

# **PROJECT - LAND CUSTOM STATION AT FULBARI**

**SH : PROCUREMENT OF XBIS FOR LAND CUSTOMS**

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## **SCOPE OF WORK:**

- a) Supply of
  - i) Two Nos. XBIS (X-Ray Baggage Inspection System) as per the given specifications
- b) Supply of indigenous component as per the followings:
  - i) 17" Color Monitors - 02 Nos for each machine.
  - ii) Control Desk -01 No. for each machine.
  - iii) Combined Test Piece (CTP) -01 No. for each machine.
  - iv) Voltage Stabilizer - 01 No. for each machine
  - v) Feed Rollers and Output Roller as per requirement for land custom.
- c) Installation, Testing and Commissioning of the whole system.
- d) One no. 2 KVA uninterrupted power pack for each system.
- e) Supply of 5 Nos. frame metal detector as per specification.
- f) Supply of 6 Nos hand metal detector as per specification.

## **TECHNICAL SPECIFICATIONS OF THE XBIS**

Standard Type XBIS of 100 cm X 100 cm Tunnel size shall have the following features:

### **Standard Bed Height :**

<b>Tunnel dimensions</b>	: 1010 (W) X 1010 (H) (mm). 39.7" (W) X 39.7" (H)
<b>Max. object size</b>	: 1000 (W) X 1000 (H) (mm). 39.4" (W) X 39.4" (H)
<b>Conveyor height</b>	: approx. 600-750 mm (24.0")
<b>Conveyor speed</b>	: Typical 0.2 (m/s) (adjustable with frequency converter)
<b>Generator Position</b>	: Below of tunnel

### **Low Bed Height :**

<b>Tunnel dimensions</b>	: 1010 (W) X 1010 (H) (mm). 39.7" (W) X 39.7" (H)
<b>Max. object size</b>	: 1000 (W) X 1000 (H) (mm). 39.4" (W) X 39.4" (H)
<b>Conveyor height</b>	: approx. 330 mm (12.0")
<b>Conveyor speed</b>	: Typical 0.2 (m/s) (adjustable with frequency converter)
<b>Generator Position</b>	: Side of tunnel

**(AH other features shall be followed as issued by BCAS)**

## **GENERAL SPECIFICATIONS FOR XBIS AS PER BCAS**

- ❖ All machines should operate on 230V AC 50 Hz power supply and should be able to withstand voltage fluctuations in the range of 170V to 260V.
- ❖ Tunnel size of the machine should conform to the purpose for which the machine is used.
- ❖ Penetration should be of 26 mm thickness of steel or more.
- ❖ Resolution: The machine should be able to display single un-insulated tinned copper wire of 40 SWG. All penetration and resolution condition should be met without pressing any

functional key and should be online.

- ❖ The system should be able to produce clear images on color monitors with minimum of 1024 X 768 pixels.
- ❖ Zoom facility should be available to magnify the chosen area of an image four times (X4) or more. Image features shall be keyboard controllable.
- ❖ The machine should be film safe, in other words photographic films must not be damaged due to X-ray examination.
- ❖ The machine should have features of multi energy X-ray imaging facility where materials of different atomic number will be displayed in different colors to distinguish between organic and inorganic materials. With this method it should be possible to distinguish high-density organic materials including explosives. Machine should have variable color or material stripping to facilitate the operator to monitor images of organic materials for closer scrutiny. All suspicious items (Explosives, High density material, narcotics) should be displayed in one mode and that should be on line. No black & white machine should be procured in future except the machine operating on backscatter principle.
- ❖ The radiation level should not exceed accepted health standard (0.1 m R/Hr) at a distance of 5 cm from external housing.
- ❖ Lead impregnated safety screens should be available at either ends of the tunnel. Idle rollers to be provided at either ends of the tunnel to facilitate placing of baggage at the input and output points.
- ❖ The X-ray, beam divergence should be such that the complete image of maximum size of bag is displayed without corner cuts.
- ❖ Facility for variable contrast must be incorporated to allow enhancement of lighter and darker portion of the image.
- ❖ If the machine fails to penetrate a particular item, then an alarm (visual and audio both) should be generated to notify the operator.
- ❖ The threat image projection (TIP) system software to be incorporated in all X-Ray BIS operation as per details given in **BCAS Specification No 33**.
- ❖ Control desk with security housing and locking provision should be available. The operator personal identification number can be entered through keyboards.
- ❖ Facility of image enhancement should be available.
- ❖ Conveyor belt speed should be between 0.18 and 0.3 mtrs per second for X-Ray baggage inspection system for hand and registered baggage. Lesser speed is acceptable for cargo screening. For cargo machine input and output roller should be motor driven enabling of the heavy cargo.
- ❖ All software feature of machine should be online and password protected.
- ❖ In case of defective diode arrays, scanning should be disabled and error message should be displayed on the screen.
- ❖ System should work on one software only. All software features should be controlled from keyboard of machine only. Keyboard function should be user friendly. To enable / disable the software features, system should not be rebooted.
- ❖ All models should have online recording facility and images can be recorded in Zip floppy.
- ❖ All models should have software controlled diagnosis report facility and system should

give printout if printer is connected.

- ❖ The operating temperature should be 0°C to 40°C and storage temperature -20°C to 50°C.
- ❖ Anti rodent and dust proof cover must be provided.
- ❖ The company manufacturing the equipment should have ISO certification for manufacturing and servicing of X-Ray screening machines.
- ❖ The machine should be so designed that software enhancement can be easily implemented to take care of new technique in image processing and pattern recognition.
- ❖ Through put shall be 300 bags per hour for hand and checked baggage and 150 bags per hour for cargo machines.
- ❖ The machine must comply with requirements of health and safety regulations with regard mechanical, electrical and radiation hazards. Before installation of the machine, the supplier/ manufacturers should furnish NOC from Atomic Energy Regulatory Board India regarding radiation safety.
- ❖ One operator manual shall be provided with each machine.
- ❖ Machine should be capable of recalling 15-20 previous images.
- ❖ It should be capability of archiving 3000-4000 images.

### **COMBINED TEST PIECE (CTP)**

The manufacturer shall provide one set of CTP per machine for checking serviceability of the machine by the operator. The results of the tests should be recorded. The CTP should be placed on the belt and passed through the belt least once in a day before the baggage is screened or after the X-Ray equipment is switched on to ensure that the equipment is working properly, if the image is satisfactory the equipment may be used. The CTP may be viewed by using image enhancing facility till the operator is satisfied that the machine is working properly. The optimum position of CTP on the belt will depend on X-Ray source and detector arrangements. This may be ascertained from the service engineer, if need arise The details of CTP tests are required given below: -

**SINGLE WIRE RESOLUTION (TEST NO.1)** : The requirement is to display 40 SWG wire not covered by step wedge. A tick will indicate the visibility of appropriate wire. A set of un-insulated tinned copper wire of size 26, 30, 35, 38, 40 and 42 SWG are placed on a Perspex sheet. The wires are laid out in S shaped curves. The wires are placed behind varying thickness of aluminum. Metallic marker should be provided using high-density materials, so that SWG numbers in the VDU are clearly visible.

**USEFUL PENETRATION (TEST NO. 2)** : \_The test defines what level of details can be seen behind a thickness of known material. The CTP has different gauges of wire behind varying thickness of aluminum. The requirement for this test is that the 26 SWG wire is seen under second step wedge (5/16"). Tick on log sheet will indicate what wires are visible.

**MATERIALS DISCRIMINATION (TEST NO. 3)** : The requirement is that different colors be allocated to the simple of inorganic and inorganic substances. With multi energy X-Ray it should be possible to distinguish between materials of different average atomic number. This means that organic and inorganic substances can be differentiated. The use of sugar and salt samples encapsulated on the test piece and various materials used in the construction of CTP will check the material discrimination facility. A tick will indicate that the sugar / Salt samples are shown in different colour.

**SIMPLE PENETRATION (TEST NO. 4)** : The requirement is that the lead be visible beneath 26 mm of steel. This test defines what thickness of steel the machine should be able to penetrate. The steel step wedge on the CTP has steps 2 mm from 16 mm to 30 mm with a lead strip to check

that the machine is above or below the requirement. A tick log sheet will indicate where a lead strip is visible.

**SPATIAL RESOLUTION (TEST NO. 5) :** The requirement is that vertical and horizontal grating to be seen. This test defines the ability of the system to distinguish and display objects, which are close together. The CTP has 16 copper gratings at right angles to each other. A tick in the log sheet will indicate that gaps in the grating are visible.

**THIN METAL IMAGING (TEST NO. 6) :** The requirement is to image steel 0.1 mm thick. This tests the machine's ability to image thin metal. A number of thin metals strip of various thickness are placed in a row.

## **RESULTS:**

- ❖ The best results taking color and black & white images into account may be recorded for a particular machine.
- ❖ The results of test should be recorded giving information like date, time, machine number and type, supervisors name and other remarks.
- ❖ Supervisory officer should carry out the tests once in a week and compare the results with daily test sheets. In case the images are not up to the standard, service engineer must be asked to rectify the fault. The machine may not be used when its performance is in doubt or not satisfactory in the opinion of the supervisor.
- ❖ XBIS shall have sufficient internal memory to store images of screened baggages for minimum one-year period so that the same can be retrieved for investigation and evidence purposes. If required, suitable compression techniques may be used.

## **THREAT IMAGE PROJECTION (TIP)**

**General :** TIP Software facility shall be incorporated in the offered X-ray machines to assist supervisors in testing the operator alertness and training X-ray screeners to improve their ability in identifying specific threat object. The system will create a threat object and the same will be superimposed on monitor screen while a bag is being screened. To acknowledge that the operator has seen the false object, operator must press the control Panel key that will cause the computer generated threat object to disappear from x-rayed bag image on the VDU screen. Each operator's action shall be recorded in the hard disc of the computer for the auditing purpose by the supervisor or other authorized person.

**Design of the system:** TIP software should be compatible with other X-ray technologies such as automatic reject unit, Dual X-ray screen technologies, automatic threat recognition system etc. All x-ray image functions must be available at the same time along with the TIP.

**Image Library :** (i) The TIP facility should have an image library containing at least 100 explosive devices, 100 knives and 100 fire arms in various sizes, shapes, locations & orientations. However, the system shall have facility to expand the library to incorporate additional images by user without assistance of the manufacturer. (ii) The image library should contain images of threats at different orientations-both plane and end-on orientation should be used. Although these will be assigned different file names and references, it must be possible to cross-reference these as the same threat. All threat Image Projection images must be realistic, representative and non-distinguishable from real threat items.

**Time Interval :** (i) Programming facility shall be available to project threat images in different intervals. The time period for threat image as well as image mix in percentage shall be user programmable e.g. software shall select 40% images of explosive devices, 35% of fire arms & 25% of knives or Random etc. (ii) Once the screener has responded to identify the computer generated threat image, it should remain on the screen for a pre-defined user programmable time for analyses. The image should be highlighted, upon identification, and feedback message shall be visible to the screener.

**System Administration :** (i) The threat image projection facility shall have details of user database such as Airport name, Screener name, Organization, user ID number, level of access such as Screener, Administrator, Maintenance & Password etc. (ii) Access to start-up Menu should be restricted only to the authorized individuals. A log-in procedure by means of "Password" or "security key" could achieve restricted access to each of the comment. The log-in procedure should not take longer than 20 seconds. The system should have facility to bypass the TIP facility, if programmed so by the System Administrator, it is to be ensured that the TIP software shall not be hindrance to normal functioning of X-ray Machines. (iii) When the operator logs-in or logs-out, message should be displayed on XBIS VDU Screen to confirm that he/she has been correctly logged-in or logged-out.

**Feed Back/Report :** (i) The Threat Image Projection should be capable of giving feed back "HIT, MISS or FALSE ALARM" message. No message will be presented if a screener correctly passed as clear bag. (ii) A "HIT" message to be presented when a screener has correctly identified a Threat Image Projection image. A "MISS" message shall be presented when screener fails to identify the Threat Image Projection Image. A "False Alarm" message shall be given when screener incorrectly indicate that Threat Image Projection image is present when in fact no Threat Image Projection is present. The feed back should clearly indicate in a screen that a TIP object has been correctly identified / TIP object has been missed / no TIP object was present. The information should be recorded in the database. (iii) Different color coding shall be used for feedback to the Screener. It is recommended that color Code "Red for MISS", Green for HIT and "Yellow to False Alarm or interrupt" be used. (iv) The system shall automatically prepare the daily log of events for each shift and for each Screener performance. TIP log shall include particulars of Airport, XBIS, Name of Screener, Time & date of threat image, whether threat image was successfully identified or missed etc. (v) The report on Threat Image Projection system may have date and time (From-To) as per requirement, Screener particulars, and decision/outcome i.e. MISS, HIT or False alarm in percentage as well in absolute numbers, number of bags screened, categories such as explosive devices knife or weapon etc. (vi) As a standard practice, daily / weekly / monthly report shall be retrieved. Report shall be for any given time and period, as per command. (vii) All data should be stored on the system for a minimum of two months after it has been downloaded. No individual, regardless of access rights to the Threat image Projection components would delete or amend any of Threat Image Projection data or time i.e. Threat Image Projection data on the actual X-ray machine will be read only file.

## **SPECIFICATIONS OF 2 KVA UPS**

- ❖ The system shall work on mains 230v, 50Hz single phase power supply, in case of failure, the system shall function on an on-line UPS. UPS backup battery should be maintenance free and shall be able to withstand overcharging / under-charging without any damage. Battery should be in built or mounted on a suitable stand having acid resistant paint and numbering for cell position. UPS should automatically isolate the load in case of overload.
- ❖ UPS shall have following indication on the front panel: -Mains on visual indication Mains off-audio visual indication with alarm silence switch Inverter mode/Mains mode visual indication Indicator showing load condition Indication showing BATTERY charging and discharging condition with audio alarm/ alarm silence switch.
- ❖ UPS 2 KVA with SMF batteries for minimum 15 minutes backup at full load condition needed for XBIS.

## **TENDERER SHALL SUBMIT IN THE TECHNICAL BID THE FOLLOWING DETAILED INFORMATION / CERTIFICATES:**

Single line block schematic diagram of the proposed system with description and principle of operations.

Power requirements of the entire system in Watts/VA at 230V, 50 Hz single-phase mains input.

ISO 9001 certification issued in favour of the firm whose product is being proposed against this tender. Minimum guaranteed life of: -

- a. The system as a whole, and
- b. X-Ray generator unit in particular.

NOC from Atomic Energy Regulatory Board, Govt. of India, regarding radiation safety for the product offered to be submitted within one month of opening of Technical bids.

Complete technical details and any special features proposed to be incorporated must be given in the technical bid along with supporting document for full technical evaluation.

### **TECHNICAL MANUALS/DOCUMENTATION**

- ❖ All manuals and documents shall be in English language and in such a way that a qualified engineer/technician is able to fully understand and do the preventive as well as breakdown maintenance with the help of these manuals.
- ❖ The technical manuals of each type of machine offered should also be supplied along with the technical bid for technical evaluation.
- ❖ The contractor shall provide one complete set of the following documents with each system to be supplied: -
  - ❖ Detailed specification.
    - Block diagram of the system with brief descriptions.
    - Working diagram of the complete system.
    - Schematic circuit diagram as also unit/Module-wise diagram and stage-by-stage detailed description.
    - Data flow chart with data at different points during operations & testing.
    - Component layout & position chart /photograph for ease of locating the components.
    - Detailed technical data of all active components (Transistors, ICs etc.) & Modules being used in the system with DC voltages and input/output data clearly marked.
    - List of components/units/PCB, module-wise with value, tolerance, Part No., type and circuit reference.
    - Servicing/Maintenance Instructions including preventive Maintenance schedule. Indicate type of test equipment to be used for maintenance.
    - Trouble shooting chart with proper test sequence, Voltage and data at various test points.
    - Contractor shall provide one set of Operation manual for XBIS machine at the time of testing & commissioning, at each airport.
    - Contractor shall provide one set of System Software in CD media for XBIS supplied at site along with the installation manual with documentation.

### **SPECIAL CONDITIONS**

The following Special Conditions shall be read in conjunction with General Conditions of Contract and amendments / corrections thereto. If there are any provisions in these special conditions which are at variance with the provisions in the above-mentioned documents the provisions in these special conditions shall take precedence.

For the purpose of inspection of site and relevant documents the contractor is required to contact the concerned Engineer-in charge, who shall give reasonable facilities for inspection of the same. The contractor shall be deemed to have satisfied him as to the nature of the site of work, local facilities of access, availability of materials and all other matters effecting his prices for the execution and completion of work. He is required to make himself fully acquainted with the nature and scope of work.

### **GUARANTEE AND DAMAGE/DEFECTS LIABILITY PERIOD**



The contractor shall guarantee that all equipments shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall operate satisfactorily and that the performance and efficiencies of the equipment shall not be less than the guaranteed values. The guarantee shall be valid for a period of 365 days from the date of installation of the machine. Any parts found defective during guarantee period shall be replaced by the contractor without any charges whatsoever. The services of contractors personnel, if requisitioned during this period, for such work shall be made available free of any cost to the Authority. If the defects are not remedied within a reasonable time as mentioned in the written notice, the Authority shall proceed to do so at the contractor's risk and expense without prejudice to any other right.

## **INSPECTION OF TESTING**

- i) The Authority's authorized consultant shall have full power to inspect drawings of any portion of the work, examine the materials and workmanship at the contractor's works or at any other place from which the material or equipment is obtained. Acceptance of any material or equipment shall in no way relieve the contractor of his responsibility for meeting the requirement of the specifications but shall have to be paid by the contractor in case the equipment of work is found defective or of inferior quality.
- ii) Routine type tests for the various items of equipment shall be performed at the contractor's works and test certificates furnished. The contractor shall permit the Authority's authorized consultant to be present during any of, or all the tests. After notification to the Authority, that the installation has been completed, the contractor shall make under the direction and in the presence of Engineer-in-charge, such tests and inspections as have been specified, or as the Engineer-in-charge shall consider necessary, to determine whether or not, the full intent of requirements of the plans and specifications have been fulfilled. In case the work does not meet the full intent of the specifications, the contractor at no extra cost shall rectify it, and the contractor shall bear all the expenses for any further tests considered necessary
- iii) All tools, instruments, plants and labour/operating personnel for the test shall be provided by the contractor at his own cost.
- iv) Delivery of equipment shall be completed within two months from the date of issuing of order and only after pre-delivery inspection by the Authority's representative. Pre-delivery inspection of equipment shall be carried at the factory premises of principals or at any other place suitable to the firm & SJDA. The Authority shall be informed of such an inspection at least 15 days in advance.
- v) A work-schedule chart/ bar-chart indicating the time schedule for commencement of various activities of work like inspection & delivery of materials, commencement of work, completion of work etc. required for the execution & timely completion of work shall be submitted by the tenderers to the Engineer-in charge for approval within fifteen days of the date of acceptance of the tender. It shall be the responsibility of the contractor to adhere to this work-schedule and complete the work in the specified time. Any deviation from this schedule, for any reason, shall be brought to the notice of the Engineer-in-charge immediately to enable the Engineer-in-charge take corrective action for achieving the timely completion of work. Failure to submit the work-schedule chart within the specified time or meeting the various committed deadlines shall be treated as delay on the part of the tenderers and shall be dealt as per Clause 2 of the Conditions of Contract unless the said work is completed in the scheduled time.
- vi) The Contractor shall at all times, during the period of execution of works keep in mind the specified completion time and other terms & conditions of contract as specified in the NIT which is, and shall remain the essence of the contract. On completion of the installation, the tenderers shall conduct a system acceptance test.
- vii) The tenderers shall rectify any deficiencies encountered during the acceptance tests, at no additional cost to SJDA.

- viii) All cables shall be marked and color-coded for easy recognition. Proper cable ends or plugs/sockets/multi-pin connectors shall be used for ending of each cable. Cable ends & terminating points shall be marked in such a way that it can be connected without referring to the Technical Manual every time.
- ix) Cost of connectors and other accessories required for completion of work is deemed to be included in the quoted prices.
- x) While designing the system, particular attention should be given to the maintenance part. Mechanical designs shall be such that all the inside components of different units of the system are clearly visible & easily approachable for the purpose of testing & servicing the units. Modular concept using Plug-in type of modules shall be used. Wires used for interconnecting these PCBs shall be neatly bunched and routed. These wires shall be connected to the PCBs through multi-pin, plug-in type of connectors to facilitate easy removal of PCBs for servicing.
- xi) Test points are to be provided & marked at all the required points in the equipment units. Voltages/data flow chart etc. shall be given in the technical manual
- xii) Equipment should consist of plug-in sub-assembly units or cards so that fault could be located by eliminating/ substitution process.
- xiii) Rate for each of the items of schedule of quantities shall be on lump sum basis for equipment delivered, installed, commissioned and tested at site including all taxes and levies. In the case of the tenderers remaining silent on taxes, duties & levies, the authority shall presume that the rates quoted for each of the items are inclusive of all taxes, duties & levies. Claims made later in such cases, by the tenderers for payment of taxes, duties and levies, over and above the quoted price for each of the items in the schedule of quantity, shall not be considered for evaluation by the Authority and the tender shall stand rejected. The decision of the Authority in this regard shall be final and binding. Prices shall remain firm and free from variations due to rise and fall in the cost of materials, equipment, labour or any other reason whatsoever except due to changes in authority's rules and regulations in so far as admissible under the conditions of contract.



## SCHEDULE OF QUANTITY

SL. NO.	DESCRIPTION OF ITEM	QTY.	RATE	UNIT	AMOUNT
1.	Supply, Installation, Testing, Commissioning of Low Bed type XBIS of 100 cm x 100 cm Tunnel size, conveyor height 600 - 750 mm with typical speed of 0.2 (m/s) with 2 nos. 17" color monitor, 1 No. Control desk, 1 No. CTP, 1 No. Voltage Stabilizer & Feed roller / output roller. The system should complete as specified and as required.	1		Set	
2.	Supply, Installation, Testing, Commissioning of Low Bed type XBIS of 100 cm x 100 cm Tunnel size, conveyor height 330 mm with typical speed of 0.2 (m/s) with 2 nos. 17" color monitor, 1 No. Control desk, 1 No. CTP, 1 No. Voltage Stabilizer & Feed roller / output roller. The system should complete as specified and as required.	1		Set	
3.	Supply, Installation, Testing, Commissioning of 2 KVA UPS by reputed make as specified with required SMF batteries for the connection of XBIS. The system should complete as specified and as required.	2		Set	
4.	Supply, Installation, Testing, Commissioning of Frame Metal Detector (1200 mm X 2000 H mm) with power back up 1 KVA UPS by reputed make as specified with required SMF batteries. The system should complete as specified and as required.	5		Set	
5.	Supply, Installation, Testing, Commissioning of Hand Metal Detector with required SMF batteries. The system should complete as specified and as required.	6		Set	
	<b>TOTAL</b>				

**In Word :**