CHECK LIST : PRE APVL STG

S No	Mandatory Details	Remarks
1.	Name of Proj (incl ver)	Electromagnetic Management of Battlespace Software (EMBS)
2.	Name of sponsor	Army Centre for Electromagnetics (ACE), Mhow
3.	Type of Sw (Bespoke / COTS / Customised)	**COTS**
4.	Brief justification / endorsement on reqmt for devp of Sw appl	Seamless and uninterrupted availability of scarce Electromagnetic Spectrum (EMS) in the battlefield warrants regular oversight and strict management of spectrum usage. A major part of the spectrum management process is computer-based simulation which will provide a detailed Electromagnetic Operational Environment (EMOE) operation picture and help in identification of Electromagnetic conflict spots and congestion zones bringing out the imp aspects of Electromagnetic congestion zones in a given geographic battlespace. Apropos, a need was felt for induction of a Electromagnetic battlespace simulation software termed as **Electromagnetic Management of Battlespace Software** (EMBS).
5.	Aim & Scope Purpose incl utility, beneficiaries and tgt users.	The Aim & Scope is described in detail as part of proj brief att as **Annx I.**
6.	To be hosted on internent/ ADN with brief justification	The application is proposed to be hosted on NFS or DCN network over a dedicated VPN pipeline in order to avoid exposure of sensitive data over the network.
7.	Being devp in house or throught IT Funds	Procurement through IT Fund.
8.	Usability of proposed appls by other arms/ services/ org/ est	The proposed application will primarily be used by IA for simulation and management of EMOE and is proposed to be promulgated till Corps HQ level. Comments on usage by other services incl HQ IDS is under consideration and comments on the same have been sought from respective service HQ. Broad licensing reqmts incorporating likely usage by other services in att as **Annx II**.
9.	Hw and IT infrastructure reqd	The draft GSQR of the proj incl procurement of requisite IT HW and networking infra to support seamless functioning of the application. A list of proposed deliverables is att as **Annx III.**
10.	Brief details of content of the prosed Sw appl	The brief details of the SW appl is given as part of proj brief att as **Annx I.**
11.	Endorsement by Head of Br/ Svc/ Fmn	The proj has been approved by the Joint Electromagneitc Bd (JEMB) 2022 and promulgated vide JEMB letter No IDS/1129/SMEMBS/JCES dt 15 Dec 2022.
12.	Details of user base	The proposed appl will be used by GS Staff while incorporating data inputs from multiple stake holders. Broad licensing reqmts incorporating likely usage by other services in att as **Annx II.**

Annx I

PROJECT BRIEF

ELECTRO-MAGNETIC BATTLE SPACE SIMULATION (EMBS) SOFTWARE

1. **Background**. Seamless and uninterrupted availability of scarce Electromagnetic Spectrum (EMS) in the battlefield warrants regular oversight and strict management of spectrum usage. A major part of the spectrum management process is computer-based simulation which will provide a detailed Electromagnetic Operational Environment (EMOE) operation picture and help in identification of Electromagnetic conflict spots and congestion zones bringing out the imp aspects of Electromagnetic congestion zones in a given geographic battlespace. Apropos, a need was felt for induction of a Electromagnetic battlespace simulation software termed as **Electro-Magnetic Battle Space Simulation** software.

2. **History**. This project is a successor to project Simulation of Electromagnetic Battle Space which has been divided in two parts ie Strategic part namely Defence Spectrum and Allocation Management Sys (DSAMS) to be taken by Joint Communications Electronics Staff (JCES) and the tactical part namely Electromagnetic Management of Battle Space (EMBS) to be undertaken by ACE, Mhow and DRDO. During the Joint Electromagnetic Board (JEMB) meet held in November 2022, it was decided that now DRDO will no longer be the developing agency and the project now can be done through open tendering by ACE, Mhow only.

3. **Scope of Project**. The Electromagnetic Management of Battle Space (EMBS) software will provide versatile capabilities for simulation and analysis of the Electromagnetic Operational Environment (EMOE). The tool will utilize data pertaining to ORBAT, trunnion, emitter characteristics and frequency bands alongwith captured spectrum data to accurately simulate the Electromagnetic Operational Environment and create the Electromagnetic Spectrum operational picture. Along with this, the tool is also capable of providing recommendations and simulation results pertaining to emitter coverage, radio link analysis, best deployment site selection, simultaneous emitter simulation, Electromagnetic conflict identification and dynamic frequency allocation. Major features which have been envisaged for the project are as follows: -

(a) Process data pertaining to ORBAT, terrain, emitter characteristics and frequency spots alongwith captured spectrum data to accurately simulate the Electromagnetic Operational Environment (EMOE) and create the Electromagnetic (EM) operation picture. (Illustrated in **Figure 1**).

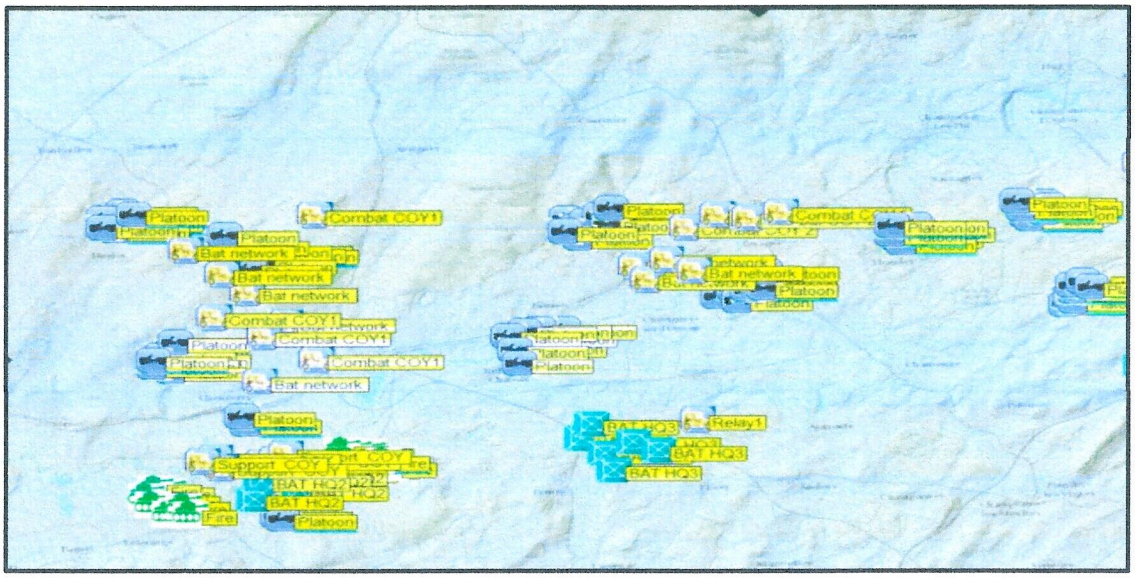

Figure 1 : Deployment of emitters using ORBAT data on GIS Interface

(b) Capability of running in integrated mode with a centralized server or standalone mode.

(c) Generate accurate electromagnetic simulation of single/multiple communication & non-communication emitters deployed in a given geographical battlespace. (Illustrated in **Figure 2**).

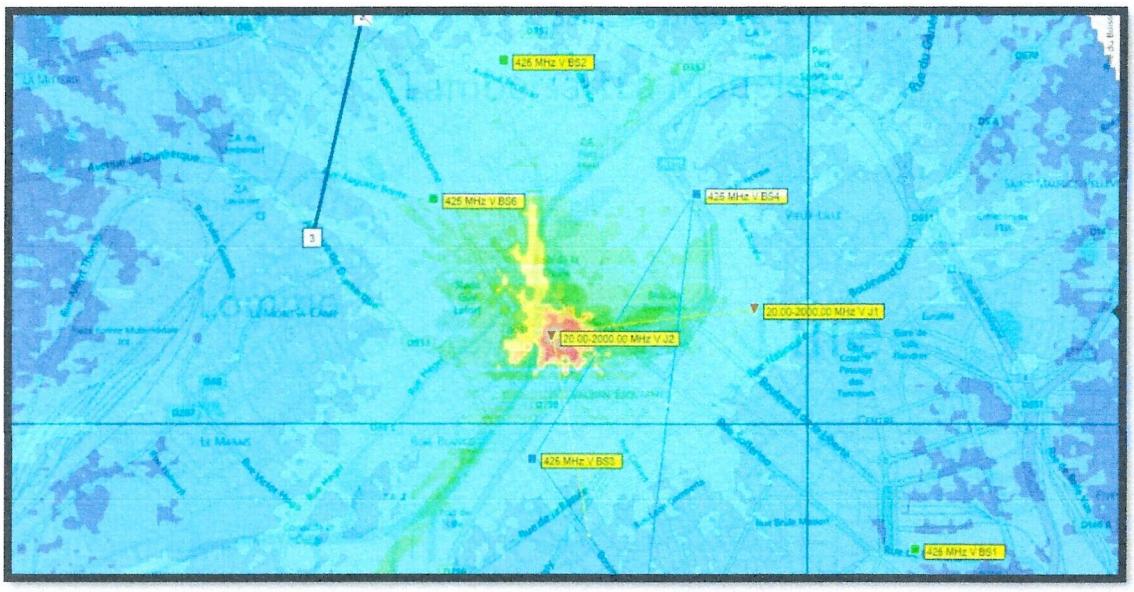

Figure 2 : Electromagnetics simulation of multiple emitters in battlespace

(d) Automated functions to automatically calculate composite coverages and interference analysis (example for a Division Defence Sector).

(e) UAV/UAS mission planning – including integration between ground-to-air and air-to-air services and ability to model coexistence with other emitters.

(f) Network modelling – to model dynamic military scenarios and featuring on-the-move capability including move of strike forces for offensive ops.

(g) Simulate the effect of a new system to be deployed in the Area of responsibility and suggest optimal deployment criteria.

(h) Flightpath RF simulation analysis – importing flight-path information and conducting Electromagnetic modelling and communication validation.

(j) Automatic identification of Electromagnetics congestion zones and conflict spots and generate alerts and reports regarding the same.

(k) Suggest alternate deployment sites and deployment parameters for emitters identified as causing Electromagnetics congestion and conflict.

(l) Automation capabilities – the ability to custom workflows to support different end-user requirements or system capabilities.

(m) Simulate effect of Electromagnetics equipment on own communications and non-communications equipment.

4. **Proposed Architecture**. The software is proposed to be deployment in both integrated mode (over secure data network) and standalone mode. In the integrated mode, the software will function using a web/application based GIS interface which will help in visualizing the effects of Electromagnetic Spectrum (EMS) using map overlays. The software will provide identical functionalities in standalone mode except for central database storage.

Annx II

PROJ EMBS: SCALING & LICENSING

Fmn Level	Total Fmns	License/Fmn	Total License Reqmts	Remarks
IA				
Army HQ	-	02	02	
Comd HQs	07	01	07	
Corps HQs	14	01	14	
ACE, Mhow	-	04	04	
IN				
Naval HQ		02	02	Appreciated Reqmt
Comd HQs	03	01	01	- do-
Naval EMC Centre		02	02	- do-
IAF				
Air HQ		02	02	- do-
Comd HQs	06	01	06	- do-
AFSSR, Sona Rd		02	02	- do-
HQ IDS (JCES)		01	01	- do-
Trg		04	04	
Grand Total			47	

PROJ EMBS: LIST OF DELIVERABLES

1. Electromagnetic simulation application software with requisite licenses (Appreciated: 47 Nos) capable of running in standalone mode.
2. Central Application Servers with 1+1 physical redundancy (hot standby) mounted on 19" racks with associated power supply and online Uninterruptible Power Supply (UPS).
3. Central Database/ Geographical Information System (GIS) Servers with 1+1 physical redundancy (hot standby) mounted on 19" racks with associated power supply and online Uninterruptible Power Supply.
4. Central Network Attached Storage (NAS) Servers with 1+1 physical redundancy (hot standby) mounted on 19" racks with associated power supply and online UPS.
5. Simulation Workstations (Appreciated: 47 Nos) with online Uninterruptible Power Supply.
6. Network Printers for report generation.
7. Requisite networks equipment for inter-connecting the central servers with workstations over Ethernet media.