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File No: TM (M)/0025/DAPP/MO (Goa)

Technical Manager (Maritime & Systems)
Room No. 05, D-II Wing, Ground Floor
Sena Bhawan, Ministry of Defence,
New Delhi-110011

TM (M&S) Ministry of Defence

18 Dec 17

REQUEST FOR TECHNICAL AND COMMERCIAL PROPOSAL FOR "MODERNISATION OF MATERIAL ORGANISATION, GOA" ON 'TURNKEY' BASIS
CATEGORY: 'BUY INDIAN'

Dear Sir,

1. The Ministry of Defence, Government of India, intends to undertake, Modernisation of Material Organisation, Goa [MO (Goa)] on '**Turnkey**' basis. This Request for Proposal (RFP) consists of four parts as indicated below: -

(a) **Part I**. The first part consists of the general requirement of the equipment, the numbers required, the time frame for deliveries, the environmental parameters for functioning, conditions of usage and maintenance, requirement for training, Annual Comprehensive Maintenance Contract, and warranty guarantee conditions, etc. It includes procedure, last date and time for submission of offers.

(b) **Part II**. The second part of the RFP incorporates the aspects of SQRs describing the technical parameters for modernisation. The operational characteristics and features that should be met for the modernisation and their details with respect to Store Houses of Material Organisation are elucidated at **Appendix A.**

(c) **Part III**. The third part of the RFP consists of the commercial clauses and Standard clauses of contract. The bidders are required to give confirmation of their acceptance of these clauses.

(d) **Part IV**. The fourth part of RFP consists of acceptance of bids, in terms of vendor selection criteria, technical and commercial contents, Evaluation criteria and Price bid format. Submission of incomplete details in price bid format will render the offer liable for rejection.

2. The Government of India invites responses to this request only from Original Equipment Manufacturers (OEMs) or Authorised Vendors or Integrators capable of undertaking the proposed Modernisation project on 'Turnkey' basis. The end user of the proposed equipment is the Indian Navy. The criterion for vendor selection has been elaborated at Part IV to this RFP.

2a. For the purposes of this RFP and the acquisition contract (if any) signed by the Ministry of Defence with a successful vendor, indigenous content shall be as defined under paragraphs 1 and 2 of Appendix F to Chapter 1 of the DPP-2013. In addition, reporting requirements for prime (main) vendors (and for sub-vendors reporting to higher stages/ tiers) shall be as prescribed under paragraphs 3 and 4 thereof. The right to audit vendors/ sub-vendors shall vest in the Ministry of Defence as prescribed under paragraphs 5 and 6; and aspects of delivery, certification, payments, withholding of payments, and imposition of penalties shall be as prescribed under paragraphs 7 to 12 thereof. Furthermore, vendors will be required to submit their indigenisation plan in respect of indigenous content as stipulated in Para 7 of Appendix F to Chapter I.

PART I: GENERAL REQUIREMENTS

3. **Year of Production**. Supplies of all the proposed equipment should be of latest manufacture, conform to the current production standard and should have 100% of the defined life at the time of delivery. Deviations if any should be clearly brought out by the vendor in the Technical Proposal.

4. **Delivery Schedule**. The proposal being a **'Turnkey'** project, the vendor is required to supply, install and commission all equipment within a period of **24 months** (comprising of **four phases of approximately six months each**) from the effective date of contract (T0). The installation and commissioning of the proposed equipment and facilities would be undertaken in 17 Store Houses and 29 Sections of varying dimensions and the four Phases have been worked out based on the priority and availability of Store Houses. The implementation schedule of the Project is placed at **Annexure II to Appendix 'A'**. The Indian Navy acceptance team will accept the proposed equipment and facilities in fully operational and functional condition post satisfactory demonstration and trials by the technical team of the vendors on-site at MO (Goa) at the end of each phase. Prior to positioning of equipment and material at MO (Goa), the vendor shall obtain certification from agency such as Structural Engineering Department of IITs, NABL accredited agencies or any other equivalent Govt agencies or PSUs certifying that the material under supply for erection, assembling and commissioning is as per standards specified in RFP. The delivery schedule is as follows: -

(i) Phase – I. The first phase of project comprising of one each of MiG 29K Store House and MiG 29K Heavy store house and one Fast Moving Stores (the present Rotable Section) needs to be implemented in the Phase-I from the effective date of contract.

(ii) Phase – II. The second phase of project comprising of TU Stores, Heavy duty Store house – I, Rotable stores,IL-38 SD New Store house, KM-31 Store House and Scrap Yard needs to be implemented in the Phase-II post issuance of completion certificate of Phase-I.

(iii) Phase – III. The third phase of project comprising of KV-28 Store House, Motor Transport Store House, Shipping Store House, SE/FC and

Annex Store House, POL Store House and AGS Store House, needs to be implemented in the Phase-III post issuance of completion certificate of Phase-II.

(iv) Phase – IV. The fourth phase of project comprising of Sea Harrier Store Houses, Kiran Store House and R & D section needs to be implemented in the Phase-IV post issuance of completion certificate of Phase-III.

Note: The overall duration of 24 months would be binding on the seller.

4(a). Once the contract is concluded, the vendor would be required to submit to IHQ MoD (N) / DAPP, the plan of implementation of each phase with the durations and the delivery schedule. The supplier shall adhere to the timelines thereafter and ensure continuity of supply of items and their components under the contract.

5. **Warranty**. All equipment supplied and facilities provided shall carry a warranty of 24 months (02 years) from the Date of Acceptance of equipment and facilities of Phase IV. Warranty Clause is given at **Appendix C**. In addition, the vendor will undertake the maintenance of all equipment and facilities of Ph-I, Ph-II and Ph-III, commissioned and accepted by IN, prior commencement of the warranty period.

6. **Comprehensive Annual Maintenance Contract (CAMC)** The proposal is envisaged on '**Turnkey**' basis, wherein the firm would supply, install and commission the equipment, on-site at MO(Goa). Every item would be under 100% warranty replacement for a period of two years. During the warranty period, on-site maintenance, repair and replacement support would be provided by the vendor as part of this contract. Thereafter, the vendor' needs to provide Product Support for all equipment, hardware and software, supplied under the contract in the form of Comprehensive, on-site AMC for a further period of 03 years. The vendor is required to include a proposal of Comprehensive AMC for a period of 03 years. The conditions of Comprehensive AMC are elucidated at **Appendix D**. The details of Comprehensive AMC proposal must also be submitted separately by the vendor with technical aspects being included in the technical offer and commercial aspects being included in the commercial offer. The cost of CAMC would be included in determining the L1 vendor.

7. The bidder is required to provide Itemised Spare Parts Price List of the supplied equipment (Prices to be indicated only in the commercial offer), and the likely consumption rate of the spares based on the exploitation pattern of the equipment along with the Technical bid.

8. **In Service Life and Shelf Life**. The In-Service Life and Shelf Life of the proposed facilities and equipment, individual accessories, sub-systems and modules, components as applicable and defined in the technical documents shall be 20 years. The vendor is required to give details of reliability model, reliability prediction and its validation by designer/ manufacturer to ensure reliability of stores throughout shelf life. The storage and operating conditions for all the equipment supplied by the bidder would be as stated at Para 3 of **Appendix A** to RFP, including saline and humid conditions. In case specialised storage conditions are required for

specific equipment, the same needs to be indicated by the bidder in the technical offer along with the details thereof.

9. **Product Support**. The vendor would be bound by a condition in the contract that he is in a position to provide product support in terms of maintenance, materials and spares for a minimum period of 20 (Twenty) years. Even after the said mandatory period, the bidder would be bound to give at least two years notice to the Government of India prior to closing the production line so as to enable a Life Time Buy of all necessary spares before closure of the said production line. The said aspect would also form an integral part of the contract. All upgrades and modifications carried out on the equipment during the next 20 (Twenty) years or its life cycle must be intimated to the Indian Navy.

10. **Training of Crew and Maintenance Personnel**. The bidder would be required to provide training to Indian Navy and Defence Civilians at MO (Goa) covering the Operation and Maintenance of each type of proposed equipment and support facilities. The training would be Store House specific and to be given to not more than 10 personnel from each Store House. The duration of training would be minimum 10 days which could be increased by the vendor as considered essential. This training provided by the bidder should enable the operator to fully exploit the proposed equipment and the Maintenance Personnel to undertake routine, periodic and calendar servicing. Post completion of training, the trained personnel should be able to perform replenishment and daily servicing, preparing the equipment for operations and functional checking. The bidder is also required to provide training material and aids (Computer Based Training and Other Training Aids) at MO (Goa). The cost of the training should be mentioned separately and would be taken into account for arriving at the L1 vendor.

11. **Government Regulations**. It may also be confirmed that there are no Government restrictions or limitations in the country of the supplier or countries from which sub-components are being procured and or for the export of any part of the system being supplied. It may further be confirmed that all national and international obligations relevant to transfer of conventional arms of the country of supplier or countries from which parts and components are being procured, have been taken into account for the duration of the contract. Accordingly, thereafter, there would be no review, revocation or suspension of defence export licenses and other related clearances issued to the supplier for the contract that could impinge on the continuity of supply of items and their parts or components under the contract.

12. If equipment and facilities being offered by the vendor have been supplied and contracted with any organisation, public / private in India, the details of the same may be furnished in the technical as well as commercial offers. The vendors are required to give a written undertaking that they have not supplied / are not supplying the similar systems or subsystems at a price lower than that offered in the present bid to any other Ministry/Department of the Government of India and if the similar systems have been supplied at a lower price, then the details regarding the cost, time of supply and quantities be included as part of the commercial offer. In case of non-disclosure, if it is found at any stage that the similar systems or subsystems were supplied by the vendor to any other Ministry/Department of the Government of India at a lower price, then that very price, will be applicable to the present case and,

with due allowance for elapsed time, the difference in the cost would be refunded to the Indian Navy, if the contract has already been concluded.

13. **Patent Rights.** The vendor has to confirm that there are no infringements of any Patent Rights in accordance with the laws prevailing in their respective countries.

14. In the subject RFP, the vendor is required to sign and submit Pre Contract Integrity Pact (PCIP) given at **Annexure I** to **Appendix G** and shall also deposit ₹ Five Lakhs as Integrity Pact Bank Guarantee (IPBG) through any of the instruments mentioned therein. This would be submitted in a separate envelope clearly marked as 'IP and IPBG' at the time of submission of Technical and Commercial offers.

14a. Any queries or clarifications to this RFP may be sent this office by 05 Feb 18 A copy of the same may also be sent to the following address:-

The Principal Director
Directorate of Air Projects and Plans
Dara Shukoh Road
'A' Block Hutments
New Delhi - 110011
Fax no: 011 – 23793011

15. The Documents for Vendor Selection, Technical Proposal and Commercial Proposal should be sealed separately in **three separate envelopes** and super-scribed on the cover as "**Vendor Selection**", "**Technical Proposal**" and **"Commercial Proposal"** (the envelope should clearly state this letter No and the type of equipment) and submitted together along with 'IP and IPBG' at the following address by 1200 hours on 19 Mar 18 . If this manner of submission is not followed, the proposals can be summarily rejected.

The Principal Director
Directorate of Air Projects and Plans
Dara Shukoh Road
'A' Block Hutments
New Delhi- 110011
Fax no: 011 – 23793011

16. The Vendor Selection Documents and Technical Offers will be opened first, at 1500 hours on 19 Mar 18 at the same venue as indicated at Para 15 above. The vendor or his authorised representative is welcome to be present at the opening of the proposals. Necessary details of personnel may be sent a week in advance to Directorate of Air Projects and Plans (Fax 011-23793011) to facilitate obtaining of security clearance.

17. The 'Vendor Selection Criteria' will be evaluated by a Technical Evaluation Committee (TEC). Technical offers of only those vendors will be evaluated by the Technical Evaluation Committee who are found qualified in the 'Vendor Selection Criteria'. The vendor prior to submission of Technical Offer will have to prove the feasibility of integration of the Warehouse Management System (WMS) software being supplied as part of ASRS, with ILMS (Air) system. To this end, the vendors

shall liaise with the Centre of Naval Aviation Management System (CNAMS) at Kochi to prove that the WMS software can be integrated successfully with the Navy's existing ILMS(Air) system as elaborated at para 7.8 of Part I of **Appendix A**. The certificate from Director CNAMS, Kochi, to the effect that WMS and ILMS (Air) can be integrated, shall be submitted by the vendor along with the Technical Offer. Failure to comply with this requirement would out rightly render the Technical Offer invalid. The vendor would be required to demonstrate functioning and operation of each equipment on-site at MO (Goa) on completion of each Phase of the Project prior acceptance as per Acceptance Procedure given at **Appendix A1**. The Indian Navy acceptance team will accept the proposed equipment and facilities in fully operational and functional condition post satisfactory demonstration and trials by the technical team of the Supplier on-site at MO (Goa).

18. The bidders shall provide, free of cost, all necessary software libraries and hardware specifications which will be used to integrate the WMS with ILMS (Air). The updates and upgrades to such items provided, in future, shall also be provided free of cost. Any "breaking changes" (arising in WMS due to the integration) will be resolved by the vendor free of cost (restricted to the integration part only). The feasibility of integration proved during the technical evaluation phase, shall be confirmed again on installation of the actual system. Any deviations will be resolved by the vendor free of cost.

19. Commercial offers of only those vendors will be opened, who qualify / meet the vendor selection criteria and whose Technical Bids clear the technical evaluation process. In this regard, please refer to the conditions at para 34 of Part IV also.

PART II: TECHNICAL PARAMETERS

20. **Operational Characteristics and Features.** The broad operational characteristics and features that should be met by the equipment and its details and implementation schedule with respect to Store Houses are elucidated at **Appendix A.**

21. **Technical Offer.** The Technical Offer must enable detailed understanding of the functioning and characteristics of all proposed equipment and facilities as a whole and each sub-system independently. It must include the performance parameters as listed at **Appendix A** and any other information pertaining to the technical specifications of the proposed equipment and facilities considered important and relevant and its implementation plan by the bidder. The technical proposal should also include maintenance schedules to achieve maximum life and expected life of each assembly and its sub-assemblies storage conditions / environment condition recommended and the resultant guaranteed in-service/shelf life.

22. If there is any associated optional equipment on offer that should also be indicated separately along with the benefit that are likely to accrue by procuring such optional equipment. Should the vendor be contemplating any upgrades or modifications to the equipment being offered, the details regarding these should also be included in the Technical Proposal.

23. **Technical Details**.

(a) The technical details should be factual, comprehensive and include specifications of the offered equipment and facilities against broad requirements listed in **Appendix A** of RFP.

(b) Insufficient or incomplete details may lead to rejection of the offer. Mere indication of compliance may be construed as incomplete information unless system's specific technical details are available in the offer. A format of the **Compliance Table** for the technical parameters and certain important commercial conditions of RFP is attached as **Appendix B**.

24. The technical offer should have a **separate detachable Compliance Table** as per format given at **Appendix B** stating specific answers to all the parameters as listed at **Appendix A**. It is mandatory to append answers to all the parameters listed in **Appendix A**. Four copies of the Technical Proposal should be submitted (along with one soft copy) however, only one copy of the commercial proposal is required.

24a. The firm is required to submit a 'Malicious Code Certificate' (***only for Electronic items and Software)*** along with the Technical Proposal. The format is placed at **Appendix J**.

25. Third party inspection by any central government approved agency, capable of certifying the design and material specifications is required to be specified along with Technical offer. The bidder is to submit QAP and detailed design drawings and calculations to the Inspection agency within 60 days of the award of contract. QAP for installation checks including stability, checks, load tests etc also to be approved by Inspection agency. Inspection agency will forward the QAPs and drawings with their comments and recommendations to the (MO 'Goa') for final approval. All imported and COTs items will be inspected at site for performance and detailed specifications given in quotes or firms' manuals. All facilities required for inspection including tools, instrument, test equipment, test loads, services etc are to be provided to the inspection agency and the entire cost of third party inspection is to be borne by the vendor. The final acceptance will be by a board of officers constituted by HQNA, who will issue the acceptance certificate. This board of officers will also carry out progress reviews during implementation stage and will oversee the installation at site.

PART III: COMMERCIAL ASPECTS

Commercial Offer

26. Commercial offers of only those vendors will be opened, who qualify / meet the vendor selection criteria and whose Technical Bids clear the technical evaluation process. Please refer para 31 of Part IV also. The Commercial Offer must be firm and fixed and should be valid for at least 18 months from the date of submission of offer. The commercial offer is to be submitted as per the price bid format given at **Appendix 'F'** to this RFP.

27. The Commercial Offers will be opened by a committee and if vendor desires he may depute his representative, duly authorised in writing, to be present at the time of opening of the offers. The committee will determine the lowest bidder (L1). No negotiations would be carried out with the L1 vendor once the reasonability of the price quoted by him is established. The date, time and venue fixed for this purpose will be intimated separately after the evaluations are completed.

28. The bidder is requested to take into consideration the Payment terms given at **Appendix E** while formulating the Commercial Offers.

Additional Aspects

29. **Standard Clauses on Contract**. The Government of India desires that all actions regarding procurement of any equipment are totally transparent and carried out as per established procedures. The supplier is required to accept our standard clauses regarding agents / agency commission, penalty for use of undue influence access to books of accounts, arbitration and laws which would be incorporated in the contract. The text of these clauses is at **Appendix G**. The Standard Contract Document at Chapter V of DPP-2013 (www.mod.nic.in) indicates the general conditions of contract that would be the guideline for all acquisitions. The draft contract would be prepared as per these guidelines.

PART IV: EVALUATION AND ACCEPTANCE CRITERIA

30. **Evaluation and Acceptance Process**. The evaluation of vendor would be undertaken based on his capability to meet the requirements of vendor selection, technical proposal and commercial proposal to the RFP.

31. **Vendor Selection**. The criteria that would be used for vendor selection are as enumerated below. (Vendors should submit documentary proofs in a separate envelope, along with separately sealed Technical and Commercial bids, as mentioned in **para 15 of Part I, else their bids are liable to be summarily rejected**):-

(a) **Past Experience of Executing Similar Projects**. The vendor should have experience of having successfully completed Provisioning of Automated Storage Solutions, for store houses / companies during last 07 years. In addition, experience of vendor in supplying MHE or under taking civil works would be preferable. The vendor should have this experience of supply as the main contractor and not as a sub contractor. Following documents / details are required to be submitted:-

(i) Copies of contracts / supply order highlighting the contract amount.

(ii) Proof of satisfactory work completion of the above mentioned contracts.

(b) **Past experience of AMC**. The vendor should have capability to undertake AMC post expiry of the warranty period. He would be required to submit an undertaking stating the above, along with the 'Technical Offer'.

(c) **Visit to Mo(Goa)**. The vendors in addition, would be required to visit MO (Goa) to understand the requirements as specified in the RFP. The vendors would be required to obtain a certificate to this effect from MO (Goa) stating the firm has visited and understood the requirements as per the RFP. Vendors, who do not submit this certificate along with vendor selection criteria, would not be considered for bidding process. The contact details of MO (Goa) are appended below:-

The Material Superintendent
(for Deputy Superintendent)
Material Organisation
Dabolim, Goa-403801
Tele: 0832-2555062
Fax: 0832-2555296

(d) **Vigilance Angle**. The vendor would be required to furnish an Affidavit on judicial stamp paper stating that the firm is not black listed by any government agency.

(e) **Financial Standing**. The company's Average Annual financial turnover during last 03 years, ending 31 Mar 17, should be at least Rs. 15 Crores. The company during last 07 years ending last day of Jan 18 should have undertaken or is undertaking, either of the following: -.

(i) Three similar works costing not less than Rs 16 Crores.

or

(ii) Two similar works costing not less than Rs 20 Crores.

or

(iii) One similar work costing not less than Rs 30 Crores.

(f) The vendor would be required to submit the following documents / details towards establishing its financial standing:-

(i) Audited Financial Statement
(ii) Balance sheet and profit loss statement

(g) The following additional documents need to be submitted by all vendors (attested copies, any addresses mentioned should be same as that of the registered firm address):-

(i) ESI Registration Certificate along with receipt of premium paid.
(ii) EPF Registration Certificate along with receipt of premium paid

(iii) PAN Card (in the name of the firm)
(iv) GST Certificate

(h) The firm should be an Indian vendor as defined in the DPP.

(j) Net worth of the Vendor (except MSMEs) should not be less that Rs 20 Cr.

(k) **Credit Rating**. The vendor should have a minimum credit rating equivalent to CRISIL rating on corporate credit Scale as CRR-BBB and SME-04 for SMEs issued by credit rating agencies recognised by RBI.

(i) The firm should give an undertaking that any of its promoters and directors is not a wilful defaulter.

(ii) Accounts of the firm with any bank should not have been classified as NPA.

(iii) The firm should not be under CDR/SDR or under joint lenders Forum's corrective action.

32 **Evaluation of Vendor Selection Criteria**. The vendors would be shortlisted based on the evaluation criteria as specified at para 31 of Part IV to this RFP. The vendor would be required to submit the following documents:-

(a) Details of Past experience as per para 31(a)
(b) Undertaking stating capability to execute AMC as per para 31(b)
(c) Certificate of visit to MO (Goa) as per para 31(c)
(d) Affidavit for vigilance angle as per para 31(d)
(e) Documents to support financial standing as per para 31(e) and (f)
(f) Additional documents required as per para 31(g)
(g) Credit rating proof as per para 31(k)

33. Evaluation of Technical Proposals. Post completion of vendor selection, the technical proposals of only the short listed vendors, will be evaluated by a Technical Evaluation Committee (TEC). The TEC will examine the extent of variations/differences, if any, in the technical characteristics of the proposed equipment, facilities and software offered by various vendors with reference to the QRs and prepare a "Compliance Statement" short listing the vendors. The compliance would be determined only on the basis of the parameters specified in the RFP. The vendors would be required to submit the following:-

(a) A Compliance Table (as per Appendix B) complying to all individual paragraphs of this RFP

(b) All necessary supporting drawings, plans, documents and brochures for all technical parameters as per Appendix A.

(c) Indigenisation plan in respect of indigenous content as per para 2a of RFP.

(d) Compliance that Certification from agency such as structural engineering department of IITs, NABL accredited agencies or any other govt agencies or PSU certifying that material under supply is as per standards specified in the RFP prior positioning of equipment and material at MO (Goa) as per para 4 to the RFP.

(e) Supply of itemised spare part list as per para 7

(f) Certificate of feasibility from CNAMS as per para 17

34. Evaluation of Commercial Proposals. The Commercial bids of only those bidders will be opened whose technical bids has been cleared by TEC. **Comparison of bids would be done on the basis of Evaluation criteria given in Appendix F**. The bidders are required to quote their price in the Price bid format given in **Appendix F**. The L1 bidder would be determined by Contract Negotiation Committee (CNC) on the basis of Para 1.5 Sl J of **Appendix F**. Only L-1 bidder would be invited for negotiations by the CNC.

35. Contract Conclusion. The successful conclusion of CNC will be followed by contract conclusion.

Conditions under which this RFP is Issued

36. This RFP is being issued with no financial commitment; and the Ministry of Defence reserves the right to withdraw the RFP and change or vary any part thereof or foreclose the procurement case at any stage. The Government of India also reserves the right to disqualify any vendor should it be so necessary at any stage on grounds of National Security.

37. Please acknowledge receipt.

Yours faithfully

(Satish Uniyal)
Commodore
Dy TM (M & S)

TM (M&S) Ministry of Defence

LIST OF APPENDICES

ABBREVIATIONS

SL No.	Abbreviation	Expanded form
(a)	AGS	Aircraft General Stores
(b)	AMC	Annual Maintenance Contract
(c)	ASRS	Automated Storage and Retrieval System
(d)	CCTV	Close Circuit Television
(e)	CNAMS	Centre of Naval Aviation Management System
(f)	DG SET	Diesel Generator set
(g)	FRP	Fibre Re-enforced Plastic
(h)	ILMS(AIR)	Integrated Logistics Management System(Air)
(j)	MCB	Main Circuit Breakers
(k)	MHE	Material Handling Equipment
(l)	MRLS	Manufacturer Recommended List of Spares
(m)	NABL	National Accreditation Board for Testing and Calibration Laboratories
(n)	POL	Petroleum Oil Lubricants
(p)	SFM	Single Face Mobile
(q)	TEC	Technical Evaluation Committee
(r)	TFT	Thin film transistor
(s)	UDL	Uniformly distributed Load
(t)	UPS	Uninterrupted Power Supply
(u)	WMS	Warehouse Management System

Appendix A to RFP

(Refers to Paras 1(b), 8, 18, 20, 21, 23(a), & 24 of RFP)

OPERATIONAL CHARACTERISTICS AND FEATURES

1. As the instant case envisages Modernisation of MO (Goa) on "Turnkey" basis, a large number of equipment are being procured. All equipment proposed for procurement have been classified into under mentioned four major heads / parts based on their role and functionality:-

(a) **Part - I**: - Automatic Storage and Retrieval System (*for fast moving rotable storehouse*)

(b) **Part - II**: - Storage Solutions (*for remaining store houses*)

(c) **Part - III**:- Material Handling Equipment (*for all store houses*)

(d) **Part - IV**: - Support Facilities (*for all store houses*)

2. Technical Parameters. These have been formulated and categorised into above mentioned four major parts as brought out in succeeding paragraphs.

3. Environmental Conditions: The equipment being supplied should be capable to withstand the environmental conditions prevailing in Goa. The requirements are as stipulated below:

(a) Temperature - 0 to +50 Degree Celsius
(b) Humidity - Upto 90 % RH

4. Implementation Schedule. The implementation of the project is being undertaken in four phases as stipulated at Para 4 of RFP. The detailed schedule is placed at Annexure-II to Appendix A.

PART- I

AUTOMATED STORAGE AND RETRIEVAL SYSTEM (ASRS)

5. **Aim**. To procure, install, commission and integrate with ILMS(Air) System of the Navy, **Qty one Mini - load 'Automated Storage and Retrieval System (ASRS)'** for fast moving stores of different types of aircraft in a storehouse of size 43.5 m X 16 m X 9 m. This would ensure quick storage and retrieval of fast moving stores of all aircraft. It would further enhance efficiency and storage handling capability of Material Organisation (Goa).

6. **Role**. ASRS would be utilised for storage of minimum 12000 spares (by type), under fast moving category, of all type of aircraft spares held at MO(Goa). This system would be integrated with the Integrated Logistics Management System (Air) of the Navy.

7. **Mini load ASRS**.

7.1 **Stacker Crane**. Two Single Mast and Double Deep Stacker Cranes capable of handling Bin size of L(600-650) X W(400-450) X H(250-300)mm with minimum 50 kg load bearing capacity (excluding bin weight) and picking up Bins from loading conveyors and stacking them into empty slots of Racking system. Similarly, it shall be also capable of retrieving the Bins from Racking System and deposit on the unloading conveyors. The height of crane should be 8 to 9 metres (for max. utilisation of building height and hence increased storage capacity). The operation of crane should be feasible in both automatic and manual mode.

7.2 **Storage and Retrieval Stations**. There should be at least 4 'Work Stations' for controlling the storing and retrieval of items in ASRS. Specifications of the Work Stations are enumerated in Para 11.2.

7.3 **Transfer Cars**. ASRS needs to be provided with suitable number of Transfer Cars (minimum 2) to meet the specified Throughput (transactions per hour) of the stipulated number of spares (at least 12000, by type) and the number of control work stations. The design of drive units should be of four wheels and in-built Laser based positioning system.

7.4 **Racking System**. The Racking system should be capable of storing minimum 8500 Bins of size L(600-650) X W(400-450) X H(250-300)mm. The racking type should be as follows:-

(a) Two racks in each tracks (either side)

(b) Double deep open type, 35 – 45 rows

7.5 **Loading and Unloading Conveyors**. ASRS needs to be provided with conveyors at the front end of the system called as Pick and Deliver conveyors.

7.6 **Metal (non corrosive) Bins for Mini load ASRS**. The dimensions of Bins need to be approx. L(600-650) X W(400-450) X H(250-300)mm with minimum 50 kg load bearing capacity (excluding bin weight). The Bins should be suitably designed to safely carry and store the material.

7.7 **Aisle Equipment**. The mechanical aisle equipment needs to be made of IRS (Indian Railway Standards)-52 or equivalent standards and provided with adjustable clamps for holding the rails in position to ensure proper alignment. Top rail needs to be mounted on the racking system through clamps fixed on tie channels of Aisle. The electrical aisle equipment needs to consist of power rail (fully enclosed bus bar having 07 poles) which is mounted on the racking system below the first loading level. The bottom rail alignment is to be maintained by non-shrinking cement block and be provided with Resilient rubber padding for vibration absorption.

7.8 **Software**. Warehouse Management System (WMS) shall be integrated with ILMS(Air) at no extra cost. Presently, Indian Navy undertakes

spares management through ILMS (Air). ILMS (Air) is an indigenous Relational Database Management System working on Oracle. The application updates the quantity and location of each item post receipt and stock-release, automatically. The vendor shall ensure that the operation of WMS is integrated with ILMS (Air) in all respects such that all functions and transactions would be performed by one single transaction on ILMS (Air) only. This is vital to ensure that unnecessary 'duplication' of work is avoided. The vendors would have to liaise with Centre for Naval Aviation Management System (CNAMS), Kochi for integrating their software with ILMS (Air). All initial Data entry into ILMS (Air) system, would be carried out by the vendor. The bidder's prior to submission of Technical Offer will have to prove the feasibility of integration of the Warehouse Management System (WMS) software being supplied as part of ASRS and submit a certificate issued by Director CNAMS, Kochi to the effect that WMS and ILMS(Air) can be integrated.

8. **Operation Cycle for ASRS.** The sequence of operations i.e. input and output cycles shall be as per the final integration of WMS with ILMS (Air).

9. **Automated Control**. As mentioned at Para 7.8, the WMS's Inventory Control, Location Management functions shall be controlled by ILMS (Air). However, the WMS shall monitor the actual movement of the equipment and controls the function of actual process of travelling, hoisting, forking, extracting etc.

10. **Design Standards**

10.1 The Design of ASRS needs to conform to Indian and International standards, ensuring that best of systems is supplied. Following Indian and International standards need to be followed for design, processes, construction, fabrication, automation and safeties.

10.1.1 IS (Indian Standards) 800 – 2007 General Construction on Steel.
10.1.2 IS 801- 1975 Code of practice for use of cold formed light gauge steel structural members in general building construction.
10.1.3 IS 10748 – 2004 Hot - rolled steel strip for welded tubes and pipes – specification
10.1.4 IS 3655 - 1985 Recommended practice for electroplating.
10.1.5 IS 101 – (Part 1-4) 1986-89: Methods of sampling and test for paints, varnishes and related products
10.1.6 IS 2074 – 1992: Ready mixed paint, air drying, red oxide zinc chrome, priming – specification
10.1.7 IS 513 - 2008: Cold rolled low carbon steel sheets & strips
10.1.8 IS 325 - 1996: 3 - Phase induction motor – specifications
10.1.9 IS 1363 - (Part 1-3) 2002: Hexagon head bolts, screws and nuts
10.1.10 IS 2062 - (2011): Steel for general structural purposes-specification
10.1.11 IS 4923: 1997 Hollow steel sections for structural use.
10.1.12 IS 2266 - 2002: Steel wire rope for engineering purpose.
10.1.13 FEM (European Federation of Material Handling) 9.311 – 1978: Rules for design of storage & retrieval systems- structures.

10.1.14 FEM 9.831- 2012: Basis of calculation for storage & retrieval machines – tolerances & clearances within warehouse.
10.1.15 FEM 9.851 – 2003: Performance data of Storage and Retrieval systems – cycle time.

10.2 The vendor shall use standards indicated above at para 10.1 or any other equivalent standards for manufacture of parts and sub assemblies as required. However, all metallic parts need to be given suitable anti corrosive treatments and coatings to ensure trouble free operations in highly salt laden atmospheric conditions at Goa.

11. **Technical Specifications**. The required technical specifications are as follows:-

11.1 **Stacker Crane (Mini load Storage & Retrieval Machine)**

Machine type: Single Mast / Double Deep
Safe Working load: Min 50 kg load bearing capacity (excluding bin weight)
Telescopic fork: Single deep stroke= 600-750 mm
Double deep stroke= 1200-1450 mm
Design of drive unit: 2 wheels, Gear Motor drive to rear wheel

Performance Total throughput of system: Minimum 40 bins per hour

Power loading

Voltage (V) : 415V, 3 Phase
Cycles (Hz) : 50 Hz

Controls Type
Interface: Supplier to provide details of data transmission
Control modes: Automatic & Manual both
Controls type: Programmable Logic Control (PLC)

11.2 **Storage Racking System**

11.2.1 **Technical specification of racking for ASRS Bins.**
The Bin storage system needs to be designed as per International Standards for static and seismic conditions. The standards followed and details of each component should be as mentioned below:-

11.2.1.1 The racking should be capable of storing bins of size L(600-650) X W(400-450) X H(250-300)mm with minimum 50 kg load bearing capacity (excluding bin weight). Each location shall have adequate vertical clearance above the bin height for stacking & retrieving of bins.

11.2.1.2 The racking system shall consist of frames, load beam angles and other stability components.

11.2.1.3 The system shall consider seismic forces as per Seismic Zone – III.

11.2.1.4 All components are to be assembled through bolting and no welding is allowed at site.

11.2.2 **Raw Materials.**

The components need to be manufactured from cold rolled or hot rolled sheets of steel conforming to EN 10025 or EN 10327 with minimum yield stress of 250N/mm2.
or
The corresponding IS code for steel used needs to be IS 10748, IS 513 and fasteners like nuts, bolts be IS 1363.

11.3 **Loading and Unloading Conveyors**. Roller and Chain conveyor need to be designed for the movement of items stored in bins in and out of the ASRS.

11.4 **Controls and Hardware**.

Interface:	Supplier to provide details
Controls type:	PLC
Control Class:	FEM 9.851 Class 200 **or** Equivalent standards

11.5 **IT Hardware**. All IT hardware required to interface the WMS with ILMS (Air) and ensure successful operation of ASRS shall be provided by the Vendor. Primarily, it shall consist of:-

(a) Main and Standby WMS Servers (integrated with ILMS Air).

(b) 4 PCs (for workstations) with licensed software, 17 inch TFT monitor, keyboard and UPSs.

(c) 4 Printers

(d) Associated wirings

(e) Any other hardware required to integrate with ILMS(Air) and ensure successful WMS operation.

(**Note**: The specifications of the above IT Hardware items are required to be such that the ASRS system operates to its full capacity)

11.6 **Bins.** Bins as per under mentioned specifications.

Dimensions:	L (600-650) X W (400-450) X H (250-300) mm
Feature:	The bin should be made of sheet metal structure
Load capacity:	Min 50 kg (excluding bin weight)
Main components:	Metal Sheets

(a) **Pre-treatment**. The bins need to be subjected to anti-corrosion treatment by following the process of degreasing, rinsing, phosphating, rinse and de-mineralised water rinsing.

(b) **Final finish**. The final finish should be two coats of air drying synthetic enamel paint by spray with DFT (Dry Film Thickness) of minimum 30 microns or Powder Coating of minimum 30 microns.

12. **Additional features of ASRS**.

12.1 Speed control of Stacker Crane needs to be obtained through minimum 02 Variable Frequency Drives (VFDs) to ensure smooth acceleration and stop.

12.2 Only Geared motors need to be provided for X,Y,Z directions. The controls should be operated on frequency of 50Hz only.

12.3 Stacker crane should be controlled through PLC only and not by any micro-processor or micro-computer.

13. **Safety Features**. The ASRS is to have adequate inbuilt electrical and mechanical safety to ensure fail-safe operation as indicated below:-

(a) End of aisle shock absorbers and bumpers for Stacker Crane.

(b) End of travel buffer for the Lifting Carriage.

(c) Anti-tilt mechanism for stacker crane.

(d) Continuous rail cleaning brush for floor rail.

(e) Adjustable Rail Clamps to ensure alignment.

(f) Resilient Rubber Pads on adjustable clamps for vibration dampening.

(g) Profile check on lifting carriage to check all three dimensions (width, depth & height) of the pallet.

(h) Safety fences along with one of electro-magnetic aisle access Doors.

(j) Traveling movements should not be allowed if bin is not centered on forks.

(k) Features (such as Photocells) to identify bin status (empty or full or half-empty) to ensure bins picked up for storage has space in it.

(l) Adequate provision for prevention of dropping of items and bin from height in the course of storage or retrieval.

(m) Slack rope if any, to be detected by a safety switch that cuts off total movement of Stacker Crane.

(n) Safety in terms of interlocking of travelling and forking movements.

(p) Time Out logic for critical activities.

(q) Necessary speed control at the end of Aisle through PLC and Encoders.

(r) Safety fences along with one of electro-magnetic Aisle access doors.

14. **Support System**

14.1 **Server room**. One room of 5M X 3M available in the storehouse is to be converted to Server room for housing the WMS Server.

14.2 **Work Station**. An ergonomic user-friendly and efficient workstation should be provided for each of the four terminals. The workstation shall have following facilities:-

(a) Document Filing and Stowage.
(b) Place to keep the stores which have been retrieved or are required to be stored.

(c) Space for PC, keyboard, display monitor, UPS etc.

(d) Adjustable and comfortable seating for 2 persons in each terminal.

14.3 **Power Back Up**. Qty one, DG set (uninterrupted power supply) of 200 KVA or 160 KW capacity needs to be installed as a 'back-up' for providing electrical supply to above equipment in case of power failure. The supplier would be responsible to supply, undertaking all civil works for providing a weather proof enclosure, install the DG set and lay required electrical cable from enclosure to main supply of the building. The DG set needs to be of any reputed Indian company having provision for automatic switching ON during main supply breakdown and switching OFF on availability of power supply within 30 - 45 seconds. The set should have necessary sound proofing arrangement.

14.4 **Material Handling Equipment**. The requirement of Material Handling Equipment for fast moving storehouse has been worked out and is indicated along with other MHE for entire storehouses.

15. **Miscellaneous Provisions in Store House**. The vendor would be responsible for following provisions in the store houses: -

(a) **Conditioning of Floor and Ramp Slope**. The required grouting of railings for transfer car or stacker crane and construction of foundation for ASRS is required to be carried out by the vendor. The required floor strengthening, conditioning and ramp slopes needs to be undertaken by the vendor prior fitment of the machine as the present flooring of this store house

consists of six inch thick PCC on rocky plane or hard surface. The floor of entire storehouse is to be provided with epoxy coated dust free floor finish. The floor should have suitable gradient on either side from centre to prevent accumulation of water. The weather proofing of the store houses needs to be ensured by the vendor.

(b) **Air Curtains and Dust Proofing Measures of the Main Doors of Store Houses**. In order to have dust free operations, air curtains and dust free measures needs to be provided by the vendor preferably with automated double door arrangement for entry into individual terminal and workstation.

(c) **Relocation of Stores**. The vendor would be required to relocate minimum 12000 by type items from different storehouses (of different aircraft) to this fast-moving store. The list of these items along with present location would be provided by Indian Navy. The vendor would store these items in respective bins of ASRS and update the location on ILMS (Air) in association with reps of Indian Navy. All existing stores and fittings and racks need to be removed and placed at suitable location as per user requirement.

(d) **Electrical Wiring and Fittings**. All affected and disturbed electrical wirings, fittings and installations during fitment of ASRS in the storehouse are to be restored by the vendor. The vendor would also be required to provide sufficient numbers of power points (15 amps and 5 amps) as per requirement in Server room, office space and operator terminals for fitment of electrical appliances. The vendor is also responsible to provide a desired charging point for MHE. Present electrical wirings of this building is only capable to take load for existing electrical appliances including lights, fan etc. The laying of new electrical cables suitable for proposed equipment and support system such as PCs, servers, air conditioners, fire detection and extinguishing and alarm system, CCTV system and various other essential electrical appliances need to be provided by the vendor. During the execution Phase of the work, the vendor would be responsible for electrical safety of the buildings including equipment post installation of all new equipment.

16. **Environmental Conditioning**. The ASRS Storehouse needs to be provided with controlled environment i.e. temperatures to be maintained between 20^0 to 30^0C with appropriate humidity range (50-60 RH). Qty 26, Split ACs, wall-mounted, each of 4 Ton capacity need to be provided in this storehouse to maintain required temperature and humidity (Para 63 of Part IV of Appendix 'A' refers).

17. **Safety Provisions**

(a) **Fire Detection, Alarm and Extinguishing System**. The entire store house needs to be fitted with fire sensing and smoke detection system with central alarm and CO_2 extinguishing system. The storehouse is to be divided into zones and fire and smoke, if any in the respective zones would be detected by optical detectors in that zone. Each optical detector needs to be linked to central alarm system through the respective zone indicating exact location of fire and smoke. The CO_2 extinguishing system would have both

manual and automatic options (mode of operation selected by user). The main features of this system should be as follows:-

Sl	Description	Qty
(i)	45 Kg CO_2 Cylinders as per IS Standards with CO_2 gas Slave Valve Ceodeux with associated pipe connections, NRV, Discharge hose, manifolds, pressure switches etc.	172
(ii)	45 Kg CO_2 Cylinders as per IS Standards with CO_2 gas master valve with actuator valve Ceodeux with associated pipe connections, NRV, Discharge hose, manifolds, pressure switches etc	10
(iii)	Manual release switches	10
(iv)	Fire Alarm panel with CO_2 gas release module (with battery)	02
(v)	Optical detectors with accessories (covering entire area of 44 X 16 Mtrs)	Approx 145 Nos
(vi)	Electronic Hooters	04 in Nos
(vii)	Warning panels and Signs (2 in Storehouse, and 1 each Foreman office, MO (Goa) Guard Room)	04

(b) **Data Backup Supply**. A suitable UPS (01 hour backup) for server room needs to be provided for maintaining ASRS operations and safe storage of data in case of supply failure or while changing over of supply.

18. **Manual Access to Stores**. Provision for manual retrieval of stores should be mandatorily available so that the retrieval and issue of spares to units is not affected in case of system shutdown. A suitable order picker or ladder needs to be provided in each track to facilitate retrieval of stores manually. The ladder should have inbuilt hoist mechanism to lower retrieved spares safely (from height) without resorting to the manual handling.

19. **Endurance**. The complete ASRS system and machine need to operate continuously for 12 hours without any interruption. It should not take more than approximately 10 minutes for starting and switching off of the system.

20. **Provision of Temporary Storage**. The vendor is responsible for removing all stores from the respective store houses including existing storage racking system and keeping them under safe, temporary storage space without disturbing the present location of each item so as to ensure uninterrupted functioning of the

organisation. The vendor is to re-position all stores to newly installed racking arrangement and update new location in all records including ILMS (Air).

21. **Obsolescence Management**. Vendor need to provide assurance that equipment would be supportable for twenty years.

PART II

INSTALLATION OF STORAGE AND RETRIEVAL SOLUTIONS IN ALL STOREHOUSES

22. **Aim**. To procure, install and commission specific storage solution and equipment in all storehouses. This will ensure quick storage and retrieval of stores in storehouses. It would further enhance efficiency and storage handling capability of Material Organisation (Goa).

23. **Role**. The proposed modern storage equipment and systems would consist of mainly mobile racking (Compactors), Heavy duty Pallet racking, light and medium Shelving, heavy duty Cantilever racking, motorised tyre Carousel, POL racks etc. The main role of these equipment is to store all type of items and facilitate their quick retrievals as per requirement. The technical details of the system are enumerated in succeeding paragraphs.

24. **Proposed Storage Solutions**. The above storage systems and equipment at para 23 above, are to be procured, installed and commissioned in all storehouses (**except fast moving store**). **The consolidated details of these equipment are placed at Annexure I**.

25. **Storage Effect**. The proposed storage equipment would be utilised for storage of all types of spares and stores i.e. dimensions of same will vary from very small to large up to 5 meter in length and weight up to 2500 Kg each. The proposed storage solution will ensure utilisation of complete vertical space available in each store house and max surface area. **The retrieval of spares will be further augmented with help of Material Handling Equipment as enumerated at Part III of present Appendix.**

26. **Design Standards**. All equipment should comply with International standards for their design, processes, construction, fabrication, automation and safety margin during operations. Minimum essential requirement are listed at succeeding paragraphs. The racking components need to be designed as per Indian or European standards as described below:-

Indian Standard (IS)
IS 800 – General construction in steel
IS 801 – Code of practice for use of cold formed light gauge steel structure members in building construction

Or

European Standard (EN)
The assembly, inspection and tests are required to be carried out as per FEM standards 9.831

27. **Raw Material**. The components need to be manufactured from cold rolled or hot rolled sheets of steel confirming to EN 10025 or EN 10327 (and equivalent) with minimum yield stress of 250N/mm2 **Or** the corresponding IS code for steel used needs to be IS 10748, IS 513 and fasteners like nuts, bolts be IS 1363.

28. **Technical details of Storage Equipment and System**. The Technical details of each storage equipment and system are enumerated in the succeeding paragraphs.

29. **Heavy Duty Cantilever Fixed/ Mobile Racking**. This type of racking system would be used for storage of longer and heavy stores. The load capacity of individual rack needs to be minimum 2500 kg. The Cantilever arms and height of each rack of cantilever storage equipment (fixed or mobile) should have provision for manual adjustment as per dimensions of stores being positioned. The Storage system components should comply with international standards for their design, processes, construction, fabrication, automation and safety margin during operations. The minimum factor of safety is considered as 1.5 as per standards with respect to yield stress of material used. The material used for main load bearing structure should be of prime quality M.S. Material & confirms to IS standards grade. All fasteners used should be electro-galvanised and must confirm to IS standards including its chemical and mechanical properties. All items are to be supplied duly powder coated. All the components (except fasteners) are to be given 4-stage, 7-steps anti-corrosive treatment. Before carrying out powder coating, pre- treatment to steel surface to be carried out such as degreasing, pickling & phosphating. Each racking system should have minimum five to seven racks depending upon height of the building in which same is being installed. Each component of the system is to be subjected to powder coating with a minimum thickness of 30 micron.

30. **Mobile Racking systems with Single and Double Faced units (Compactors)**. This would ensure maximum utilisation of the warehouse space including total usable height whilst allowing 100% access to materials. The proposed mobile racking system (Single and Double) will vary in dimension and should be able to take load of 50 kg in each rack. Each racking system should have minimum five to seven racks depending upon height of the building in which same is being installed.

(a) **Design**. The complete mobile racking system (double faced and single faced) with fixed racks at the ends and in centre for bifurcation should be designed with 'State of the Art' technology of boltless shelving as per international practice with aesthetic look and finish. Design needs to incorporate utmost safety features like anti-tilt arrangement, over-travel stopper, drive wheel locking, central locking. Mobile racking system and its components such as base frame and super structure should be designed considering factor of safety as 1.5 with respect to yield stress of the material used. All load bearing sheet metal components should be cold formed or roll formed ensuring best workmanship, accuracy, quality and consistency.

(b) **Rail and Channels**. Extra care needs to be taken while designing, fabricating and installing of Rails to achieve flawless, smooth and easy movement of units in full load and eccentric loading conditions. Rail channel should be designed to incorporate anti – tilt. End stoppers must be provided at the end of rails to prevent derailing of mobile unit.

(c) **Base frame**. To be designed considering maximum UDL of 5000 Kg for single face unit and UDL of 10000 Kg for double face unit as live load in addition to the dead load of the unit.

(d) **Safety Locking (for All Mobile Units)**. Each Mobile unit should have Safety locking arrangement, which when operated will not allow the unit to move.

(e) **Central Locking (for every system with SFM)**. Each Single Face Mobile (SFM) Unit is to have central locking panel. When all the units in particular sets are closed together, operating lock on central locking panel should lock the complete system. There needs to be one central locking arrangement for each set of system.

(f) **Indexing Arrangement (for every SFF, SFM, DFM units)**. Each unit needs to have indexing arrangement for easy identification of stored items. This is to be fixed on the front panel at convenient readable height for the convenience of operating person.

(g) **Pre-treatment and Final finish of Mobile Racking System**. All components of mobile racking system are to be duly finished with powder coating. Prior to this, components need to be subjected to pre-treatment, 4-Stage, 7-Step on surface to achieve rust free and phosphate coating surface for best adhesion condition.

31. **Heavy Duty Tyre Racking Unit (Motorized Tyre Carousel)**. This type of racking unit would ensure storage of various type and sizes of aircraft tyres in such a position that tyres can be rotated easily as part of periodic storage servicing and inspection. In this storage system, tyres would be stored in upright and vertical position to ensure proper storage as per OEM recommendation. The storing and removal of tyres from this type of racking units would be achieved without any obstruction. It would be linked with motorised gear system to facilitate easy rotation of tyres as part of storage servicing procedure. One person should be able to rotate the tyre carrier frames and lock it at a desired position and same can be repeated on next occasion as per requirement. The removal and storage of tyres should be in such a way that respective motorised tyre rack should open up for removal and stacking. Each rack should be able to take the load of 200- 500 kg. The rack should be adjustable to store aircraft tyres ranging from 30 cm to 150 cm diameter. It should have minimum 5 to 7 racks and total height of approx 6 Mtrs. The carousal should have the capacity to house approx following type and number of tyres :-

(a) 30 to 60 cm diameter - qty 400
(b) 60 to 100 cm diameter - qty 300
(c) 100 to 150 cm diameter - qty 150

32. **Heavy Duty Racking for Oil Drums and POL Racking Unit**. This type of racking unit would be used for storage of heavy drums containing various type of POLs. Drums kept in these types of racks would be picked up by drum retrieval kit and transported to any location. This racking arrangement would be used to store huge consignments of drums of various sizes and capacities. This racking unit would

be of heavy duty type and have horizontal storage arrangement for heavy oil drums. The top surface of each rack should have rubberized coating and soft padding to avoid damage to the POL drums. Each rack should be able to take up load of minimum 1000 kg. Each racking system should have minimum three to five racks depending upon height of the building in which the same is being installed.

33. **Light and Medium Duty Shelving**. Light and Medium Duty Shelving would be used for hand-loading application. It would be used for storage of a symmetric and bulky loads. It should have minimum load capacity of 400 kg / level of each item. It should be easy to assemble and disassemble. The design standards and material requirement is to be same as that of heavy duty pallet, shelving unit except for size and dimensions and load capacity. Each racking system should have minimum five to seven racks depending upon height of the building in which it is being installed.

34. **Heavy Duty Pallet Racking (Mobile & Fixed) with or without Deck Panel and Shelving Units**. The required technical details are as follows:-

(a) Each mobile unit should be motorised with movable storage unit with individual push button control for forward & reverse movement.

(b) Each component of the system to be treated with rust preventive treatment and powder coated for better finish.

(c) All the wheels, axle shaft, drive shaft should be supported with heavy duty, self aligned, self lubricated sealed for life time pedestal mounted bearings for trouble free & smooth movement of the system.

(d) Heavy duty 3 phase, A.C. Electric motor with life lubricated radial ball bearing coupled with maintenance free gearbox based lubricant to be provided.

(e) Each racking system should have minimum five to seven racks depending upon height of the building in which same is being installed.

35. **Electrical Wiring and Fittings**. All affected and disturbed electrical wirings, fittings and installations during fitment of above storage system in each store house are to be restored by the vendor. The vendor is required to provide sufficient numbers of power points (15 amps and 5 amps) as per requirement in office space and working terminals for fitment of electrical appliances. It may be noted that present electrical wirings are only capable to take load for existing electrical appliances including lights, fan etc. The laying of new electrical cable suitable for proposed equipment is considered essential and same will be undertaken by the vendor. The electrical safety of the building including equipment to be ensured by the vendor post installation of all above equipment. The vendor shall be responsible for laying new electrical wiring with capability of taking electrical load for entire equipment. The quality of all the equipment being supplied will be accepted subject to clearance by the Third party inspection as brought out vide Para 25 of RFP, page 7 refers).

36. **Miscellaneous Provisions and Works in Store House**. The vendor would be required to undertake following miscellaneous and essential works in all concerned store houses: -

(a) **Clearance of Storehouse**. The vendor is responsible for removal of all existing storage equipment from concerned storehouses and placing them at locations as suggested by unit. The vendor would also be responsible for removal of stores from each store house and create safe, covered, temporary storage facilities for uninterrupted functioning during transition and execution phase. Location of stores are to be marked for quick retrieval.

(b) **Strengthening of Floor**. The required floor reinforcement and strengthening needs to be undertaken by the vendor prior fitment of equipment as the present flooring of this store house consists of 6 inch thick PCC on rocky plane and hard surface.

(c) **Floor Finish**. The flooring of all storehouses should be smooth-cemented with FM2 grade. The floor is to have suitable gradient on either side from centre.

(d) **Ramp Slope**. The slope of ramps on either side of each store house needs to be suitably altered and reshaped for safe movement of stores with Material Handling Equipment.

(e) **Wall Finish**. Prior to installation of proposed storage system and post completion of electrical wiring and fitting, affected wall is to be painted and distempered with anti fungus treatment of suitable colours.

(f) **Roof Water Proofing**. The roof of each storehouse should be applied with water proofing compound (acrylic based bonding agent) and roof is to be made fully water proof prior installation of proposed system to prevent seepage into the building space. The ceiling roof needs to be painted with anti-fungus paint.

37. The consolidated dimensions of racking systems for requirements mentioned at Paras 29 to 34 above are placed at **Part I of Annexure I to Appendix A**. The standards to be adhered for these deliverables are mentioned at Design Standard (Para 10 of Part-I). Also, the requirements of storehouses have been brought out in the implementation schedule brought out at Annexure- II of **Appendix A**.

PART III

PROCUREMENT INSTALLATION AND COMMISSIONING OF MATERIAL HANDLING EQUIPMENT (MHE)

38. **Aim**. To procure, assemble and commission Material Handling Equipment (MHE) as per list for all storehouses at MO (Goa). These equipment will be utilised for handling (loading and unloading) of voluminous stores of all sizes. It would enhance efficiency and storage handling capability of Material Organisation (Goa).

39. **Role**. The role of proposed handling equipment will be to load or unload or handle stores of various dimensions. The MHE would be utilised for quick retrieval of stores from all locations in the store houses. The technical details of the equipment are enumerated in succeeding paragraphs.

40. **Proposed Material Handling Equipment**. Material Handling Equipment are required to be procured, assembled and commissioned in all storehouses. **The consolidated details of these equipment have been indicated at Part II of Annexure I to Appendix A.**

41. **Design and Safety Standards**. All equipment should comply with latest **Indian or International standards** for processes, construction, fabrication, automation and safety margin during operations.

42. **Technical Specifications**.The technical requirements of each equipment are appended in succeeding paragraphs.

43. **High Reach Lift Truck**. This equipment will be utilised for handling and lifting of stores (Boxes and Packages) and storing in uppermost racks and subsequent retrieval of same. The Reach truck should be equipped with suitable designed forks for load and unload cage pallets and cartons on or from single deep racking arrangement. The Reach truck shall be provided with suitable drives for traverses and lift carriage with forks and for stopping the motions during regular operation and during emergency conditions. For accurate positioning of the forks for stacking and retrieving, there should also be a provision of camera and operator's cabin shall have viewing device and monitor facility, so that operator can also view and judge the fork position during stacking and retrieval of pallets from the racks. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(a)	Drive type	Full electric (Battery operated)
(b)	Operator Type	Seated
(c)	Load capacity/Rate load @ load centre	2.0 Ton @ 600mm load centre
(d)	Max Lift height (last loading level)	8 mtr
(e)	Derated capacity at last loading level	Min 1.5 Ton
(f)	Min Fork length	1150 mm (+/- 5%)
(g)	Max Clear Aisle Width	3100 mm (+/- 5%)
(h)	Transfer / Intersecting aisle width	3000 mm (+/- 5%)
(j)	Lift Motor rating	Min 13.0 KW
(k)	Traction Motor	Min 6.0 KW
(l)	Battery Voltage & A-hrs	48 / (Min) 750 Ah
(m)	Brake system	Electromagnetic braking

44. **Full Electric Stacker**. This equipment will be utilised for handling and lifting of stores weighing up to 1500 kg on ground and should be helpful in quick transportation of equipment in store houses. The operation of this equipment is to be fully electrical including lifting of stores and movement on ground. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(a)	Drive	Full electric (battery operated)
(b)	Operator type	Standing
(c)	Load capacity / rate load @ load centre	1.5 ton @ 600 mm load centre
(d)	Max lift height (last loading level)	3 mtrs
(e)	Wheels	Polyurethane
(f)	Fork length	1150 mm (+/- 5%)
(g)	Overall length	Max 2500 mm
(h)	Overall width	Max 1000 mm
(j)	Travel speed(min), laden / unladen	Min 5 / 5 km/hr
(k)	Lift speed(min), laden / unladen	Min 0.10 / 0.10 m/s
(l)	Lowering speed(min), laden / unladen	Min 0.10 / 0.10 m/s
(m)	Lift motor	Min 3.0 KW
(n)	Battery voltage & A-hrs	24 V , (min) 200 A hr

45. **Hand Pallet Truck**. This equipment will be utilised for handling and lifting of stores upto 1000 kg manually on ground and should be helpful in quick transportation of equipment in store houses. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(i)	Capacity	Min 1000 kg
(ii)	Max. lift height	Min 160 mm
(iii)	Fork length	Min 1100 mm
(iv)	Fork width	Min 150 mm
(v)	Fork spread	500 – 750 mm

46. **Order Picker**. This equipment will be utilised for handling/ lifting of stores in between two rows of mobile racking system (Compactors). The required technical specifications are as follows: -

Sl	Description	Size and Capacity
(a)	Drive	Full electric (battery operated)
(b)	Operator type	Standing
(c)	Load capacity/ rate load @ load centre	500 kg@600mm load centre
(d)	Max lift height (last loading level)	Min 3000 mm (qty – 10) Min 5500 mm (qty - 08)
(e)	Derated capacity at last loading level	500 kg
(f)	Fork length	1100 (+/- 3%) mm
(g)	Max clear aisle width	Max 2000mm
(h)	Transfer / intersecting aisle width	Max 4000mm

Sl	Description	Size and Capacity
(j)	Lift motor	Min 2.5KW
(k)	Wheels	Polyurethane
(l)	Battery Voltage & Ahrs	Lead Acid Battery 24V/ (min.) 750Ah

47. **Narrow Aisle Forklift**. This equipment will be utilised for handling and lifting of stores in narrow space between Heavy Duty Cantilever and Heavy Pallet Racking. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(a)	Drive	Full electric (battery operated)
(b)	Operator type	Seated
(c)	Load capacity / rate load @ load center	2.0 ton@ 500mm load center
(d)	Max lift height (last loading level)	6 mtrs
(e)	Derated capacity at last loading level	Min 1.0 ton
(f)	Fork length	Min 1000 mm
(g)	Front chassis articulation angle	+/-110 degrees
(h)	Rotation angle	220 degrees
(j)	Max clear aisle width	1800 (+/- 5%) mm
(k)	Transfer / intersecting aisle width	2700 (+/- 5%) mm
(l)	Lift motor	Min 8.0 KW
(m)	Type of drive control	AC
(n)	Battery type / voltage & Ah	Lead acid, 48 V /(min.) 750 Ah

48. **Cage pallets (Collapsible)**. These pallets will be utilised for storing heavy boxes / stores in the heavy duty pallets racking. The stores and boxes will be placed on these pallets and then stored on the racks along with pallets. The retrieval of these stores will also be undertaken along with pallets. The size and dimension and load capacities of these pallets should be 1000 mm x 1000 mm x 1000 mm and 1.0 ton. The construction of these pallets should be of steel based material with anti-corrosive treatment. The cage of these pallets should be foldable or collapsible in order to ensure stocking of maximum pallets when not in use and could be erected up to max height while placing stores in it towards securing of contents.

49. **Electric cart**. This equipment will be utilised for handling and transportation of stores up to 700 kg from one store to other with driver on board. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(a)	Operation type	Full electric (Battery operated)
(b)	Capacity / rated load	700 Kg (inclusive of driver weight)
(c)	Max speed	20 Km/h
(d)	Battery voltage, nominal capacity	24/ 420 V/Ah
(e)	Overall length	2200-2600mm
(f)	Overall width	1000-1200mm

50. **Drum Clamp Attachment**. This item will be utilised for clamping heavy POL drums into Drum Picker and Stacker. This should be capable of attaching two drums together onto fork lift vertical bar. The vertical lifting shall be by stacker movement and tilting arrangement shall be in-built in the attachment for rotation of drums. The required technical specifications are as follows: -

Sl	Description	Size/ Capacity
(i)	Max load capacity	1.0 Ton
(ii)	Fork extension length	1100 mm (+/- 5%)
(iii)	No. of drums to be attached	Min. 02

51. **Wheeled Litters Bins.** These items will be utilised for collection of garbage and waste from each store house and disposal of same at a designated place. This should be made of standard range graded plastics with using high quality of raw material like FRP with smooth finish and moulded in required dimensions with high durability & strength, ample space for storage of litter & waste. These should be light in weight and easy to handle, easy to clean and should have optimum resistance to scratch. The wheels of these bins should be made of moulded FRP and rubberised material and movement on ground should be smooth without any sound. The storage volume of these bins should be 500 litres.

52. **Injection Moulded Pallets.** These moulded pallets will be utilised for temporary storage of stores for dispatch and merging in stores. These will be in two colours i.e. Red for Dispatch and Green for Receipts. The required size and capacity of two different sets of pallets required are as follows:-

(a) 1500 X 1200 mm / 1 ton (+/- 10 %)
(b) 1200 x 1000 mm / 1 ton (+/- 10 %)

This should be made of reinforced plastic with injection moulding processes. It must be light in weight maximum up to 10 kg each and durable i.e. life up to 20 years. There shall be no deformation of these pallets due to increase in temperature and continuous loading.

53. **Multi Directional Forklift**. This equipment will be utilised for handling and lifting of heavy equipment and stores up to 5000 Kg and move around in all directions as per requirement. The forklift should allow shifting of load through total 360 degree without any movement of forklift. The required technical specifications of same are as follows: -

Sl	Description	Size/ Capacity
(i)	Operation type	Fully electric (battery operated)
(ii)	Load capacity	(i) 5000 kg upto lift height of 2M (ii) 2000 kg from height of 2M to 6M

Sl	Description	Size/ Capacity
(iii)	Lift height	6M
(iv)	Fork size (L X W X T)	1200 x150 x 50 (+/- 5%) mm
(v)	Load beds widths	1000 – 1600 mm
(vi)	Battery voltage, nominal capacity	48/500 V/Ah
(vii)	Overall length	2500-3000 mm
(viii)	Overall width	1400-1800
(j)	Angular movement	Through 360^0

54. **Electric Lifting Platform**. This equipment would be used in KV 28 storehouse for transfer of goods from ground floor to first floor with flushed platform at floor level.

(a) The required technical details of same are as follows: -

Sl	Description	Size/ Capacity
(i)	Operation type	Electro Hydraulics
(ii)	Load capacity	Min 1.0 Ton
(iii)	Lift height	Min 6.0 M
(iv)	Platform size	1.2 x 1.2 x 1.3 (+/- 5%) M
(v)	Operating level	Ground to first floor
(vi)	Type of installation	Pit installation
(vii)	Power supply	AC motor, 2 HP, 3 phase, 415 Volts

(b) The vendor will be responsible for supply, installation and commissioning of entire equipment. All associated works will be executed by the vendor. The hydraulic system should consist of electric motor, gear pump, oil reservoir, solenoid valve and necessary indication of pressure & oil level. The vendor will also be responsible for laying suitable cable from main supply for this equipment and install control panel with MCB contactors and over load relay for protection of motor.

55. **Steel Pallets**. The steel pallets of size 1200 x 1200 mm are required for storage of heavy stores weighing upto 2 ton. These pallets will be placed on heavy duty racks along with stores. The design and construction of these pallets should be such that their minimal deformation should take place even in hot climatic conditions, changing environment conditions and continuous loadings. The surface finish of these items should be anti corrosive and non oxidant. The life of these items should be 20 years and more. The weight of each pallet should not be more than 15 - 20 kg and plate thickness of suitable gauge with corresponding strength.

56. **Mobile and Fixed Dock Leveller**. This equipment will be utilised for loading and unloading of heavy stores and vehicles to or from trucks and lorries. Each dock leveller should be capable of handling weight upto 5 ton and min 2.5 mtrs width. The equipment should have a flat portion and the ramp. The levellers should be adjustable to flush with bed of trucks or Lorries or Trailers. The construction of same

is of high tensile steel material and painted with golden yellow colour. The mobile dock leveller should be able to be move on its wheels and should have provision for locking at a position during loading or unloading operation. The fixed dock leveller will be installed at a location permanently.

57. **Obsolescence Management**. Vendor need to provide assurance that equipment would be supportable for twenty years.

PART IV

SUPPORT FACILITIES IN STOREHOUSES OF MO (GOA)

58. **Aim**. To procure, install and commission under-mentioned support facilities in the form of equipment, systems and infrastructure in storehouses of MO (Goa). It would enhance efficiency of material handling capability of Material Organisation (Goa).

59. **Role**. The main role of these equipment and systems is to store all inventory in safe, secure and controlled environment. This would further enhance efficiency of storehouse staff by providing modern technology support facilities.

60. **Details of Equipment, System and Facilities**. **The consolidated details of proposed systems / facilities and equipment are placed at Part III of Annexure I to Appendix A.**

61. **Distribution**. The above proposed systems, equipment and facilities would be provided in different storehouses.

62. **Design/ Safety Standards**. All equipment should comply with latest international standards for their design, processes, construction, fabrication, automation and safety margins during operations. Minimum essential requirement are listed in succeeding paragraphs.

63. **Split AC**. The required technical specifications of proposed Split AC are as follows:-

(a) Type - Split AC, wall-mounted
(b) Capacity - 4 ton each
(c) Qty - 57 (Fast moving store & ASRS - 26, MiG store -10, SH store- 08, KM store - 08,ROT store-02, POL store- 03)
(d) Technical specifications: -

Sl	Description	Size, Capacity, Qty
(i)	Weight	50-60 kg each
(ii)	Noise level	55 - 70 db
(iii)	Air filter	01 each
(iv)	Moisture removing capacity	500-600 CFM
(v)	Compressor	1 each rotary type

(vi)	Power consumption	3500 – 4000 W
(vii)	Performance/ capacity (cooling effect)	45000- 50000 btu/hr
(viii)	Fan	01 each

(e) The following features are essentially required for Split AC: -

(i) Provision for manual setting of fan speed, air direction, air discharge and temperature control etc.
(ii) Provision for automatic cut IN and OUT as per temperature setting.
(iii) De - humidification
(iv) Temperature control, ON and OFF timer.
(v) Filter cleaning indicator
(vi) Auto restart

(f) The supplier will be required to lay new and suitable electrical cables for above air conditioners from main source of respective store house to the individual AC.

64. **CCTV System**.

(a) It is proposed to install CCTV with IP cameras along with monitoring and surveillance system. Backbone connectivity would be on fibre and rest on copper cabling. The requirement of items in the CCTV system is as follows:-

Sl.	Description	Size/Capacity	Qty	Remarks
(i)	CCTV Camera	IP Camera with digital zoom	30	One camera in each section of storehouse. 2 Cameras at Main Gate
(ii)	Monitors	25" – 32" TFT	4	2 each in Guard Room and Regulating Office.

(b) The technical specifications of proposed CCTV system are as follows: -

Sl	Description	Size/ Capacity
(i)	Optical & Digital zoom speed dome IP Camera	8X - 10 X optical zoom
(ii)	Min. illumination (Color, BW, slow shutter mode)	0.7/ 0.02/0.005 lux
(iii)	Motion detection	Built - in
(iv)	Pan/ tilt	360^0/ 180^0
(v)	Angle of view	50^0 – 90^0 (diagonal)
(vi)	IR range	10-15 M
(vii)	Sensors	¼ CCD type
(viii)	Lens Type	Varifocal
(ix)	Lens focal length	0.7/0.02/0.005 lux
(x)	Video compression	H.264 HP/MP/BP, MPEG-4 SP,

Sl	Description	Size/ Capacity
		M-JPEG and equivalent
(xi)	Protocol	TCP/IP, IPV6, DNS,DDNS, DHCP,NTP, UDP, ICMP, SMTP, FTP, HTTP, RTP, 3GPP
(xii)	Operating temperature	-20 to 60 degree centigrade

(c) Back up provision of all video recordings on daily basis should exist.

(d) Data storage facilities for storage of at least one month's video recording should be provided along with above equipment.

(e) Video footage to be linked to every store office desk individually and a combined link to be provided for visuals at main gate.

65. **Fire and Smoke Sensors with Alarm System**. All storehouses are required to be installed with fire sensing and smoke detection system with central alarm. Each store house is to be divided into zones and fire and smoke, if any, in the respective zones would be detected by optical detectors in that zone. Each optical detector should be linked to central alarm system through the respective zone indicating exact location of fire and smoke. The details of proposed system are as follows:-

Sl.	Description	Qty (Minimum)
(i)	Optical detectors with accessories (Intelligent photo thermal detector with flash scan) for covering entire area of 17 store houses and 29 sections	3000
(ii)	Fire Alarm Panel with individual battery	34
(iii)	Electronic Hooters (covering entire area of 17 store houses and 29 sections)	20
(iv)	Warning Panel and Sign	20
(v)	Automatic fire alarm stations within built facilities	20
(vi)	Cabling/ electrical wiring in each store house for individual alarm panel and a combined line for central alarm panel at main gate	As required

Note.

(a) The package includes fabrication, installation, testing, commissioning and training of above fire detection system.

(b) The detailed scheme of complete system being installed by the bidders bringing out installation plan needs to be submitted along with technical bid.

(c) The vendor will be required to reassess total requirement of detectors and electrical wiring.

66. **Work Stations**. An ergonomic user-friendly and efficient workstation should be provided in each storehouse. The workstation shall have following facilities:-

(a) Document Filing/Stowage.

(b) Space for PC, keyboard, display monitor, UPS etc.

(c) Adjustable and comfortable seating for 2 persons in each terminal.

67. **Electrical Wiring and Fittings**. All affected and disturbed electrical wirings, fittings and installations during fitment of above facilities in the storehouses are to be restored by the vendor. The vendor will also be required to provide sufficient numbers of power points. It may be noted that present electrical wirings of these buildings is only capable to take load for existing electrical appliances including lights, fan etc. The laying of new electrical cable suitable for proposed equipment is considered essential and same will be undertaken by the vendor. The vendor would be responsible for electrical safety of the buildings during execution of the contract for all equipment. The scheme of electrification of all store houses along with specifications of equipment should be submitted by the vendor during the work.

Annexure I
(Refers to Para 24, 37, 40, 60 of Appendix A)

DETAILS OF STORAGE EQUIPMENT, MATERIAL HANDLING EQUIPMENT AND ASSOCIATED SUPPORT FACILITIES

Note: Max acceptable tolerance of all equipment + - 5% or 100 mm whichever is smaller

I. STORAGE SOLUTIONS

(A) Automatic Storage and Retrieval System (ASRS) for fast-moving stores, as per the requirements specified in Part I of Appendix A.

(B) Other Storehouse equipment **(Refers to Annexure II to Appendix A)**

SL	DESCRIPTION	SIZE (IN MM)	QTY
1.	Cantilever Fixed Racking Refers Para 1.2 (b) proposed solution Sl (d)	7400 x 2600 x 6400	6
2.	Cantilever racking units with decking panels Refers Para 1.1 (b) proposed solution Sl (a)	7400 x 1500 x 7000	8
3.	Fixed Cantilever Racking Unit with decking panels Refers Para 1.2 (a) (i) proposed solution Sl (b) & Refers Para 1.4 (a) (i) proposed solution Sl (b)	3600x1500 x 6500	6
4.	Mobile Cantilever Racking Unit with decking panels Refers Para 1.2 (a) (i) proposed solution Sl (a) & Refers Para 1.4 (a) (i) proposed solution Sl (a)	3600x2600 x 6500	8
5.	Mobile Cantilever Racking Unit with decking panels Refers Para 1.2 (c) proposed solution Sl (a)	7400 x 2600 x 5200	6
6.	Mobile Cantilever Racking Unit with decking panels Refers Para 1.3 (c) proposed solution Sl (a)	7400 x 2600 x 5000	2
7.	Mobile Cantilever Racking Unit with decking panels Refers Para 1.2 (c) proposed solution Sl (b)	7400 x 2600 x 3200	6
8.	Mobile cantilever racking unit with decking panels Refers Para 1.4 (c) proposed solution Sl (a)	3800 x 770 x 3145	20
9.	Heavy Duty Cantilever racking system Refers Para 1.1 (a) (ii) proposed solution Sl (c)	2700 x 800 x 7000	20
10.	Heavy Duty Cantilever racking system Refers Para 1.1 (a) (ii) proposed solution Sl (d)	1400 x 800 x 7000	6
11.	Double face mobile storage system Refers Para 1.2 (a) (ii) proposed solution Sl (a)	4650x1200x 4500	16

12.	Double face mobile storage system Refers Para 1.3 (a) (i) proposed solution Sl (a)	4550 x 1200 x 3000	15
13.	Double face fixed storage systemt Refers Para 1.2 (d) proposed solution Sl (b)	4550 x 1200 x 4500	2
14.	Double face fixed storage system Refers Para 1.2 (d) proposed solution Sl (e)	1550 x 1200 x 4500	2
15.	Double face fixed storage system Refers Para 1.3 (a) (i) proposed solution Sl (b)	4550 x1200 x 3000	1
16.	Double face fixed storage system Refers Para 1.3 (a) (ii) proposed solution Sl (b)	4550 x 1200 x 3500	1
17.	Double face fixed storage system Refers Para 1.3 (a) (ii) proposed solution Sl (e)	3050 x 1200 x 3500	2
18.	Double face mobile storage system Refers Para 1.4 (a) (iii) proposed solution Sl (a)	4650 x 1200 x 4500	10
19.	Double face fixed storage system Refers Para 1.4 (a) (iii) proposed solution Sl (b)	4650 x 1200 x 4500	2
20.	Double face fixed storage system Refers Para 1.4 (a) (iii) proposed solution Sl (e)	3050 x 1200 x 4500	2
21.	Double face mobile storage system Refers Para 1.3 (e) (i) proposed solution Sl (a)	3050 x 900 x 2600	5
22.	Double face mobile storage system Refers Para 1.3 (e) (ii) proposed solution Sl (a)	4550 x 900 x 2600	12
23.	Double face mobile storage system Refers Para 1.3 (a) (ii) proposed solution Sl (a)	4550 x 1200 x 3500	15
24.	Double face mobile storage system Refers Para 1.4 (a) (iii) proposed solution Sl (d)	3050 x 1200 x 4500	10
25.	Double face mobile storage system Refers Para 1.3 (a) (ii) proposed solution Sl (d)	3050 x 1200 x 3500	21
26.	Double face mobile storage system Refers Para 1.3 (e) (ii) proposed solution Sl (c)	6050 x 900 x 2600	12
27.	Double face mobile storage system Refers Para 1.3 (e) (iii) proposed solution Sl (a)	7550 x 900 x 2600	8
28.	Double Faced Mobile storage system with drawers Refers Para 1.1 (a) (i) proposed solution Sl (a)	4740 x 770 x 3520	15
29.	Double Faced Mobile storage system Refers Para 1.1 (a) (i) proposed solution Sl (d)	4740 x 770 x 3520	15

30.	Double Faced Mobile storage system Refers Para 1.2 (d) proposed solution Sl (a)	4550 x 1200 x 4500	12
31.	Double Faced Mobile storage system with drawers Refers Para 1.1 (a) (iii) proposed solution Sl (a)	4550 x 1200 x 4550	24
32.	Double faced mobile storage system with drawers. Refers Para 1.4 (b) (i) proposed solution Sl (a)	3800 x 770 x 3145	10
33.	Double faced mobile storage system with drawers. Refers Para 1.4 (a) (ii) proposed solution Sl (a)	3800 x 700 x 3450	30
34.	Single faced mobile storage system with drawers. Refers Para 1.4 (a) (ii) proposed solution Sl (b)	3800 x 625 x 3450	6
35.	Single faced mobile storage system with drawers. Refers Para 1.4 (b) (i) proposed solution Sl (b)	3800 x 625 x 3145	2
36.	Single faced mobile storage system with drawers. Refers Para 1.4 (b) (ii) proposed solution Sl (b)	4740 x 625 x 3450	4
37.	Single faced mobile storage system with drawers. Refers Para 1.4 (b) (iii) proposed solution Sl (b)	4740 x 625 x 3145	4
38.	Double face mobile storage system with perforations for air circulation in AC room. Refers Para 1.3 (d) proposed solution Sl (a)	6050 x 1200 x 3000	6
39.	Single face fixed storage system with perforations for air circulation in AC room. Refers Para 1.3 (d) proposed solution Sl (b)	6050 x 600 x 3000	1
40.	Double Faced fixed storage system with drawers Refers Para 1.1 (a) (iii) proposed solution Sl (b)	4550 x 1200 x 4550	2
41.	Double faced fixed storage system with drawers. Refers Para 1.4 (a) (ii) proposed solution Sl (c)	3800 x 770 x 3450	4
42.	Double faced fixed storage system with drawers. Refers Para 1.4 (b) (i) proposed solution Sl (c)	3800 x 770 x 3145	1
43.	Double faced mobile storage system with drawers. Refers Para 1.4 (b) (ii) proposed solution Sl (a)	4740 x 770 x 3450	32
44.	Double faced mobile storage system with drawers. Refers Para 1.4 (b) (iii) proposed solution Sl (a)	4740 x 770 x 3145	16
45.	Double faced fixed storage system with drawers. Refers Para 1.4 (b) (ii) proposed solution Sl (c)	4740 x 770 x 3450	4
46.	Double faced fixed storage system with drawers. Refers Para 1.4 (b) (iii) proposed solution Sl (c)	4740 x 770 x 3145	2

47.	Double faced Heavy Duty Tyre racking with wire mesh decking panels. Refers Para 1.3 (b) proposed solution Sl (a)	6460 x 2300 x 3000	6
48.	Single faced Heavy Duty Tyre racking with wire mesh decking panels. Refers Para 1.3 (b) proposed solution Sl (b)	6460 x 1100 x 3000	2
49.	Heavy duty motorized tyre carousel Refers Para 1.4 (b) (i) proposed solution Sl (d)	600 x 550 x 720 x 375	10
50.	Motorised Tyre Carousel Refers para 1.1 (a) (i) proposed solution sl (g)	525 x 510 x 620 x 325	10
51.	Heavy Duty Pallet racking with decking panels Refers para 1.2 (e) proposed solution sl (a)	2410 x 800 x 4000	16
52.	Heavy Duty Pallet Unit Refers para 1.3 (c) proposed solution sl (c)	7400 x 2600 x 5000	4
53.	Heavy Duty Palletised racking system Refers para 1.1 (a) (ii) proposed solution sl (a)	2700 x800x7000	20
54.	Heavy Duty Palletised racking system Refers para 1.1 (a) (ii) proposed solution sl (b)	1400 x800x7000	6
55.	Heavy Duty Palletised racking system Refers para 1.4 (c) proposed solution sl (c)	3800 x 770 x 3145	10
56.	Heavy Duty Palletised racking system Refers para 1.4 (c) proposed solution sl (d)	2600 x 2500 x 3145	10
57.	Heavy Duty Rack Refers para 1.3 (d) proposed solution sl (c)	2790 x 800 x 3000	20
58.	Heavy duty rack for battery storage Refers para 1.3 (b) proposed solution sl (c)	2500 x 800 x 3000	12
59.	Heavy duty racking for oil drums Refers para 1.3 (e) (i) proposed solution sl (c) Refers para 1.3 (e) (iii) proposed solution sl (c)	2700 x 700 x 2500	6
60.	Heavy duty racking for oil drums Refers para 1.3 (e) (i) proposed solution sl (d) Refers para 1.3 (e) (iii) proposed solution sl (d)	1400 x 700 x 2500	4
61.	Heavy Duty racking system Refers para 1.1 (b) proposed solution sl (b)	2790 x 800 x 7000	8
62.	Light Duty Palletised/ shelving racking system Refers para 1.3 (f) proposed solution sl (b)	4740 x 770 x 3520	10
63.	Light Duty Shelving/ Racking Units	4550x1200x 3000	8

	Refers para 1.3 (a) (i) proposed solution sl (d)		
64.	Medium Duty Palletised racking system Refers para 1.3 (f) proposed solution sl (a)	4740 x 770 x 3520	10
65.	Medium duty shelves Refers para 1.3 (b) proposed solution sl (d)	6460X2300X3000	12
66.	Medium duty shelves Refers para 1.3 (d) proposed solution sl (d)	6050 x 1200 x 3000	10
67.	Medium Duty Shelving/ Pallet Fixed Units Refers para 1.2 (c) proposed solution sl (c)	7400 x 2600 x 3200	6
68.	Medium Duty Shelving/ Pallet Fixed Units Refers para 1.2 (c) proposed solution sl (d)	7400 x 2600 x 5200	6
69.	Mobile Heavy Duty pallet Racking Refers para 1.2 (a) (i) proposed solution sl (d) & Refers para 1.4 (a) (i) proposed solution sl (d)	3500x2500 x 6500	8
70.	Mobile Heavy Duty pallet Racking. Refers para 1.2 (b) proposed solution sl (c)	7400 x 2600 x 6400	4
71.	Mobile Heavy Duty Rack with Deck Panel Unit Refers para 1.2 (b) proposed solution sl (b)	7400x2500 x 6400	8
72.	Mobile Heavy Duty Rack with Deck Panel Unit Refers para 1.2 (a) (i) proposed solution sl (c) & Refers para 1.4 (a) (i) proposed solution sl (c)	3600x2500 x 6500	10
73.	Mobile Heavy Duty Rack with Deck Panel Unit Refers para 1.3 (c) proposed solution sl (b)	2600x 2500 x 5000	4
74.	Mobile heavy duty racking unit with decking panels Refers para 1.4 (c) proposed solution sl (b)	2600 x 2500 x 3145	12
75.	Single Faced fixed storage system with drawers Refers para 1.1 (a) (i) proposed solution sl (c)	4740 x 625x 3520	3
76.	Single Faced mobile storage system with drawers Refers para 1.1 (a) (i) proposed solution sl (b)	4740 x 625x 3520	3
77.	Single Faced fixed storage system with drawers Refers para 1.1 (a) (iii) proposed solution sl (c)	4550 x 600 x 4550	4
78.	Single face fixed storage system Refers para 1.2 (a) (ii) proposed solution sl (c) Refers para 1.4 (a) (iii) proposed solution sl (c)	4650x 600x 4500	6
79.	Single face fixed storage system Refers para 1.2 (d) proposed solution sl (c)	4550 x 600 x 4500	4
80.	Single face fixed storage system Refers para 1.2 (d) proposed solution sl (f)	1550 x 600 x 4500	4

81.	Single face fixed storage system Refers para 1.3 (a) (ii) proposed solution sl (c)	4550 x 600 x 3500	2
82.	Single face fixed storage system Refers para 1.3 (a) (i) proposed solution sl (c)	4550 x 600 x 3000	2
83.	Single face fixed storage system Refers para 1.4 (a) (iii) proposed solution sl (f)	3050 x 600 x 4500	4
84.	Single face fixed storage system Refers para 1.3 (e) (ii) proposed solution sl (b)	4550 x 900 x 2600	2
85.	Single face fixed storage system Refers para 1.3 (e) (ii) proposed solution sl (d)	6050 x 900 x 2600	2
86.	Single face fixed storage system Refers para 1.3 (e) (iii) proposed solution sl (b)	7550 x 450 x 2600	4
87.	Single face mobile storage system Refers para 1.3 (e) (i) proposed solution sl (b)	3050 x 600 x 2600	2
88.	Single face fixed storage system Refers para 1.3 (a) (ii) proposed solution sl (f)	3050 x 600 x 3500	2
89.	Single face mobile storage system Refers para 1.1 (a) (i) proposed solution sl (e)	4740 x 625 x 3520	3
90.	Single faced fixed unit with decking panel Refers para 1.2 (b) proposed solution sl (a)	7400 x 1500 x 6400	4
91.	Single face fixed storage system Refers para 1.1 (a) (i) proposed solution sl (f)	4740 x 625 x 3520	3
92.	ASRS with accessories i.e. four tracks, two stacker crane & one transfer carriage Refers para 1.1 (c) proposed solution sl (a)	Covering total area 42 x 15 mtr and height upto 8.5 mtr	01 set with all accessories
93.	Double face fixed storage system Refers para 1.2 (a) (ii) proposed solution sl (b)	4650x1200x 4500	02
94.	Double face mobile storage system Refers para 1.2 (d) proposed solution sl (d)	1550 x 1200 x 4500	12

II. **MATERIAL HANDLING EQUIPMENT**

SL	DESCRIPTION	SIZE/ CAPACITY	QTY
1.	Cage Pallets (Collapsible)	1000 x 1000 x 1000 mm/ 1 ton	325
2.	Drum Clamp Attachment (for 2 drum sets) with fork extension.	1 ton capacity with fork extension L-1100mm / 1 ton. Refers Para 1.3 (e) (i) recommended MHE sl (b)	2 set
3.	Electric Cart	3.5 x 2 x 2 M with carrying capacity 2 persons plus 500 Kg. Refers Para 1.4 (c) recommended MHE sl (e) & 1.1 (c) recommended MHE sl (d)	2
4.	Electric Lifting Platform	1200 x 1200 x 1300 mm & 1 ton Refers para 1.3 (a) (i) recommended MHE sl (f)	1
5.	High Reach lift truck	Lift Height 8000 mm & 2 ton	4
6.	Full Electric stacker	Lift Height 3000mm & 1.5 ton	15
7.	Hand pallet truck	1500 mm Fork Length & 1 ton	12
8.	Injection Moulded Pallets	1200 x 1000 mm/ 1 ton (120 – Green & 80 – Red)	200
9.	Injection Moulded Pallet	1500 x 1200 mm & 1 ton (200- Green & 100 – Red)	300
10.	Multi Directional Forklift	Lift Height 6000 mm & 5 ton Refers para 1.2 (b) recommended MHE sl (c) 1.2 (c) recommended MHE sl (b), 1.3 (e) (iii) recommended MHE sl (c) 1.4 (c) recommended MHE sl (b)	4
11.	Narrow Aisle Forklift	Lift Height 6000 mm & 2 ton Refers para 1.3 (c) recommended MHE sl (a) & Para 1.2 (b) recommended MHE sl (a)	2
12.	Order Picker	Lift Height 3000 mm & 0.5 ton	10
13.	Order Picker	Lift Height 5500 mm & 0.5 ton	8
14.	Mobile and Fixed Dock Leveller	Refer Para 56 of Part III of Appendix A	02 (1 each fixed and mobile)
15.	Steel Pallets	1200 x 1200 mm & 2 ton	100
16.	Wheeled litter bins	Volume up to 500 ltrs	45

III. **SUPPORT FACILITIES**

SL	DESCRIPTION	SIZE/ CAPACITY	QTY	REMARKS
1.	Split AC (Wall Mounted)	4 ton each	57	Distribution in storehouses as follows:- Fast-moving -26, MiG29k-10, SH-8, KM-8, ROT-2, POL-3 (subject to minor changes)
2.	CCTV Cameras	IP Camera with digital zoom.	30	One camera in each section of storehouse. 2 Cameras at Main Gate.
3.	CCTV Monitors	25"-32" TFT Screen	4	2 each in Guard Room and Regulating Office
4.	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters & central alarm	Refer Para 65 of Part IV of Appendix 'A'	All store houses as per distribution.
5.	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters and central alarm with built-in CO_2 extinguishers	01 set	For ASRS. (Refer Para 17 (a) of Part I of Appendix A)
6.	Power back up (DG set)	200 KVA/ 160 KW	01	For ASRS in Fast moving stores.
7.	Work Station (for two personnel)	Ergonomic user-friendly and efficient workstations with following facilities:- (a) Document Filing and Stowage. (b) Space for PC, keyboard, display monitor, UPS etc. (c) Adjustable and comfortable seating for 2 persons in each terminal.	38	All storehouses as per distribution

Annexure – II to Appendix A
(Refers para 4 of RFP)

IMPLEMENTATION SCHEDULE

1. The project implementation schedule is as indicated in subsequent paragraphs.

1.1 **PHASE – I**. During the first phase of project implementation, both MiG Store Houses and Fast Moving Stores (present Rotable Section) will be taken up for modernisation view no storage system is presently available in these Store Houses. The details of equipment recommended for each store house are appended in the succeeding paragraphs.

(a) **MIG 29K Store House**. This building has been constructed for storage of aircraft spares, equipment and various support/test equipment of newly inducted MiG 29K/KUB aircraft. However, this building has not been provided with any storage arrangement/MHE. The spares and equipment have already arrived and huge consignments are expected with additional aircraft. The procurement, installation and commissioning of following storage systems and Material Handling Equipment (MHE) is required to be taken up in the first phase of the project:-

(i) **Ground floor Main Stores**

EXISTING FACILITIES							
Overall size (in mtr)	**Usable Area (in mtr)**	**Total Height (in mtr)**	**Usable Height (in mtr)**	**EOT Crane**	**Storage Facilities**	**AC/ NON-AC**	**Remarks**
22.8 x 14	21 x 13	4.95	4.5	No	Nil	Non AC	Light and Medium Stores

PROPOSED STORAGE SOLUTIONS						
Sl	**Storage System**	**Type/ Model**	**Size (in mm)**	**Qty**		**Remarks**
(a)	Compactors	Double Faced Mobile storage system with drawers	4740 x 770 x 3520	15		Half section for electronic/ engine components/ PCBs
(b)		Single Faced Mobile storage system with drawers	4740 x 625x 3520	03		
(c)		Single Faced fixed storage system with drawers	4740 x 625x 3520	03		
(d)		Double Faced Mobile storage system	4740 x 770 x 3520	15		Half section for storage of Sonobuoys
(e)		Single Faced Mobile storage system	4740 x 625x 3520	03		
(f)		Single Faced fixed storage system	4740 x 625x 3520	03		
(g)	Tyre storage	Motorised Tyre Carousel	525 x 510 x 620 x 325	10		Aircraft tyres of 350 -500 mm dia

RECOMMENDED MATERIAL HANDLING EQUIPMENT					
	Type	**Size/ capacity**	**Qty**		**Remarks**
(a)	Full Electrical Stacker	Minimum 3000 mm Fork Length/ 1.5 ton	1		All equipment operated manually.
(b)	Order Picker	Lift Height 5500 mm/ 0.5 ton	1		
(c)	Injection moulded Pallets	1500 x 1200 mm/ 1 ton	12		
(d)	Wheeled litter bins	Volume up to 500 ltrs	1		
RECOMMENDED SUPPORT SYSTEM					
Sl	**Description**	**Size/ capacity**	**Qty**		**Remarks**
(a)	Split AC	4 ton each	10		
(b)	Work station (for two personnel)	An ergonomic user-friendly and efficient workstation should be provided in each storehouse. The workstation shall have following facilities:- (a) Document Filing and Stowage. (b) Space for PC, keyboard, display monitor, UPS, printer, etc. (c) Adjustable and comfortable seating for 2 persons in each terminal	1		
(c)	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters & central alarm	1 set		
(d)	CCTV cameras/ monitors	IP Camera with digital zoom and IR capability	1 set		

(ii) **Ground Floor Heavy Section**

EXISTING FACILITIES							
Overall size (in mtr)	**Usable Area (in mtr)**	**Total Height (in mtr)**	**Usable Height (in mtr)**	**EOT Crane**	**Storage Facilities**	**AC/ NON-AC**	**Remarks**
22.8 x 14	21 x 13	9	8.4	Yes	Nil	Non AC	Heavy stores

PROPOSED STORAGE SOLUTIONS						
Sl	**Storage System**	**Type/ Model**	**Size (in mm)**	**Qty**		**Remarks**
(a)	Heavy Duty Racking System	Heavy Duty Palletised racking system	2700 x 800 x 7000 mm	20		Each rack should sustain 500 Kg to 1000 Kg weight
(b)		Heavy Duty Palletised racking system	1400 x 800 x 7000 mm	06		
(c)		Heavy Duty Cantilever racking system	2700 x 800 x 7000	20		
(d)		Heavy Duty Cantilever racking system	1400 x 800 x 7000	06		

RECOMMENDED MATERIAL HANDLING EQUIPMENT					
Sl	**Type**	**Size/capacity**	**Qty**		**Remarks**
(a)	High reach lift truck	Lift height upto 8000 mm/ 2 ton	1		
(b)	Hand pallet truck	Minimum 1500 mm Fork Length/ 1 ton	1		
	Injection moulded Pallets	1500 x 1200 mm/ 1 ton	10		
(c)	Cage Pallets (Collapsible)	1000 x 1000 x 1000 mm/ 1 ton	10		

(d)	Wheeled litter bins	Volume up to 500 ltrs	2		
RECOMMENDED SUPPORT SYSTEM					
Sl	**Description**	**Size/capacity**	**Qty**		**Remarks**
(a)	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters & central alarm	1 set		
(b)	Bird proofing	Bird Deterrent Gel (supply & application)	450 Kg		

(iii) **First floor (AC Space)**

EXISTING FACILITIES							
Overall size (in mtr)	**Usable Area (in mtr)**	**Total Height (in mtr)**	**Usable Height (in mtr)**	**EOT Crane**	**Storage Facilities**	**AC/ NON-AC**	**Remarks**
22.8 x 14	21 x 13	7	6.5	No	Nil	Yes	Light Stores

PROPOSED STORAGE SOLUTIONS						
Sl	**Storage System**	**Type/ Model**	**Size (in mm)**	**Qty**		**Remarks**
(a)	Compactors	Double Faced Mobile storage system with drawers	4550 x 1200 x 4550	24		For storage of rubberized , light stores of MiG29K
(b)		Double Faced fixed storage system with drawers	4550 x 1200 x 4550	02		
(c)		Single Faced fixed storage system with drawers	4550 x 600 x 4550	04		
RECOMMENDED MATERIAL HANDLING EQUIPMENT						
Sl	**Type**	**Size/capacity**		**Qty**		**Remarks**
(a)	Hand Pallet Truck	Minimum 1500 mm Fork Length/ 1 ton		1		All equipment operated manually.
(b)	Order Picker	Lift Height 5500 mm/ 0.5 ton		2		
(c)	Injection moulded Pallets	1500 x 1200 mm/ 1 ton		10		
(d)	Wheeled litter bins	Volume up to 500 ltrs		1		
RECOMMENDED SUPPORT SYSTEM						
Sl	**Description**	**Size/capacity**		**Qty**		**Remarks**
(a)	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters & central alarm		1 set		
(b)	CCTV cameras/ monitors	IP Camera with digital zoom and IR capability		1 set		

(b) **MiG - 29K Heavy Store House**. This building has been constructed (2010-11) for storage of MiG-29K heavy stores and test equipment and various OREs and ground support equipment. However, this building has not been provided with any storage arrangement and MHE. The OREs and other ground support equipment have already arrived and huge consignments are expected with additional aircraft. Approx 120 boxes have already been received and stacked on top of each other. The procurement, installation and commissioning of following storage systems and MHE needs to be taken up in the first phase of the project:-

EXISTING FACILITIES							
Overall size (in m)	**Usable Area (in m)**	**Total Height (in m)**	**Usable Height (in m)**	**EOT Crane**	**Storage Facilities**	**AC/ NON-AC**	**Remarks**
19.2 x 14	18 x 13	9	8.5	Yes	Nil	Non AC	Heavy stores

PROPOSED STORAGE SOLUTIONS						
Sl	**Storage System**	**Type/ Model**	**Size (in mm)**	**Qty**		**Remarks**
(a)	Heavy Duty Racking System	Cantilever racking units with decking panels	7400 x 1500 x 7000	8		Each rack should sustain 500 Kg to 2000 Kg weight
(b)		Heavy Duty racking system	2790 x 800 x 7000	8		

RECOMMENDED MATERIAL HANDLING EQUIPMENT					
Sl	**Type**	**Size/capacity**	**Qty**		**Remarks**
(a)	High reach lift truck	Lift height upto 8000 mm/ 2 ton	1		
(b)	Hand pallet truck	Minimum 1500 mm Fork Length/ 1 ton	1		
(c)	Injection moulded Pallets	1500 x 1200 mm/ 1 ton	16		
(d)	Wheeled litter bins	Volume up to 500 ltrs	2		
(e)	Cage Pallet (Collapsible)	1000x1000x1000/ 1 ton	20		

RECOMMENDED SUPPORT SYSTEM					
Sl	**Description**	**Size/capacity**	**Qty**		**Remarks**
(a)	Fire/ smoke sensors with Alarm system	Optical detectors, Electronic hooters & central alarm	1 set		
(b)	Bird proofing	Bird Deterrent Gel (supply & application)	400 Kg		

(c) **Fast moving stores (Present Rotable Store House) - ASRS:** This Store House (Building No. P-35, constructed in 2003) being converted into Automatic Storage and Retrieval System (ASRS) for Fast Moving items of all aircraft. The movement/ transactions of stores in this store house will be of high volume. This store house needs to be self sufficient in terms of environmental conditioning, power back up, handling equipment, modern work stations, server room and other aesthetic provisions. The Store House would be mainly for storage of fast moving spares and speedy stowage/removal of same is paramount. The procurement, installation and commissioning of following storage systems and Material Handling Equipment along with support facilities is recommended to be taken up in first phase of the project:-

EXISTING FACILITIES							
Over all size (in mtr)	**Usable Area (in mtr)**	**Total Height (in mtr)**	**Usable Height (in mtr)**	**EOT Crane**	**Storage Facilities**	**AC/ NON-AC**	**Remarks**
44.5 x 16.5	43.5 x 16	9.5	9	No	Palletised racks	Non AC	Presently Rotable stores

PROPOSED STORAGE SOLUTIONS						
Sl	**Storage System**	**Type/ Model**	**Size**	**Qty**		**Remarks**
(a)	Automated Storage and Retrieval System (ASRS)	ASRS with accessories i.e. four tracks, two stacker crane & one transfer carriage (details placed at **Appendix A, Part - I**),	Covering total area 42 x 15 mtr and height upto 8.5 mtr	01 set with all accessories		For storage of minimum. 12000 items by type