



WORLD CUSTOMS ORGANIZATION

Guidelines for the procurement and deployment of scanning/NII equipment

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GUIDELINES FOR THE PROCUREMENT AND DEPLOYMENT OF SCANNING/NII EQUIPMENT

I. INTRODUCTION

Members are looking at the potential of technical equipment, particularly X-ray or gamma ray equipment for scanning containers, to help meet their objectives by increasing efficiency in inspections. Container scanning/NII equipment can increase the number of consignments which receive Customs attention without causing undue delay, and it can identify illicit goods. The equipment requires a large capital outlay and the process of introducing it, from conception through to operation, impacts on both control and intelligence sectors and may entail changes to Departmental infrastructure and procedures. To justify the outlay cost, and ensure maximum return for the investment, it is necessary to ensure scanning/NII equipment is used effectively and is fully integrated into the risk assessment regime. The experience of Customs administrations who currently use it emphasizes that planning at an early stage for the introduction of the equipment is essential.

One of the key objectives and principles of the SAFE Framework is to promote the seamless movement of goods through secure international trade supply chains. The SAFE Framework consists of four key elements

- Harmonisation of advanced cargo information requirements
- Employment of a consistent risk management approach
- Outbound inspection of high risk containers and cargo, preferably by using non intrusive inspection equipment
- Definition of benefits that Customs will provide businesses that meet minimal supply chain security standards and best practice

SAFE Framework has identified in standard 3 of the Customs to Customs Pillar that non intrusive equipment and radiation detection equipment should be available and used for conducting inspections, where available and in accordance with risk assessment. The equipment is necessary to inspect high risk containers or cargo quickly, without disrupting the flow of legitimate trade

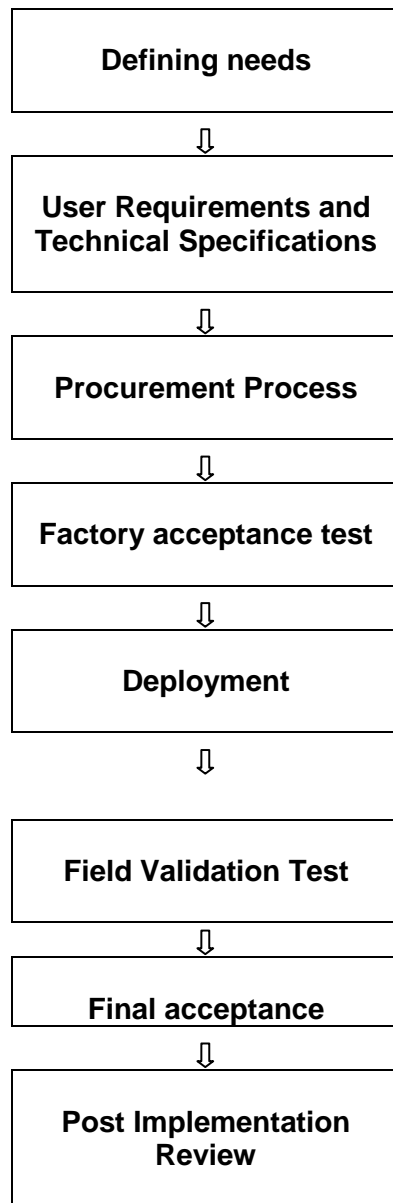
II. OBJECTIVE

These Guidelines assist Member Administrations which are considering the procurement of container scanning/NII equipment by detailing relevant administrative issues. These Guidelines do not necessarily reflect all national needs (e.g. legislation or regulatory requirements). Crucial to the effective deployment of this equipment is the integration of the scanner into Customs controls as part of a risk management process. This equipment requires a proper infrastructure must exist to ensure efficient delivery of selected containers to the scanning unit.

These Guidelines cover the various ionising radiation detection technology applications but do not include nuclear and other radioactive material detection equipment including radiation portal monitors; nonetheless, radioactive and special nuclear material detectors may be considered as optional extras when procuring container scanners.

The International Atomic Energy Agency (IAEA) has produced suitable technical guidance for nuclear and other radioactive material detection equipment entitled “Technical and Functional Specification for Border Monitoring Equipment [IAEA Nuclear Series no.1]”

Flowchart



III. DEFINING NEEDS

Customs administrations are faced with increasing volumes of traffic and greater expectations from business for faster clearance times without a corresponding increase in resources. At the same time, governments and society expect Customs to provide an effective control on imports, exports and transit traffic. Global terrorist attacks have also raised the expectations placed upon Customs administrations in respect of border security. To cope with this situation, many Members are looking at the potential of technical equipment, particularly X-ray or gamma ray NII equipment for scanning containers, to help meet their objectives by increasing efficiency in inspections.

It is important to understand the operational and business environment and other factors that need to be taken into account. Some important issues to be considered at the outset are:

- Why do we carry out NII inspections?
- What do we need to inspect? (transport modes)
- What are the risks/threats to be identified? (e.g. drugs, explosives, fiscal)
- Where do we carry out the inspections? (is enough space available and at what cost?)
- What equipment and resources do we need for inspections?
- What research do we need to carry out into existing and emerging inspection systems?
- What budget is needed both in terms of capital outlay and ongoing cost?
- Have future needs, including traffic flows and international scanning requirements been taken into account?
- How will NII equipment fit into existing Customs operational procedures?

The underlying consideration is whether container scanning/NII equipment is a justified acquisition. It should be emphasized that prior to investment in NII equipment a full business case including a cost-benefit analysis should be conducted to determine whether the use of scanning equipment would be more beneficial than manual intervention.

In preparing the business case, the following issues should be addressed:

1. Ensure that budgetary provision is made for annual operational and maintenance costs bearing in mind that annual maintenance cost will be significant over the life time of the NII equipment. (It may be financially attractive to negotiate a long term (10 year) maintenance contract at the outset.
2. A programme manager should be appointed to manage the implementation of the project.
3. A procurement group should be formed to include expertise in the following areas: Customs policy, radiological issues, technical issues, procurement procedures, Customs operations and financial issues. This procurement group will be responsible for writing

the delivery contract, the maintenance contract and the formulation of the programme of requirements.

4. A Radiation Safety programme should be developed to ensure the safe operation of the scanning system in accordance with national regulatory requirements, as well as the training of Customs officers.

Procurement of equipment and scanning sites (where necessary) are major cost for Customs administrations. The potential returns against this investment will vary according to traffic volumes and associated revenue risk. The deterrent factor, although not quantifiable, is also an important consideration especially in the areas of drugs and explosives detection.

For the most effective and efficient use of this equipment input from trade groups, port authorities and Customs administrations must be considered. It is important to address concerns of both the trade and port or border crossing operators from an early stage. Trade bodies and port authorities and other border crossing operators must be kept informed of intentions and progress and should be involved in planning to minimize delays in the flow of trade.

The effect of the deployment of the NII equipment on trade patterns and whether traders will divert their goods to other ports or border crossings (“port shopping”) should be considered. To address this concern, it will be necessary to show through consistent application of procedures that traders wishing to avoid a port with a scanning facility will not obtain material benefits in alternative locations.

IV. USER REQUIREMENTS and TECHNICAL SPECIFICATIONS

Before deciding on technical specifications, the purchaser should carry out sufficient research into technology solutions which are currently available, as well as new and emerging technologies. Existing users should be consulted to identify best practice and also limitations of existing systems.

An in-depth understanding of operational constraints on deployment of a particular imaging system, e.g., availability of sufficient space, national radiation requirements, (a license to hold and use equipment will be required, usually involving a series of conditions), must also be taken into account. One of the most important considerations that an administration must address is which of the commercially available technologies best meet the user requirements within financial constraints. If no such technology application is currently available, Customs should discuss potential solutions with suppliers, including their willingness to carry out research and development.

Listed below are the specific considerations an administration must address, both in contract with a vendor and within its own operational environment, during the procurement process.

- It is recommended that potential suppliers should be ISO 9001 certified

- Necessity for all ionising radiation systems to meet national and IAEA standards/regulations for radiation equipment ¹
- Local health and safety requirements e.g. shielding, exclusion zone, personnel safety programme including maximum radiation exposure limits (in consultation with the national regulatory body)
- National transportation requirements (when NII equipment is being transported)
- Maximum and minimum dimensions of scanning tunnel and targets to be scanned
- System footprint dimensions (to include equipment and safety exclusion zone as well as container/vehicle marshalling areas).The ability to scan the complete transport in one single action, including the wheels where appropriate.

Technical Specifications

Scanning indicators

- Spatial resolution
- Penetration capability
- Contrast sensitivity
- Wire detectability

(Note: The method of testing for these requirements is set out in ANSI Standards: ANSI N42.46.2008 (<http://ieeexplore.ieee.org/xpl/standards.jsp>)

- Throughput
- Scan speed (Most suppliers offer a range of scanning speeds)
- Potential interference with any existing radiation portal monitors
- Complete transport should be scanned in one single action, including the wheels where appropriate
- Maximum and minimum dimensions of scanning tunnel and targets to be scanned
- Suitable electrical power availability
- Communications availability; between scanner /other operational staff/remote image analysis station

Radiological

- It is recommended that potential suppliers should be ISO 9001 certified.
- Necessity for all ionising radiation systems to meet national and IAEA standards/regulations for radiation equipment Local health and safety requirements e.g. shielding, exclusion zone, personnel safety programme including maximum radiation exposure limits (in consultation with national regulatory body)

Financial

- Port authority charges (i.e. rent for the land where the system is deployed and scanning handling charges)
- Future upgrades can lead to additional investment in the re-design of existing NII equipment
- Other costs to be taken into account: radiological license fee, radiation detection monitoring costs (dosimeters and analysis costs etc), radiation training costs, support vehicles, additional staffing costs, scanning vehicle maintenance cost.

¹ The International Basic Safety Standards against Ionizing Radiation and for the Safety of Radiation Sources (SS115, 1996) and Safety Guide RS-G-1.10: Safety of Radiation Generators and Sealed Radioactive Sources

Logistical

- National transportation requirements.
- Indoor/outdoor usage
- Minimal logistical impact including traffic/cargo flow on port operations
- Suitable site access for maintenance personnel
- System footprint dimensions (to include equipment and safety exclusion zone as well as container/vehicle marshalling areas)

Environment/ weather

- Minimum and maximum temperatures at which the equipment may operate
- Other environmental factors such as wind, moisture, sand, dust, sea salt
- Geological considerations
- Environmental impact

Other

- Planning, permits and requirements (permits required for developing and building the site, and for the exploitation of the NII equipment)
- Provision for adequate training for operators including image analysis training
- Compatibility with existing system

Maintenance

The average lifetime of scanning equipment is about 10 years. This especially applies to important components such as the accelerator, detectors and software. Because of this life expectancy, it is recommended that the tender includes provision for a 5-year maintenance contract, with a possible extension for an additional 5 years. Regular review of the maintenance service is an important element which may provide the opportunity to make appropriate amendments.

Other topics to consider concerning maintenance:

- Local service organisation with maximum response time
- 24/7 helpdesk with maximum response time
- Guarantee of delivery of spare parts during contract period
- On-site storage of spare parts
- Spare parts and maintenance required from a third party (e.g. accelerator supplier)
- Does maintenance cost include spare parts, all relevant duties/taxes and other associated cost?(e.g. travel, subsistence, accommodation, car hire)

Types of technology

The various technology applications currently available include;

a) X-ray

An X-ray is an electromagnetic wave of very short wavelength. X-rays are polychromatic and have a larger spectrum than gamma rays. The power source for X-ray systems is electrical. This means it can be turned on and off. It also means that in a site where the electricity supply is not

certain, it is essential to have a back-up generator. The energy level of X-ray systems is measured in mega-electron volts (MeV). The MeV rating varies between fixed, mobile and relocatable systems; these are discussed in detail below. For the purpose of container scanning the maximum X-ray energy is 9 MeV. X-ray systems are considered to provide better image quality but are more expensive and, in general, are physically larger than Gamma Ray systems.

b) Gamma Ray

Gamma rays are monochromatic electromagnetic waves of shorter wavelength than X-rays. Gamma rays are produced from natural isotopes such as ¹³⁷Cesium and ⁶⁰Cobalt. These are radioactive sources and the energy emission is continuous. Because of this, the isotopes must be kept in a shielded cabinet at all times. Over time, the radioactive isotopes decay and ultimately require replacement, usually every 5 years. Some Members that operate these systems have included within their contracts a provision for periodic testing to ensure that energy levels remain sufficiently high. Contracts should include supplier "take back" provisions for spent sources.

Gamma ray systems are cheaper to purchase and to operate but the images produced may be more difficult to interpret. A gamma ray unit is, in general, smaller than an X-ray unit which gives these systems a higher degree of mobility. Gamma ray units are more likely to be mobile or relocatable than fixed.

A common comparative method for systems is to refer to steel penetration capability. A gamma based system using a ⁶⁰Cobalt radioisotope, which has greater penetration capability than one based on ¹³⁷Cesium, is said to penetrate up to 165mm of steel. Manufacturers of X-ray equipment show 180mm penetration of steel for a 2.5 MeV mobile X-ray system, over 200 mm for a 3.0 MeV mobile unit and up to 350mm for a 6.0 MeV relocatable unit. Fixed X-ray systems of 9 MeV are able to penetrate up to 450 mm of steel. Some currently deployed mobile systems have energy levels as low as 300/450 KeV and are inadequate for the effective screening of typical container traffic. Members who currently use X-ray systems are of the view that - 3 MeV is the minimum energy level required for effective cargo penetration. However, steel penetration is not the sole criterion to achieve high quality X-ray images. Spatial resolution and contrast sensitivity are other important factors to be taken into account.

c) Neutron

Neutron scanning is an emerging detection technology application which has the capability to identify specific materials in cargo. For the purpose of cargo screening, neutrons with an energy of 14 MeV are produced by means of a neutron generator. When neutrons collide with the atoms of a given material characteristic gamma rays are emitted. These gamma rays provide information which allows certain constituent chemical elements to be detected and identified, particularly those present in threat materials such as drugs and explosives. Because of the high energy involved and the high penetration capability of neutrons, extensive shielding and radiation safety precautions are required.

Neutron scanning is not currently seen as a replacement for X-ray and Gamma ray screening; rather it is seen as a tool for providing an additional level of information when used in conjunction with X-ray scanning, whether in an integrated system, or interoperating with an existing X-ray scanner.

d) Backscatter X-ray

Backscatter X-ray systems operate by directing X-rays at a target object and capturing the resultant scattered, or reflected, radiation using detectors on the near side of the target. Because the detectors are located on the near side, no boom or archway is required, thereby increasing the versatility and mobility of the scanning system.

The ensuing image has a more photographic appearance than that of a transmission X-ray system, and backscatter systems are particularly suited to imaging organic materials.

However, as backscatter imaging is confined to relatively low energy systems, generally having a maximum energy of 450 KeV, the penetrative capability of such systems is quite limited.

Backscatter systems may operate with single or multiple views, or in combination with transmission X-ray sources.

Available Features

a) Dual view

Early X-ray systems used a single energy source normally scanning the target in the horizontal plane. However, dual view scanning, which incorporates a second energy source scanning in the vertical plane, is also available. Typically, similar energy levels are used for both sources. The advantage of dual view scanning is that it provides an additional dimension to the image which facilitates image analysis (depth, positioning etc)

b) Dual Energy

Interlaced linear accelerators using dual energy systems have been available since 2006. When operating, these accelerators alternate between 2 different energy levels, making it possible to achieve material discrimination. The most commonly used energy combinations are 6 and 3 MeV or 9 and 6 MeV respectively. Best results are achieved with low density homogeneous cargo. Current dual energy systems do not always provide reliable results when scanning mixed high density cargoes on account of their inability to always differentiate accurately between organic, non-organic and metallic materials.

c) Material discrimination

Different methods are available to achieve material discrimination:

- A single accelerator using one energy level together with multiple arrays of detectors placed behind each other. The higher energies of the spectrum are captured by the first detector row with the lower energies being captured by the second row of detectors. Only one run is necessary.
- An interlaced linear accelerator, alternating between high and low energy levels
Only one run is necessary
- Two accelerators each operating at a single energy level. Two runs are necessary, one run operating at the high energy level and the second operating at the low energy level.

(Note: Using a system of algorithms, the resultant images are combined to produce a single image which differentiates between organic, non-organic and metallic materials on a colour-coded basis)

Types of NII systems

a) Fixed (Stationary)

Fixed units are the most expensive and the most powerful, typically with an energy level of 9 MeV. This high energy level provides a clearer image and deeper penetration of cargo than systems of lower energy. However, due to the high energy of the system there is a possibility that X-rays may “blow through” less dense cargo without forming a proper image. Most fixed scanners tend to use X-ray. A fixed unit may permit a “dual view”, that is both horizontal and vertical profiles of the cargo can be taken. Its site permanence allows for better links between the scanner’s computer system and the main Customs control network.

A fixed unit consists of more than just the scanner. Due to the high energy of the systems and possible scatter of X-rays, the entire system must be housed in a purpose-built building with concrete walls of sufficient thickness to provide adequate shielding. The building may also require safety doors for the entrance and exit. The entire construction of this unit must also include the facility for the computer equipment and image interpretation and may also include ancillary office accommodation. The system is quite expensive in terms of actual unit purchase including the facility that must be constructed to house it.

A major consideration for fixed units is that, by definition, containers must come to them. This means there must be sufficient space for vehicles waiting to enter the facility to park and to manoeuvre. Furthermore, there must be satisfactory access roads to and from the unit that must accommodate both import and export traffic. Due to these constraints it has been found that fixed units are better suited to areas such as container ports where there is a constant flow of traffic which can be directed along a single channel or choke point.

Due to the fact that the purchase of a fixed unit may require acquisition of land for the site and will involve substantial buildings to be erected, the process may take years from initial conception to final installation. Planning application procedures must also be complied with.

b) Relocatable/Gantry

Relocatable scanning units are designed as a compromise between fixed and mobile systems by providing better performance than mobile units while overcoming the expense and land requirements of a fixed unit. Relocatable scanners typically operate at levels of approximately 6 MeV and require a lighter infrastructure and shielding structure than fixed units. The latest relocatable systems are capable of operating in the open air, without additional shielding walls for radiation protection. They are less expensive to procure and operate than fixed units but must, as with fixed units, have suitable access roads and parking facilities. Relocatable units also require a dedicated and prepared operating area at each location in which they are used.

While relocatable units may be dismantled and moved to a new location, they should not be considered mobile. The process of dismantling, transporting and reassembling them can be time-consuming and labour intensive and can take between one day and eight weeks, depending on the nature of the construction and location of the system. A relocatable unit might be the preferred choice if trade patterns indicate that traffic might shift significantly from one port or border location to another in the foreseeable future. Due to cost and size implications some administrations have opted to deploy relocatable units in the same manner as fixed units with some modifications involving an upgrade of energy and penetration levels.

All relocatable X-ray and gamma ray scanning systems require a clear area surrounding them for health and safety reasons during operation, known as an 'exclusion zone'. In theory the space required for this zone increases relative to the increase in equipment energy levels. Improved shielding/attenuation techniques in the latest systems, however, have contributed to significantly reduced exclusion zones. It is important to establish the land requirements of the exclusion zone for these relocatable units. If the necessary land is not available within the port or close to the Customs station, the scanning unit will have to be deployed at a remote location. Planning application procedures may also apply.

c) Mobile

Mobile units are less expensive than fixed units but operate at lower energy levels, typically 3 - 6 MeV. Mobile scanners equipped with an interlaced accelerator, alternating between high and low energy levels are becoming increasingly prevalent. If the cost of a mobile system (including delivery and maintenance) is the most important consideration, then a gamma ray system could be a viable option, even though the image quality may not match that of a comparable X-ray system. The reduced penetration levels of these units are offset by the mobility which allow for quick response by officers to address fast emerging risks. Prior to purchase a full review of the operation must be performed to make certain that the unit is fit for its function. Mobile scanners should require no more than 30 minutes to be ready for operation after their arrival on location. For example, they are particularly useful for land borders where traffic may cross at a number of points and smugglers are searching for the weak points in the border inspection sites. The fact that they can move to different locations at very short notice makes it more difficult for the smugglers to avoid scanning controls by shifting border entry points. They also permit the possibility of shared costs by neighbouring administrations who

could jointly purchase and operate a mobile unit. Mobile systems are subject to greater downtime and require more frequent maintenance.

Mobile scanners usually comprise of an X-ray or gamma ray scanner built onto an integrated chassis cab vehicle or, they may be constructed as articulated units which will be towed by independent tractor units. In any case, particular attention must be paid to the suitability of the vehicle when moving between locations on public roads. It must comply with national transport and road traffic regulations especially in terms of height, length, overall weight, and weight distribution. Right/Left hand drive formats, automatic/manual transmission, and any speed limitations should also be taken into account. A license for a heavy goods vehicle (HGV) and for transport of a live gamma source (radiological license) may also be required to move the vehicle between operations.

Consideration should be given to using separate fuel tanks to fuel chassis/generator where the possibility to fuel the generator with tax-free/ rebated fuel exists. Large capacity tanks may be desirable where the scanner is operating in remote locations for prolonged periods. The scope for using large/separate fuel tanks may be limited by factors such as available space, Gross Vehicle Weight (GVW) limitations and local road transport regulations.

Unlike fixed and relocatable units, mobile scanners do not require a network of access roads to be constructed because they are able to move with the traffic flow. However, like relocatable scanners, they do require an 'exclusion zone', a size of which is dependent upon the energy level and amount of shielding of the unit. Exclusion zones vary according to the models and must be specifically measured on a unit by unit basis. A rough estimate would be to assume that between 500m² and 1500m² will be needed as an exclusion zone for these units.

d) Portable

Portable units are less expensive and less powerful than relocatable systems, typically with energy levels between 2 and 3,5 MeV. These lower energy levels provide somewhat less penetration, usually a maximum of 280 mm of steel. A portable unit consists only of a scanning part. Usually it looks like a container with the X-ray equipment and office accommodation situated inside. Transportation of the portable equipment must be carried out by a truck equipped with a crane. Portable systems are suitable when the mobility of an X-ray system is an important issue. Advantages of portable systems include the short time necessary for dismantling and reassembling as well as the use of low X-ray emission. Because of the low emission of X-rays a relatively small operational area of about 15m x 15m is required.

e) Drive Through

In the earliest fixed scanning systems the emphasis was primarily on the quality of the X-ray systems. The X-ray systems were built in central locations in the ports and containers were transported from the terminals to the scanning facility. Because of the ever increasing numbers of containers to be handled, the throughput limitations resulting from relatively slow scanning speeds became a problem in busy seaports.

For this reason the drive through scanning systems were developed. Drive through systems deliver a much higher throughput, by increasing scanning speeds and allowing truck or terminal vehicle drivers to remain in the cab of the truck while a container is scanned. These systems incorporate many safety precautions to ensure that the driver is not exposed to direct or unacceptable levels of radiation. It is estimated that drivers may pass through such scanners at least 10,000 times annually without exceeding permitted radiation dose levels. However, national radiation regulatory bodies should be consulted in this regard before the commissioning of systems. The disadvantage of drive through systems, however, is that the driver's cab is not normally scanned.

The investment required for a drive through scanning system is comparable with that of a relocatable system. Drive through systems can operate in the open air, although the effects of wind, snow, sand, rain etc. should be considered. Drive-through systems operate with X-ray energy level typically between 3 and 6 but 7.5 MeV is also available. Dual energy versions, providing material discrimination, are also available.

Drive-through systems are capable of scanning between 150 and 180 containers per hour, with a drive through speed of around 11 kilometres per hour. This higher speed, relative to traditional scanning systems, will have consequences for the specification requirements as the speed will influence the penetration, resolution etc. This factor must be taken into account, therefore, within the programme of requirements, although the quality of imaging at high speeds continues to improve.

A good quality reliable optical character recognition (OCR) system, for recognizing and recording container numbers is a very important part of a drive through system. It is necessary to make a good match between the container and the saved image.

As in the case of fixed and relocatable systems, drive-through scanners require access roads. Drive through scanners can operate with a relatively small exclusion zone. The high passing speed results in a shorter period of radiation exposure for each scan. In some cases an exclusion zone of 20 X 5 metres will suffice.

f) Train Scanning

Train scanning is a relatively recent development. A train scanning system is comparable to a drive-through system. The difference is that train scanning systems are specifically built for scanning cargo/ tank wagons, or containers loaded onto trains. First generation train scanners were only capable of scanning at a very low passing speed. Scanning systems with a passing speed of 30 kilometres per hour are now commonplace.

Train scanning systems are used in various situations, most commonly on land borders between two countries. The most recent variation operates on a track, situated a few kilometres from the entry to container terminals. The passing speed at this location is 60 kilometres per hour. The first train scanning system with this capability is scheduled to be available before the end of 2011.

A good quality reliable optical character recognition (OCR) system, for recognizing and recording container numbers is also an important requirement for a train scanning system. It is necessary to make a good match between the container and the saved image.

Train scanning systems using either an X-ray source or a live (gamma ray) source are available. Gamma ray operates well when the passing speed is no higher than a few kilometres per hour. For higher passing speeds an X-ray system in the range, 6 to 9 MeV is required.

Where high energy X-rays are used to cope with high passing speeds, additional radiation safety requirements may apply, depending on national radiological legislation and requirements.

g) Radioactive Material Detection System

While many ports/border crossings may already use dedicated Radiation Portal Monitors (RPM's) to detect illicit trafficking of radioactive/nuclear materials, some scanner suppliers offer the option of a radioactive/ nuclear material detection system together with their X-ray scanning systems. Passive detectors are incorporated into the scanning process, providing an integrated cargo scanning solution. These are not intended to replace RPM's, but can allow for a more informed analysis of radioactive/ nuclear material alarms by using the additional information provided by the X-ray image.

V. PROCUREMENT PROCESS

Every country has its own procurement procedure but some common guidelines can be established in order to ensure the procurement process is transparent, fair and comprehensive.

The Request for Proposal / Tender (RFP/RFT)

1. A request for proposal/tender (RFP) is an early stage in a procurement process, issuing an invitation for suppliers, often through a bidding process, to submit a proposal on a specific commodity (e.g. equipment) or service.
2. The RFP is your "official" statement to suppliers about the equipment and/or services you require. Suppliers typically try to respond, point by point, to your RFP when they make their proposals. Therefore, the RFP "leads" suppliers by focusing their attention on certain issues. Most importantly, the RFP is the foundation upon which the supplier's relationship with you is built.
3. The RFP process brings structure to the procurement decision and allows the risks and benefits to be identified clearly upfront. The following information should be considered when preparing a proposal.

Overview - when sending out a Request for Proposal document it can be very useful to provide a high level overview of some key points

Background - as part of the proposal it is useful to provide some background information to ensure that the prospective suppliers understand what it is you are trying to achieve and to ensure that you get the right ultimate solution.

Requirements - this highlights your specific requirements both in terms of supplier relationship and the solution and configuration you are seeking.

RFP Terms and Conditions (Instructions) - identifies the elements of terms and conditions or instructions that you may want to specify in your proposal as to how the process will be managed.

Evaluation - ensures the procurement process is transparent and documenting how the proposals will be evaluated.

Response – specifies what information is expected back from the responder, in what format and to what level of detail

Further details of the elements identified above and examples of what you might include can be found in Annex I.

VI. FACTORY ACCEPTANCE TEST

Factory acceptance tests can act as an important part of the validation process as they allow for the correction of any identified faults prior to delivery. The scope of such tests will vary according to the format of the system being purchased.

Mobile Scanners

In the case of mobile scanners, it should be possible to test the performance of the X-ray system, certain mechanical and other vehicle specifications, and the dimensions of the safety exclusion zone.

Other scanning systems

In the case of relocatable and fixed systems, it will be possible to test only those parts which are fully assembled e.g. linear accelerator.

Shipping

It should be borne in mind that the transportation of the equipment to its destination may have some effect on the system's performance, which will be required to be addressed during installation and commissioning. As a precautionary measure, therefore, the supplier should ensure that the equipment is adequately protected by protective packaging etc during shipment. The supplier should also ensure that adequate marine, or other, insurance is in place.

The responsibilities for Customs clearance procedures and payment of Customs duties/other taxes as well as costs relating to the discharge, carriage to installation site and unpacking at site, should be clearly defined. These issues also apply to any spare parts supplied.

VII. DEPLOYMENT

As soon as is practical following the signing of the contract, it is important to ensure that all necessary measures are put in place to facilitate a smooth deployment of the scanning system when delivered/constructed. These include:

- Preparation of scanning site and associated buildings
- Provision of suitable accommodation to store spare parts, and to carry out maintenance in the case of mobile scanners
- Application to the regulatory body for radiological licences, including submission of justification to use ionizing radiation equipment
- Suitable methodology for selecting targets for scanning
- Arrangements for transporting target containers/ vehicles to/from scanning site
- Design of a traffic management plan
- Provision of adequate facilities for any resultant manual inspections
- Recruitment and training of scanner operators
- Compatibility of scanner computer systems with existing systems.

VIII. FIELD VALIDATION TEST

After installation, the imaging system must be tested for compliance with contractual specifications at the purchaser's site by a specialized Customs team which is familiar with these systems and test regimes. Due to varying conditions of the site, and the possible effect of transportation, systems may not perform in the same manner as they did during factory acceptance testing. Additional modifications may be required to fully meet the specifications of the contract. In this case "a cure notice" will be issued to the manufacturer notifying him of the deficiencies identified in the course of the Field Validation Test.

The tests should be drawn up carefully and agreed with the supplier in advance and should form part of the contract agreement.

They should cover specifications such as throughput, overall imaging quality, imaging tools, image saving and retrieval, steel penetration, wire detectability, contrast sensitivity, scanning speeds, maximum dimensions of target to be scanned, operator environment, paintwork and general workmanship, as specified in the programme of requirement.

The dimensions of the radiation safety exclusion zone should be verified and radiation dose levels recorded at appropriate points at the perimeter of the exclusion zone, inside a laden scanned container, and in the operator cabin (in the case of a mobile system). These measurements should be made using a recently calibrated survey meter.

Field testing should include testing for radiological compliance in accordance with national regulatory requirements and any specific licensing conditions.

Many contract agreements now include the option of a short trial period which allows the system to operate in typical operational conditions and facilitates any necessary adjustments before final acceptance.

IX. FINAL ACCEPTANCE

If the systems are tested and meet the specifications of the contract, then the contracting unit may approve formal acceptance of the equipment according to the contract terms and relevant national requirements. Systems should not be formally accepted until any significant deficiencies identified in the field test are made good.

Final acceptance usually triggers payment of the final instalment of the equipment purchase price according to the payment schedule.

It may be useful to include a contractual condition to provide for withholding a portion of the payment until any deficiencies noted in the field tests are remedied

Operational support (establishing link with maintenance support; establishing spare parts inventory or accessibility to spare parts) should be clearly established.

X. POST DEPLOYMENT REVIEW

Periodic reviewing of the operation of the system forms an intrinsic part of the overall management of the project.

Initial review

Monitoring of the operation of the system should commence immediately after the system is installed

It is inevitable that some teething problems will arise in the early stages of operation of the system. These may relate to technical problems within the scanner, logistical or staffing issues

The initial review should take the following into account:

- Effectiveness of system procedures (consider using personal log-in and password for each system operator)
- Quality of the system's images
- Quality of operational support (response times, adequacy of maintenance support; spare parts etc)
- Familiarity of operators with scanning functions

(Note: Early intervention in these areas may help to improve the overall efficiency of the system)

Long term review

As part of the long term management of the system it will be necessary to carry out periodic reviews. These reviews will rely heavily on good quality records maintained throughout the lifetime of the system. They should focus on the performance of the scanner, performance of the operators, maintenance issues, results achieved, and the benefits derived from the deployment of the system. Such reviews will also prove valuable when planning to purchase additional equipment

The following issues should be considered:

- Overall system availability
- Any major maintenance issues
- Service response times
- Quality of maintenance support
- Quality of imaging performance
- Throughput
- Number of scans carried out
- Number of resulting physical inspections
- Number of detections made
- Radiological compliance, including monitoring of radiation dose readings
- Adequacy of operator training

Team leaders and local managers should be consulted in relation to issues such as:

- whether the equipment has performed in accordance with expectations
- whether operating procedures require alteration
- requirements for refresher training or advanced image interpretation training. (Generally the training courses provided by the suppliers are fairly basic especially in the area of image interpretation)

XI. RADIATION SAFETY

All ionising radiation equipment is subject to licensing by the national regulatory authority and must conform to national and international radiation safety regulations and requirements. Additional conditions may apply to systems using live sources including transport requirements, and replacement and “take back” conditions. It is advisable therefore, to engage a suitably qualified radiation safety expert, such as a, Radiation Safety Advisor, to deal with such issues at an early stage in the procurement process.

Issues to be dealt with by this expert might include:

- Engagement with regulatory body
- Site assessment for radiological purposes
- Formulation of justification for practice

- Advise on relevant tender requirements
- Evaluation of relevant safety programme
- Implementation of radiation safety programme
- Compliance with licensing conditions
- Design of radiation safety awareness training
- Medical check-up for personnel

The radiation safety programme should include the following elements:

- Delivery of radiation safety awareness training to all operational staff before commencing operation of the system
- Appointment of Radiation Safety Officer
- Issue of Radiation Safety Procedures to all relevant operational staff
- Provision of personal dosimeters and monitoring of personal radiation doses
- Regular measurement of dose levels in scanner and at perimeter of exclusion zone
- Annual review of Radiation Safety Procedures

(Note: Notwithstanding any additional national requirements it is suggested that exposure dosage at the border of the exclusion zone be no higher than 1 micro Sievert (μSv) per hour)

In addition, the maximum radiation dose limit for operators should not exceed the limit for general public at 1 milli sievert (mSv) per year.

In addition, every effort should be made to minimise the accidental exposure to radiation of clandestines concealed within trucks and containers, especially at locations where they are regularly encountered. Additional resources, where necessary, should be provided to deal with such incidents.

Annex I

ELEMENTS TO BE CONSIDERED FOR A REQUEST FOR A PROPOSAL/TENDER

As described in Section V, the following looks at the elements to be considered and provides some examples of what might be included. The list is neither exhaustive nor mandatory.

A. Overview

Some key points to include in an overview are as follows:

Purpose of RFP – A high level statement describing what you are seeking a proposal on e.g. cargo screening equipment that enables Customs to achieve its business objectives for enhanced cargo security.

Approval Process – Clarity for Suppliers as to who is able to make decisions to purchase. This may be delegated to the Customs administrations, but it may be Customs subject to approval by the Government or another Government agency and Customs will not be able to enter into a contract prior to that approval being granted.

Due Date and Milestones – To ensure transparency, clearly document the due date for receipt of proposals and the right to accept or decline late responses. You can also include the proposed steps (milestones) you may go through and the dates by which a final decision will be made (important to stress that these may be subject to change but all potential suppliers will be notified of changes at the same time)

How to Respond –Set out how you want the proposal (information) to be provided e.g. hardcopy, how many copies, if electronic version in what format (e.g. Microsoft word). It is also useful to specify what will not be accepted e.g. “proposals will not be accepted by electronic mail”

Notes to Respondents – Include anything specific you want to highlight, it may be commentary about terminology, requirements (highlighting where in the document the requirements are included) and questions. It is an opportunity to ensure that instructions are clear.

B. Background

It is useful to provide some background information about your administration and its function, the operational and business environment and any important factors that are to be taken into account. This may include an outline of the operations e.g. how many ports (sea and air), how the ports operate, how cargo is currently processed, what sort of facilities are available, health and safety environment, environmental conditions (e.g. climate, proximity to sea, winds) and road and highway conditions.

C. Requirements

In terms of requirements you may wish to consider the following:

Supplier Relationship – what are you seeking from the supplier e.g. are you seeking one or more prime vendors? Do you want one or more vendors to manage the provision of all elements of the requirements specified in this RFP throughout the operational lifecycle of the equipment, including:

- Manufacture and supply of the required equipment including assembly and fit-out of vehicles, trailers and fixed units;
- Delivery and installation in the specified operational environment;
- Training of operators and/or training of trainers;
- Preventative maintenance of the equipment following deployment;
- Warranty, support, service and corrective maintenance of the equipment following deployment.

Are you happy for prime vendor(s) to use local agents and distributors to manage elements of the procurement, delivery, maintenance and support? Do you expect to sign a master contract with the prime vendor(s) and that overall responsibility and liability for the supply and support of the solutions will come under this contract?

These are important issues that need to be clear to prospective suppliers when sending out the proposal.

Solutions and Configurations – This is where you should define what it is you want to purchase. You should stipulate the different categories (requirements) of equipment, e.g. this could be differentiated by size, mobility and/or type of cargo that is to be screened. You should define mandatory and non-mandatory requirements. Using the terms “must”, “should”, or “may” to describe the level of importance.

These terms, when used, can indicate the following levels of importance:

- **must** - it is essential that the Respondent's Proposal meets this requirement. Non-compliance may result in the Proposal being rejected by Customs, or count significantly against the Respondent during the evaluation phase.
- **should** - the Respondent's Proposal should meet this requirement, but a Proposal is unlikely to be rejected solely for not meeting the requirement.
- **may** - the Respondent's Proposal may support this requirement, but it is optional and may be viewed by Customs as a "value-added" benefit.

It may be that if you are looking for different categories of equipment you will allow respondents to respond to any number of the categories, however each category that is being responded to must have a complete response covering all mandatory and non-mandatory requirements that respondents elect to address.

D. Evaluation

To ensure the procurement process is transparent and fair it is important to document how the proposals will be evaluated.

Process and Activities – It is important to document the process and activities that will form the evaluation process. This will be subject to your country's procurement process but can include:

- How Respondents' written Proposals will be evaluated (e.g. by a team of internal and external experts)

- A short listing process based on initial evaluation of written proposals
- Reference checks – the references given in response can be contacted and assessed
- Site visits and testing – the site visits proposed can take place and tests will be conducted to assess the performance of the proposed solutions
- Presentations and meetings – Respondents may be given the opportunity to present their Proposals and raise issues/concerns at meetings.

Evaluation Criteria/Methodology – It is important to define the criteria/methodology to be used for the assessment of respondents proposal`s. There are different methodologies available, such as the Most Economically Advantageous Tender (MEAT) system where marks are allocated on a weighted basis to the most important requirements of the procurement including cost. The major requirements could include:

- a) Inspection equipment and systems:
 - Technical capability
 - Suitability for Purpose
 - Regulatory and health & safety compliance
- b) Vehicles, trailers and other equipment:
 - Regulatory compliance
 - Suitability for Purpose
- c) Support, maintenance, warranty and training
- d) Minimum Requirements

You may want to set minimum thresholds for some of the main specifications. Failure to reach such thresholds would result in outright rejection of the Respondent's Proposal for that equipment category. Complete inability to satisfy any mandatory requirement may also result in outright rejection of the Proposal for that equipment category.

e) Cost

Costs to be taken into account should include:

- Capital cost of the equipment including vehicle chassis, trailer and standard installation equipment;
- Spare parts to be purchased to maintain minimum required service levels;
- Preventative maintenance per annum;
- Service including corrective maintenance charges per annum;
- Training
- Estimate of consumables and operating costs for equipment proposed

The following terms and conditions or instructions may be considered for inclusion in your proposal:

Format of Proposals – Make clear to respondents that proposals should adhere to the agreed format and headings as defined in the document. This may include templates to be completed to allow respondents to structure their responses in a consistent way. You may choose different formats for different parts of the proposal e.g.

- A free-form response - Respondents may be invited to state in their own words what they are proposing for each equipment category and why their products and services are suitable for Customs' requirements.
- Specific responses to each clause - All mandatory requirements must be addressed for the categories of equipment that are proposed. Additional information may be attached to responses so long as it complies with the Proposal delivery requirements.
- Specific compliance responses - Respondents must indicate whether they are able to fully comply with a particular requirement. This can be as simple as responders indicating 'COMPLY', such response indicating full and unambiguous compliance. Alternatively, Respondents may indicate 'PARTIALLY COMPLY' or 'DO NOT COMPLY' together with a full explanation of the qualified compliance or non-compliance.
- Contact with Customs –Specify one point of contact. You may want to consider specifying that unsolicited and unauthorised Respondent contact with other Customs personnel concerning this RFP may result in rejection of a Respondent's Proposal.
- Respondent Contact Details –Respondents should designate a primary/sole point of contact for all correspondence regarding the RFP.
- Proposal Validity Period – Define the period of validity of proposals which can be from either the date of submission or the Due Date for Proposals, whichever is the latter.

Reliance Upon Statements by Respondents – You may want to stipulate that Customs may rely upon all statements made by any Respondent in a Proposal and in any other communications relating to the RFP to be true. You may want to stipulate that each Respondent shall ensure that:

- All information provided in response to this RFP is complete and accurate;
- It has examined the proposal document fully and any other information provided by Customs in regard to this RFP; and
- It has considered all the risks, contingencies and other circumstances having an effect on its Proposal.

Questions concerning the RFP Content – You may allow Respondents to ask questions concerning the content of the RFP or the evaluation process up until the Due Date. However, you may want to specify how the questions are to be provided and responses made (e.g. in writing only). You may also want to ensure that questions and responses

relating to RFP content or rules are distributed to all Respondents (but will not be attributed to the originating Respondent) subject to commercial confidentiality.

RFP Variations, Cancellation and Waiver – you may want to state that you reserve the right to vary, cancel or waive any part of the RFP at your sole discretion at any time up to the Due Date including the right to extend the Due Date for responses. It will be important to stress that you will advise all Respondents if there is to be any change to the rules, procedures or criteria during the process. A change in rules or procedure should not benefit any one Respondent.

Preparation Costs – Stress that each Respondent shall be responsible for all costs associated with the preparation and submission of its Proposal and Customs shall accept no liability for any such costs.

Pricing - Be clear about pricing information. You should specify that respondents must ensure that prices set out in their Proposals are fully inclusive for the proposed solutions and that no additional prices, fees or charges shall apply to all or any part of the proposed solutions. You should also specify who shall be responsible for payment of any taxes, duties and other government charges, resulting from the procurement.

Disclaimer – You may want to specify that while every reasonable effort is made to ensure the accuracy of this RFP, Customs shall not be liable for any inaccuracy or omission in the RFP or in any additional information that may be provided in the RFP process.

Confidentiality and Intellectual Property – You may want to specify that the RFP and all Customs communication in regard to the RFP is confidential and should not be disclosed to any other party or used for any purpose other than that of preparing Proposals, without the express written consent of the Customs.

You should undertake to keep confidential any confidential, proprietary or commercially sensitive information supplied by Respondents and identified by Respondents as such, except as required by law.

Security and Operational Requirements – You should specify that during and after the RFP process, Respondents shall comply with any security and operational requirements of Customs or the Government

Conflicts of Interest – You should specify that respondents shall declare any conflicts of interest that exist or that may arise in responding to this RFP or in any Agreement that may result from this RFP, immediately upon becoming aware of such conflicts.

Public Statements – You should specify that respondents shall not make any public statement or press release, or engage in any advertising or promotion, or release any information to any news media or public forum in respect of the RFP or any contract that may result from the RFP without the express written consent of Customs.

Indemnity – You may want to specify that if a Respondent breaches any of the Terms and Conditions in the RFP and, as a result of that breach, Customs incurs costs or losses, including without limitation the cost of any investigations, procedural impairment, repetition of all or part of the RFP process or enforcement of intellectual property rights or confidentiality obligations, then that Respondent shall indemnify Customs against such costs or losses.

Rights Reserved by Customs – Without limiting any other statement in the RFP, you may want to reserve the right at any time:

- To apply or change any policy or criterion relating to participation in this RFP process or evaluation of Proposals;
- To restrict or deny the supply of or access to any Customs site or other property or any Customs personnel or information to any Respondent. However Customs will use best endeavours to provide all Respondents with equal access;
- To change the RFP Terms and Conditions by prior notice to Respondents;
- To reject any Proposal which does not, or only partially, complies with this RFP;
- Not to accept the lowest priced or any Proposal or enter into any Agreement.

Governing Law – You should specify that the RFP and any agreement arising from it shall be governed by the laws of your country, and Respondents agree to submit to the non-exclusive jurisdiction of your courts in any dispute that may arise concerning the RFP, Proposals or any Agreement.

E. Response

You may wish respondents to include the following in their proposals:

Respondent Organisation Background – This can include, contact details, company information and financial performance, history and experience as well as information that will provide assurance relating to the responders' ability to meet the requirements.

Proposed Solutions – Provide a comprehensive description of the equipment and major components proposed under each of the equipment categories as set out under the defined requirements, together with any specifications, diagrams or supporting information that illustrate the suitability of the equipment for Customs' proposed use.

Proposals should separately define the mandatory requirements and non-mandatory requirements. For non-mandatory requirements the information should indicate as to whether it is optional equipment or ancillary equipment and the response should cover, at a minimum, the following in detail:

- Description of the equipment
- Typical operating scenarios
- Major components
- Technology deployed and benefits
- Suitability for Customs requirements

Detailed Statement of Compliance with Inspection System Requirements - There should be a comprehensive statement of the detailed technical requirements included in the proposal to be completed by the Respondent. A detailed list of specifications should be set, and the Respondent should indicate compliance or otherwise against each specification. Information to be requested might include:

- Manufacturer's Technical Specifications
- Detectors
- Image Processing System
- Conveyor and Motor Drive
- Physical Dimensions
- Operating Environment
- Radiation and Safety
- Electronic Emissions and RF Interference
- Fault Diagnosis
- Power Supply Unit (Applicable if system can be plugged into mains source)
- Reliability
- Substance Differentiation and Detection Thresholds

Detailed Statement of Compliance with Commercial Vehicle Requirements – If you require a mobile X-ray solution you will also need a comprehensive statement of the detailed Commercial vehicle requirements included in the proposal requiring a response from the respondent. This would include items where an indication of compliance would be important.

Information to be requested might include:

- Compliance with Statutory Requirements
- Life expectancy
- Servicing
- Alternative Proposals
- Concept Drawing
- Vehicle Performance
- Modifications
- Movement of Dangerous Goods (ionising radiation sources)
- Braking Performance
- Static Rollover Threshold
- Hazard Lights and Working Lights
- Weatherproofing
- Foot Supports
- User's Manual
- Maintenance Manuals
- Flashing and Body Lighting
- Locker and Step Lighting
- Operational Vision

Detailed Statement of Compliance with Information and Communication Technology – Consider whether the proposed equipment must be capable of having full access to Customs' database and office software during operation. Mobile equipment should have real-time remote data access capability both during operations and while travelling.

Delivery and Deployment Schedule – Respondents to provide a delivery schedule for equipment proposed (including non-mandatory equipment) setting out dates for key stages including the delivery, installation, commissioning and deployment of the equipment. . Where precise dates are not known, earliest and latest estimates should be stated.

Warranties – Respondents to describe the warranties that apply to each equipment category and to each component of the equipment (if component warranties vary). In particular, they should describe the warranties that are applicable to:

- Vehicle chassis and/or trailer; and
- Inspection equipment including radiation source parts (such as X-ray tubes).

Maintenance and Support – Respondents to describe how they intend to provide maintenance and support of the equipment throughout its lifecycle. This should address:

- Installation;
- Preventative Maintenance (including how this may reduce non-preventative maintenance);
- Technical Guidelines for first level maintenance which may be carried out by the Customs operators
- Servicing and Corrective Maintenance; and
- Operator Support.

Spare Parts – Respondents should propose pricing for any spare parts Customs required to be purchased with each equipment category to ensure the maximum availability of the equipment and minimum time to repair.

Health and Safety Issues – Respondents to describe their approach to ensuring the safety of staff operating each equipment category. In particular, Respondents should address the following:

- Radiation safety;
- Exclusion zones, warning signage, lighting and barriers to access to the equipment;
- Operator workstation and ergonomics, equipment, and other physical health and safety attributes; Procedures to ensure safety; including adherence to international standards and best practices in health and safety.

Ability to upgrade - Respondents to detail their proposals for product renewal and ability to upgrade of the proposed equipment.

Training - Respondents to detail their proposed schedule of training for the operation of the equipment. In particular, provide the following:

- What formal courses do they provide for operators (and trainers)?
- What training course documentation (including trainer manuals) and self-training packages do they provide?
- How do they assure competency of trainers and operators (e.g. examinations, certification, etc.)?
- Does the training specifically cover health and safety compliance?
- What qualifications and experience have their trainers achieved?
- What international standards or endorsements does their training meet with?

Country of Manufacture/Local Content – You may want Respondents to provide a schedule showing the country of manufacture for all major components of the proposed equipment, together with the manufacturer's name. It may be your country's policy to encourage government purchasers to actively consider the products and services of competitive local businesses. You may want Respondents to identify any components that are provided by local companies. However, this approach may not be permitted by your national procurement rules.

Statement of Acceptance of RFP Terms and Conditions – Respondents include a statement of acceptance with the RFP Terms and Conditions and in any subsequent related notifications to Respondents. Respondents should note that non-agreement to any of these clauses may result in rejection of a Respondent's Proposal.

Client References and Site Visits – It is recommended that you ask respondents to supply the details a specified number of reference sites for each of the equipment categories proposed, where the equipment is currently being operated in an environment similar to that proposed by Customs. Contact information including business telephone, facsimile and e-mail details for the equipment operator should be provided and Respondents should obtain consent for Customs' contact.

Pricing Schedule - Respondents should provide prices for all equipment and services proposed. For consistency you should design a pricing spreadsheet and consider including the following elements:

- Capital cost of the equipment including vehicle chassis, trailer and standard installation equipment;
- Spare parts to be purchased to maintain minimum required service levels;
- Delivery including freight and insurance up to the point of acceptance by Customs;
- Deployment and installation costs;
- Preventative maintenance per annum;
- Service including corrective maintenance charges per annum;
- Operational support charges per annum;
- Training
- Estimate of consumables and operating costs for equipment proposed

Duties/taxes and Other Government Charges – The prices given in the spreadsheet should be inclusive of all duties, taxes and other government charges payable upon entry.

Currency and Exchange Rate – All pricing shall be in a specified currency

Additional Information

- Statement by Authorised Officer
 - Glossary of Terms
 - Vehicle Compliance Rules, Regulations and Guidelines
 - Pricing Schedule – template spreadsheet
-

2. Form of Bid Security (Bank Guarantee)

[Bank's name and address of issuing Branch or Office]

Beneficiary: _____ [Name and address of Client]

Date: _____

BID GUARANTEE No.: _____

We have been informed that [name of the Bidder] (hereinafter called "the Bidder") has submitted to you its bid dated (hereinafter called "the Bid") for the execution of [name of contract] under Invitation for Bids No. [IFB number] ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] ([amount in words]) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Bid Form; or
- (b) having been notified of the acceptance of its bid by the Client during the period of bid validity, (i) fails or refuses to execute the Contract Form, if required, or (ii) fails or refuses to furnish the performance security, in accordance with the Instructions to Bidders.

This guarantee will expire:

- (a) if the Bidder is the successful bidder, upon our receipt of copies of the Contract signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; or

- (b) if the Bidder is not the successful bidder, upon:

- (1) our receipt of a copy of your notification to the Bidder of the name of the successful bidder; or

- (2) twenty-eight days after the expiration of the Bidder's Bid;

Whichever is earlier.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

3. Form of Contract Agreement

THIS CONTRACT AGREEMENT is made the _____ day of _____,
20____.

BETWEEN

(1) **[Name of Client]**, a statutory body established under the Zambia Revenue Authority Act Chapter 321 of the Laws of Zambia and having its principal place of business at Revenue House, Kabwe Roundabout, Lusaka (hereinafter called "the Client"), and (2) **[name of Contractor]**, a corporation incorporated under the Laws of [country of Contractor] and having its principal place of business at **[address of Contractor]** (hereinafter called "the Contractor").

WHEREAS the Client desires to engage the Contractor to design, manufacture, test, deliver, install, complete and commission certain facilities, viz. *[list of facilities]* ("the facilities") and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents

1.1 Contract Documents

The following documents shall constitute the Contract between the Client and the Contractor, and each shall be read and construed as an integral part of the Contract:

- (a) This Contract and the Appendixes attached hereto;
- (b) Bid and Price Schedules submitted by the Contractor;
- (c) Special Conditions of Contract;
- (d) General Conditions of Contract;
- (e) Technical Specifications and Drawings;
- (f) (f) Procedures (as listed); and
- (g) Any other documents.

1.2 Order of Precedence

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1)

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 11)

The Client hereby agrees to pay to the Contractor the contract price in consideration of the performance, by the Contractor, of its obligations hereunder. The contract price shall be the aggregate of: [amount of foreign currency in words], [amount in figures] as specified in Price Schedule No. 5 (Grand Summary), and [amount of local currency in words], [amount in figures], or such other sums as may be determined in accordance with the terms and conditions of this Contract.

2.2 Terms of Payment (Reference GCC Clause 12)

The terms and procedures of payment according to which the Client will reimburse the Contractor shall be as follows:

For Schedule No. 1 and Schedule No. 2

- (1) Ninety (90%) of the cost for Schedule 1 and Schedule 2 shall be paid through an irrevocable confirmed letter of credit opened in favour of the Contractor in a bank in its country, upon submission of the following documents:
 - Three (3No.) Originals and two (2No.) copies of the Contractor's invoice showing Goods' description, quantity, unit price, and total amount;
 - Original and two (2No.) copies of the negotiable, clean, on-board bill of lading marked "freight prepaid" and two (2No.) copies of the non negotiable bill of lading;
 - Two (2No.) copies of the packing list identifying the contents of each package;
 - Insurance certificate;
 - Manufacturer's or Contractor's warranty certificate; and
 - A Factory Operational Acceptance Certificate.
- (2) Ten (10%) percent of the cost for Schedule 1 and Schedule 2 shall be paid within thirty (30) days of receipt of the Goods upon submission of claim supported by the acceptance certificate issued by the Client.

For Schedule No. 3

- (1) Ninety percent of the cost shall be paid prior to commencement of the installation, commissioning and training upon presentation of a claim by the Supplier.
- (2) Ten percent of the cost shall be paid within thirty days of completion of installation, commissioning and training upon presentation of a claim supported by the completion certificate.

For Schedule No. 4

Payments shall be made within 30 days of presentation of an invoice after the services have been provided.

In the event that the Contractor demands an advance payment, it shall not exceed 10% of the cost and shall only apply to Schedules Nos. 1 to 3. The Contractor shall be required to provide an advance payment guarantee to the sum of the advance payment being claimed.

Article 3. Effective Date for Determining Time of Completion

3.1 Effective Date (Reference GCC Clause 1)

The time of completion of the facilities shall be determined from the date when all of the following conditions have been fulfilled:

- (a) this Contract has been duly executed for and on behalf of the Client and the Contractor;
- (b) the Contractor has submitted to the Client the performance security and the advance payment guarantee;
- (c) the Client has paid the Contractor the advance payment; and
- (d) the Contractor has been advised that the documentary credit referred to in Article 2.2 above has been issued in its favour.

Each Party shall use its best efforts to fulfil the above conditions for which it is responsible as soon as practicable.

3.2

If the conditions listed under 3.1 are not fulfilled within two (2) months from the date of this Contract notification because of reasons not attributable to the Contractor, the Parties shall discuss and agree on an equitable adjustment to the contract price and the time for completion and/or other relevant conditions of the Contract.

Article 4. Appendices

4.1

The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract.

4.2

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Client and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Client

[Signature]

[Title]

in the presence of _____

Signed by, for and on behalf of the Contractor

[Signature]

[Title]

in the presence of _____

4. Performance Security Guarantee

_____ [Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: _____ [Name and Address of Client]

Date: _____

PERFORMANCE GUARANTEE No.: _____

We have been informed that [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated _____ with you, for the execution of [name of contract and brief description of Facilities] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] (____) [amount in words]⁽¹⁾, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall be reduced by half upon our receipt of:

- (a) a copy of the Operational Acceptance Certificate; or
- (b) a registered letter from the Contractor:
 - (i) attaching a copy of its notice requesting issuance of the Operational Acceptance Certificate; and
 - (ii) stating that the Project Manager has failed to issue such a Certificate within the time required or provide in writing justifiable reasons why such a Certificate has not been issued, so that Operational Acceptance is deemed to have occurred.

This guarantee shall expire no later than the earlier of:

- (a) twelve months after our receipt of either (a) or (b) above; or
- (b) eighteen months after our receipt of:
 - (1) a copy of the Completion Certificate; or
 - (2) a registered letter from the Contractor, attaching a copy of the notice to the Project Manager that the facilities are ready for commissioning, and stating that fourteen days have elapsed from the receipt of such notice (or seven days have elapsed if the notice was a repeat notice) and the Project Manager has failed to issue a Completion Certificate or inform the Contractor in writing of any defects or deficiencies; or
 - (3) a registered letter from the Contractor stating that no Completion Certificate has been issued but that the Client is making use of the facilities; or
- (c) the _____ day of _____, 20_____.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.

[signature(s)]

⁽¹⁾ The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Employer.

5. Bank Guarantee Form for Advance Payment

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: [Name and Address of Client]

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name of contract and brief description of Facilities] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum [amount in figures] (____) [amount in words] is to be made against an advance payment guarantee.

At the request of the Contractor, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] (____) [amount in words] upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than towards the execution of the works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor via his or her account number _____ at [name and address of Bank].

The maximum amount of this guarantee shall be progressively reduced in proportion to the value of each part-shipment or part-delivery of plant and equipment to the site, as indicated in copies of the relevant shipping and delivery documents that shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of documentation indicating full repayment by the Contractor of the amount of the advance payment, or on the _____ day of _____, 2_____, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

6. Form of Completion Certificate

Date: _____
Loan/Credit No: _____
IFB No: _____

[Name of Contract]

To: [Name and address of Contractor]

Dear Ladies and/or Gentlemen,

Pursuant to GCC Clause 24 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Client dated [date], relating to the [brief description of the Facilities], we hereby notify you that the following part(s) of the facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Client hereby takes over the said part(s) of the facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the facilities or part thereof: [description]
2. Date of completion: [date]

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

Title
(Project Manager)

7. Form of Operational Acceptance Certificate

Date: _____
Loan/Credit No: _____
IFB No: _____

[Name of Contract]

To: [Name and address of Contractor]

Dear Ladies and/or Gentlemen,

Pursuant to GCC Sub-Clause 25.3 (Operational Acceptance) of the General Conditions of the Contract entered into between yourselves and the Client dated [date], relating to the [brief description of the facilities], we hereby notify you that the Functional Guarantees of the following part(s) of the facilities were satisfactorily attained on the date specified below.

1. Description of the facilities or part thereof: [description]
2. Date of Operational Acceptance: [date]

This letter does not relieve you of your obligation to complete the execution of the facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

Title
(Project Manager)
