

Request for Technical and Product Information (This is NOT a Tender Document)	
Reference:	E-30185
Procuring Department:	Client Department
Description:	Provision of a mobile X-ray vehicle scanning system for cargo examination.
Contact Person:	Mr. YEUNG Chu-man, Clement Electrical and Mechanical Services Department 3 Kai Shing Street, Kowloon, Hong Kong Tel. No.: (852) 2808 3522 Fax. No.: (852) 2873 2154 E-mail: cmyeung@emsd.gov.hk
Quotation Document:	This is <u>NOT</u> a Tender Document
Submission of Information and Closing Date:	In consideration of the basic requirements as attached, please advise your system and equipment proposal, including budgetary information to the Contact Person before 12:00 hrs. on 31 st May 2009. All submissions shall be treated in the strictest confidence.
Remarks	The main objective is to develop a mobile X-ray vehicle scanning system for cargo examination in a safe, effective and efficient manner. Please refer to the attachment for further details.

Request For Technical and Product Information

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Provision of A Mobile X-ray Vehicle Scanning System for Customs and Excise Department (C&ED)

This document services to provide an insight into the basic system requirements that our client is considering at present. It should not be interpreted as the final requirements and/or specifications.

Aims and Objectives

It is intended to develop a mobile X-ray vehicle scanning system for non-intrusive inspection of the loaded vehicles and containers for smuggled goods, manifest verification, drugs, explosives, weapons and other kinds of contrabands.

The system is expected to include at least the following components:-

1. A self-sustained truck which consists of:-
 - I. Vehicle chassis;
 - II. X-ray imaging system;
 - III. Computer and control system;
 - IV. Database management system;
 - V. User management system (which includes access control with password protection and operator activity log);
 - VI. Radioactivity threat detection system;
 - VII. CCTV system to monitor the surrounding areas of the vehicle and the scanning tunnel;
 - VIII. Communication systems, such as PA, intercom;
 - IX. Electrical and mechanical systems;
 - X. Power supply systems, such as diesel generator set that shall be suitable for at least 8-hour continuous system operation;
 - XI. Control room;
 - XII. Infrared barriers;
 - XIII. Auxiliary handheld equipment for safety measurement, such as carbon monoxide detector, X-ray dose meter, X-ray leakage detection system.

2. Remote X-ray image interpretation systems equipped inside fixed rooms/offices within 100m from the operating area for the mobile X-ray vehicle scanning system.
3. Secured wireless communication links between the truck and the remote X-ray image interpretation systems.

Suggestions on any other components to facilitate system operations are welcome.

Operational Requirements

The mobile X-ray vehicle scanning system shall meet the following minimum operational requirements:-

1. The dimensions of the scanning tunnel shall not be less than 4.7m (in height) and 3.5m (in width).
2. The system shall have a minimum scanning height from 0.3m to 4.6m.
3. The system shall have a minimum scanning width of 2.6m.
4. The vehicle chassis shall support multi-speed automatic transmission system with torque converter, lock up clutch, integral retarder and lever type reverse gear shift control.
5. The system shall operate under an AC power supply of 220V single phase or 380V three phases / 50 Hz. Adequate winching and wiring system shall be provided.
6. The system set-up time, which includes deployment of the boom, system warm up and calibration, shall be less than 30 minutes.
7. The system throughput shall be at least 20 units of 40-ft ISO containers per hour.
8. The Operational Area¹ shall be less than 11m (W) x 35m (L) (for scanning of a 40-ft ISO container).

Environmental and Safety Requirements

The mobile X-ray vehicle scanning system shall meet the following minimum environmental and safety requirements:-

¹ Operating Area shall include space for maneuvering the Systems and the vehicle being scanned during the whole scanning process and sufficient clearance of at least 0.5 m from any side of the systems and the periphery of the area. There are different requirements on the radiation limits inside, on and outside Operating Area.

1. The diesel engine of the vehicle chassis shall be suitable for ultra low sulphur diesel and shall comply with Euro 5 emission standard.
2. The radiation safety of the system shall comply with all the latest the relevant laws enforced by the Department of Health as well as the standards/requirements of the relevant international organization, such as the International Commission on Radiological Protection (ICRP) and World Health Organization.
3. The maximum radiation dose to a typical container truck of 40-ft ISO container shall be less than 5 μ Sv per scan.
4. The radiation level at any point on the periphery of the Operating Area² shall not exceed 3 μ Sv/hour.
5. The maximum X-ray dosage a person will receive if the person is subject to one scanning of the system shall be much less than that of a normal X-ray chest-scan. (Please provide supporting figures.)
6. The maximum dose rate in operators working areas shall be less than 1 mSv/year.
7. The maximum dose rate outside Operating Area shall be less than 1 mSv/year.

Functional Requirements

The mobile X-ray vehicle scanning system shall meet the following minimum functional requirements:-

1. The system shall support at least single energy, single view x-ray screening.
2. The system shall support detection of neutrons and gamma radiation. The sensitivity shall be not less than 370 kBq of Cs-137 or Co-60 at center line of container filled with materials of uniform density equivalent to that of water. The detection probability shall be at least 95% and false alarm level shall be less than 0.5%.
3. The system shall support sophisticated system monitoring, emergency stopping devices, safety interlocking devices as well as alarm reporting mechanisms to ensure entirely safe operations of the system under all possible scenarios, which design should be customized according to the Government's need.
4. The system shall be equipped with advanced computing systems for X-ray image analysis as well as comprehensive database management system for

² Please refer to Note 1.

image storage, retrieval and backup, which shall all be supported by an user friendly graphical user interface (GUI), preferably in Chinese.

5. The software design of GUI and database management system shall be customized according to the Government's need.
6. The system shall be designed to allow operators to cope with all worse case operating scenarios. For example, in case the system is out of service while the detector boom has been deployed, there shall be a manual hydraulic pump, or equivalent, to stow the boom in a safe manner.

Requirements on Image Quality

The mobile X-ray vehicle scanning system shall meet the following minimum image quality requirements:-

1. Grey level of X-ray image: at least 16 bits.
2. A steel penetration of at least 180mm.
3. A spatial resolution of at least ϕ 2.5mm for steel or copper wirings.
4. A contrast sensitivity of 2.5% (i.e. steel plate of 2.5 mm of thickness visible behind steel screen of 100 mm in thickness).
5. An image quality indicator of 6% (i.e. steel wire of 6 mm of diameter visible behind steel screen of 100 mm in thickness).

Implementation Schedule

The completion of the whole system, including detailed design submission, equipment manufacturing, system development, delivery, installation, testing and commissioning is expected to be within 12 months.

Information To Be Included In The Proposal

In view of the basic requirements stated above, please advise your system proposal as well as budgetary information. In particular, the following aspects shall be covered in details in your return:-

1. The proposed X-ray source and energy level (in MeV).
2. The overall dimension of the mobile X-ray vehicle scanning system.
3. The power requirements of the system.
4. Other advanced system features.
5. Recommended spares for two years of operations.
6. Reliability figures, such as MTBF, MTTR and expected lifetime of X-ray tube.

7. Requirements on ground leveling, operational gradient and other builder works for reliable system operations.
8. Restrictions on weather conditions (such as maximum allowable wind scale, thunderstorm and rain storm limitation) for reliable system operations.
9. Details of the proposed system monitoring, emergency stopping devices, safety interlocking devices as well as alarm reporting mechanisms.

If there are a series of models available, with different energy levels, operating areas, power requirements etc., that fit the basic requirements. Please provide your information in the following tabular format:-

Equipment Model	Energy Level In MeV	Required Operating Area	Power Requirements	Budgetary Quotation	Performance contrasts in terms of operations, functionalities, image quality and safety etc.