application and Tracking application.	As part of solution as per user organization
F) Existing Map Data migration	As part of solution as per user organization


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Sunil Soni
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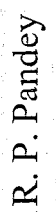

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[Approved / Not Approved]


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 DG, CRPF

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Final Trial Directive of Integrated GIS Project including Software and Hardware on 23/02/2016.

All parameters/specifications mentioned in QRs will be checked by board by ascertaining/verifying following checks in the presence of Vendor/Supplier/Manufacturer. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer of the force concerned.

- i) **Physical Checks:-** In this category, specifications of the equipment will be checked physically as per QRs.
- ii) **Functional Checks:-** The vendors will show all the features/configuration of the equipment functioning on ground to the board of officers during trials.
- iii) **Submission of Certificates:-** Specification which cannot be checked due to lack of testing facilities/expertise, self certificate of OEM has to be provided by the vendor/bidder during trial.

SERVER

Sl. No	Particulars	Description	Proposed Trial Directives
1.		The GIS server should be based on a Services Oriented Architecture (SOA).	Board will check Functionality test to be demonstrated by OEM
2.		Should support JAVA/VB SCRIPT, .Net etc and other latest technologies.	Board will check Functionality test to be demonstrated by OEM
3.		OGC certification and capability to serve and consume OGC complied web services including WMS, WFS, WCS and WFS(T).	Board will check Functionality test to be demonstrated by OEM
4.		Should be based on 64 bit architecture or better.	Board will check Functionality test to be demonstrated by OEM
5.	Architecture,	Should support Windows / Linux / Sun Solaris platform.	Board will check Functionality test to be demonstrated by OEM
6.	Interoperability and Integration	Should be able to support broad range of clients including browsers, desktops, Mobile Handsets.	Board will check Functionality test to be demonstrated by OEM
7.		Should supports unlimited Desktop client connection. Desktop GIS applications with the capability to consume WMS, WFS, WPS services should be able to connect and use data from the server.	Board will check Functionality test to be demonstrated by OEM
8.		Server Should support Oracle, SQL, Postgres and from any of these open source and COTS databases: DB2, Informix, Windows Azure SQL Database, IBM Netezza, Tera data, MySQL.	Board will check Functionality test to be demonstrated by OEM
9.		(Any DB License as required should be provided by vendor) The server should support handling, management loading of the following GIS formats:	Board will check Functionality test to be demonstrated by OEM

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<p>GIS Server Features</p> <ul style="list-style-type: none"> - Raster Formats like Tiff, Geotiff, IMG, JPEG, WMS, and other standard formats. - Vector formats like shape files, kml, dgn, WFS, WFS-T and other standard formats - Elevation formats like DTM, DTED, Geotiff, WMS and other standard formats. - Formats for symbols and annotations like png, jpeg, bmp, flt, collada and other standard formats 	<p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p> <p>Board will check Functionality test to be demonstrated by OEM</p>
<p>10. Should support unlimited number of Editing and viewing clients. It should support multiuser editing.</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>11. Should have browser-based access for viewing & editing of Geo-Spatial Data.</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>12. Should be capable of maintaining data history, version management and conflict detection/resolution.</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
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<p>15. Should have the capability to link documents like Adobe pdf, word/power-point JPEG, GIF, PNG, DTED and TIFF files etc to map features</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
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29.	Web Application Development Features Should have Web Editing Application Functionalities like simultaneous Feature class editing, isolated editing in separate versions, Undo/Redo operations, conflict detection, snapping by layer, snapping to new geometry, set table snapping, modify, merge, split features, specify an Exact X, Y location, modify and create attribute values, maintain attribute values through defined rules(Domain), any custom component based Tool for editing.	Board will check Functionality test to be demonstrated by OEM
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32.	Security The application should support LDAP (Light weight Directory Access Protocol) or Active directory based authentication. - Control user access and credentials to data by assigning roles. - Hide data completely, prevent manipulation, or allow editing, based on role - Compartmentalize data based on accessibility. - Define which groups of users can view and access data through Discretionary Access Control (DAC). - Logging records all transactions including log-ins, searches, downloads, uploads, edits, and deletions.	Board will check Functionality test to be demonstrated by OEM

P W V J A H Y S J K

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42.	<p>iv) Support for playback of time series data. Support for Pan, Tilt, Zoom with display of Map and GIS data in 2D as well as 3D in web browser.</p>	Board will check Functionality test to be demonstrated by OEM
43.	<p>i) Support for display of position under mouse. Support for calculating Distance, Area calculations and point to point navigation. ii) View image as if it were locally on your system iii) Displays the optimal presentation of the image automatically iv) Dynamically adjust imagery brightness, contrast, and sharpness in the browser as desired v) Draw lines, polygons, circles, and buffers vi) Insert icons in many shapes and sizes (e.g., tanks, planes, markers) vii) Enter text annotations viii) Measure geographic coordinates using sensor model geometry, not approximations ix) Underlying terrain used if available for geospatially correct measurements x) Measure distances and height calculations using sensor model xi) Color-code every annotation and entry xii) Collaborate via chat and jointly edit products in real-time</p>	Board will check Functionality test to be demonstrated by OEM
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47.	<p>Data Management Features Provide a Cataloging tool for creation of catalog database locally or on Database like Oracle or MS SQL for efficient access, management and</p>	Board will check Functionality test to be demonstrated by OEM

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organization of raster, feature, projects and other geographic assets. In the Cataloging tool the user should be able to,

- Manage geographic data.
- Catalog/Store raster, feature, and project information
- Maintain detailed information including type, dimension, dates, tags, metadata, and custom data.
- Search and find the standard geographical data you require for a project, using various text and geographic properties.
- Work collaboratively, contributing all updates to a common repository.
- Automatically scan and catalog entire folders.
- Store connections to various data sources.
- Catalog's data sources can be located on a local disk, on the network, on Oracle or on an SQL Server.
- On the Client there should be an ability to connect (only) – Catalog layers should be located into the project.
- In the project editor and or all modifications to the project are to be automatically need to be updated in the catalog every time the project is saved.
- Should have the facility of Activating/Deactivating User Authentication, Adding and Editing Users,
- Permissions setting to view, modify, manage catalog.
- Activate or deactivate user authentication turn on or off user name and password authentication when connecting to the catalog.
- Manage catalog users- Add or delete users or assign different permissions
- Add/Modify custom fields- Add custom filed to each layer's property sheet in the catalog for use later in the Query.
- Broken Links: Catalog should generate a list of all catalog layers whose link to the data source is broken. This happens when a data source is moved, renamed or deleted, or a network drive is inaccessible. If you know the new locations of the data source, you can repair the broken link.
- Catalog client service for the web(CSW)
- You can select multiple layers and multi edit their properties. This saved the time of editing each layer separately and ensures that all the layers have the required identical properties.
- Software should search the catalog by either or both the following:-

By Geographic region/Coordinates
By Search Query

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MOBILE APPLICATION

48.	The mobile application user interface has to be customized as per user requirement.	Board will check Functionality test to be demonstrated by OEM
49.	Support for the smart phones and tablet devices with GPS Support Support for:- Map Display and Query on attribute from GIS Server. Obtain up-to-date imagery and documents from a connected Web Server on your device Search your data by times and dates, keywords, types, and geospatial location. Reporting back Create reports while in the field. Send geo tagged pictures from device to GIS server	Board will check Functionality test to be demonstrated by OEM

DESKTOP APPLICATION

50.	The desktop application user interface has to be customized as per user requirement.	Board will check Functionality test to be demonstrated by OEM
51.	Should be able to connect to GIS server to access functionality, access and publish data. Should be able to load, edit and manage local datasets as well as from GIS server using WMS, WFS, WF-T protocols.	Board will check Functionality test to be demonstrated by OEM
52.	Support for automatic conversion and registration of geo tagged images and vector files on terrain data. - Convert one raster format to another. - Convert one vector format to another. - Facility to take screenshot and video capture of selected area. - Optimization of datasets; for faster loading.	Board will check Functionality test to be demonstrated by OEM
53.	Display And Interaction a) Map Interaction i) Pan, Zoom, Tilt ii) Lat Long Under Mouse iii) Geo Jump	Board will check Functionality test to be demonstrated by OEM

	<p>b) Map display</p> <ul style="list-style-type: none"> i) Tabular Data and 2D/3D Graph Viewing ii) Raster Data display iii) Vector Data Display iv) 3D Elevation surface display v) Time animation and temporal Data vi) Layer Reordering vii) Scale-Dependent Display <p>c) Print to PDF, Printer.</p>	
<p>54. Data Creation and Management Options</p>	<p>a) Vector Data Editing</p> <ul style="list-style-type: none"> a. Define and Edit Point Features, Colors, Styles and custom Attributes b. Define and Edit Line Features, Color, Styles and custom Attributes c. Define and Edit Polygon Features, Color, Styles and custom Attributes <p>b) Raster Editing</p> <ul style="list-style-type: none"> a. Change Geo tagging b. Edit Raster Layer Order c. Contrast Adjustment d. Optimize Image e. Specify Transformation methods f. Specify Spatial reference information <p>c) Ability to add 2D, 3D and dynamic objects to the terrain.</p> <ul style="list-style-type: none"> a. Video on Terrain b. Video Billboard c. 2D/3D symbol animation on user defined Route <p>d) Create 3D/2D fence wall from shape/line features.</p> <p>e) Annotations and Marking for Text, 2D, 3D Symbols and Annotations</p> <p>f) Data Management Interface</p> <ul style="list-style-type: none"> a. Sharing Publishing and sharing data, analysis results with multiple users b. Administration and Versioning 	<p>Board will check Functionality test to be demonstrated by OEM</p>

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	<p>c. Display and Query d. Archival and Retrieval e. Manage replicas for Spatial referencing image data (geo referencing)</p>	
<p>55. 3D Window Viewing Option</p>	<p>Tree View for Layers Geo Jump to selected layer/Element Raster Layer Opacity Change Field of view Manage Environmental effects Fog, Snow, Rain Direction, Tilt and Roll Angles Flythrough and Walkthrough on Terrain and Indoor Views Shadow, Time of Day, Fog, Clouds and Precipitation Effects</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>56. Indian Military Grid and Symbols</p>	<p>Should provide complete Indian Military Symbolology Read and display geo-referenced raster maps in TIFF format, with both latitude and Longitude and Easting & Northing (4/6/8/10) digit displayed Dynamic reading of correct values of easting & northing (Grid Ref.) EN in (4/6/8/10) digits. Read the MIL co-ordinates and Flat attribute date pertaining to the DGN maps which comes from CAMS as Oracle Dump.</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>57. Presentation/ Briefing Tool for desktop</p>	<p>Users should be able to perform the following operations with controllable parameters: Time/preset button based switching of Visibility of any raster/vector layers Time/preset button based camera flythrough/walkthrough along a path Time/preset button based Information popup Time Spanning using fast and slow play/back speed</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>58. Publishing of the Projects</p>	<p>User should be able to define projects and download raster/vector data with attributes for offline usage. User should be able to work on offline raster/vector datasets with attributes and should be able to load on server when online.</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>
<p>59. GIS Analysis</p>	<p>Default Analysis: - Attribute based GIS Queries; buffer based queries on the buffer zone - Line of Sight - Slope Aspect - Elevation Profile - Contour Generation - Distance, area measurement aerial and on ground</p>	<p>Board will check Functionality test to be demonstrated by OEM</p>

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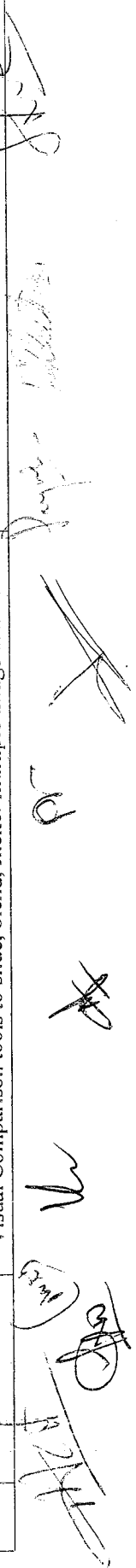
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	<ul style="list-style-type: none"> - Gun Range - And others standard Analysis 3D Result Plotting:- - Incidents, attribute based queries results as heat map, points, bar graphs etc. 	
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IMAGE PROCESSING APPLICATIONS

1.	Data Format Support	The software should support standard GIS formats including TIFF, GEOTIFF etc.	Board will check Functionality test to be demonstrated by OEM
2.	Raster Operations	<ul style="list-style-type: none"> - Raster cell Data viewing - Raster Formats and encoding conversion from one format to another - Region of Interest extraction, bands stacking or splitting - Linear and non-linear filtering - Color-mapping and adjustment including hue, saturation and contrast adjustments 	Board will check Functionality test to be demonstrated by OEM
3.	Data Preprocessing	<ul style="list-style-type: none"> - The software should allow generating optimized versions for large raster files - The software should allow geo-registration of Raster images using GCP/Control Points - Accuracy refinement based on ground control points - Ortho-rectification (sensor to ground) - Pan-sharpening 	Board will check Functionality test to be demonstrated by OEM
4.	Feature Extraction Options	Should Support Feature Extraction Options	Board will check Functionality test to be demonstrated by OEM
5.	Image Classification Mechanisms	<ul style="list-style-type: none"> - Multi-threaded Supervised and unsupervised image classifier algorithms such as K-Means or Self Organizing Maps etc. - Confusion matrix computation with respect to reference or ground truth data - Classification map regularization - Fusion of several classification maps - Object Based Image Classification 	Board will check Functionality test to be demonstrated by OEM
6.	Image Segmentation	<ul style="list-style-type: none"> - Conversion between labeled raster and GIS vector file - Raster to Vector Conversion 	Board will check Functionality test to be demonstrated by OEM
7.	Change Detection	<ul style="list-style-type: none"> - Local metric based change detection framework - Change-detection by supervised classification - Visual Comparison tools to slide, blend, flicker multiple image data sets 	Board will check Functionality test to be demonstrated by OEM



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Being an integrated GIS Solution, following Hardware will require to Host service and to access at client side

⇒ Hardware part

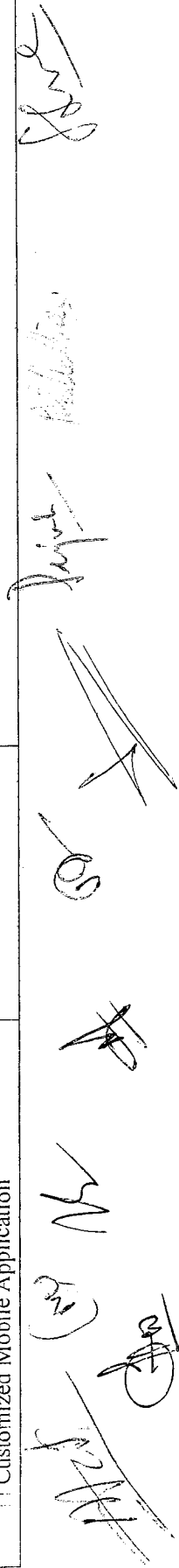
SL NO	REQUIREMENT	Proposed Trial Directives
01	Application Server with Operating system.	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
02	Database Server- With OS and Database software	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
03	SAN (Storage device) with replication software for DR	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
04	Router	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
05	Core switches at DC/DR	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
06	Distribution switches at DC/DR	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
07	Application load balancer	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
08	IPS/Firewall/UTM / Encryption Device	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
09	GIS Software with proposed QR	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.

Note:- Hardware configuration will be decided by the user organization at the time of tender and licensing also decided by user organization

REQUIREMENT	Proposed Trial Directives
A) Desktop (Standard) with following features !! 3D analysis features !! Spatial analysis features !! Full motion video playback functionality !! Network analysis features !! Data interoperability	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
B) GIS Server (Enterprise) with following extensions :- !! Portal for GIS Server for serving data and geo processing	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.

C) Image Processing Software		Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
D) Customized Web GIS Applications as follows:- !! Customized Application on GIS desktop !! Customized Web Application !! Customized Mobile Application	As part of solution as per user organization	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.


 The bottom section of the page contains several handwritten signatures and initials. On the left, there is a large signature that appears to be 'A. K. Singh' with a checkmark next to it. To its right, there are several other initials and signatures, including one that looks like 'S. K. Singh' and another that is more stylized. There are also some scribbles and marks that could be initials.

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E) Training on GIS and integration with existing ERP Application and Tracking application.	As part of solution as per user organization	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.
F) Existing Map Data migration	As part of solution as per user organization	Board will check the OEM certification, carry out physical check as well as the functional test of the parameters. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer.

~~M S BISHT~~
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~~Vishal Verma~~
AC(IT), CRPF

~~Munesh Dutt~~
AC(Int), CRPF

~~Pavitra Chakravarty~~
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~~Ram Prakash~~
AC-I, NSG

~~Prabhat~~
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IG(Comm), CRPF

~~Maj A. Bhatnagar~~
HQ DGAR

[Approved / Not Approved]

~~K. Durga Prasad, IPS~~
DG, CRPF

~~Rajesh Singh~~
Dy. Dir. DCPM