



SPECIFICATION

Gamma Dose Rate Monitoring Stations

1. Background and Scope

The ASEAN countries have decided to setup a regional radiation monitoring network. While most countries have radiation monitors already, Myanmar has not yet installed radiation monitors and is therefore not contributing to the network. However, their contribution would be very useful due to their geographical location. The IAEA is thus considering to donating an autonomous gamma dose rate monitoring system to Myanmar within the framework of IAEA Technical Cooperation Project RAS9094, which aims to enhance nuclear emergency preparedness and response in the Member States in the ASEAN region.

The autonomous gamma dose rate monitoring system is composed of two (2) monitoring stations that will be deployed. Once deployed, the stations will be connected to their server with minimal operations. The autonomous system gathers the data on environmental radioactivity measurements. Then, the autonomous system connects with the regional ASEAN radiation monitoring network and the International Radiation Monitoring Information System (IRMIS) and automatically provides data to these systems in nearly real-time.

This Specification describes the requirements for the supply and commissioning of Gamma Dose Rate Monitoring Stations (hereinafter referred to as the “**Equipment**” and/or “**System**”) for the Ministry of Science and Technology, Myanmar (hereinafter referred to as the “**End-User**”).

2. Technical requirements of the System

The System shall meet the below minimum technical requirements:

2.1 The System shall include:

- 2.1.1 Two (2) autonomous gamma dose rate monitoring stations with wall mounting and standing options (e.g., tripods).
- 2.1.2 The IT package, including the software and the server, which shall be able to gather the results of monitoring and make the data available IRIX format.
- 2.1.3 Spare parts that typically may be required for a three-year operation of the System.

2.2 The gamma dose rate monitoring stations shall meet the below requirements:

- 2.2.1 The range of measurement of dose rate $H^*(10)$ shall be from 20 nSv/h to 1 Sv/h, in the energy range of 45 keV to 2 MeV;
- 2.2.2 They shall be packed in rugged boxes for transport, which shall be able to be hand-carried with a maximum weight of 20 kg per box once loaded. Additional equipment shall also be able to be packed in rugged box(s) for transport;
- 2.2.3 The monitoring stations shall be able to be hand-carried (max. 8-10 kg overall in ‘deployed’ mode); and
- 2.2.4 The monitoring stations must be ready to operate and transmit data within Myanmar, subject to the availability of local infrastructure.

Once deployed, the System shall:

- 2.2.5 have enough autonomy for several days of operations with a minimum of three (3) days of total autonomy, including in outdoor environments with high and low temperatures, and shall be water resistant (e.g. resistant to rainfall);
- 2.2.6 connect automatically, or with minimal, operations and start sending data automatically;
- 2.2.7 transmit the data in scalable intervals between one (1) minute to 1 hour;
- 2.2.8 transmit the data (e.g. in 2G, 3G, 4G) using local SIM cards.

2.3 The IT package shall meet the below requirements:

- 2.3.1 The solution shall be based on storage of data on a local server;
- 2.3.2 The software shall be able to retrieve the data from all deployed monitoring stations;
- 2.3.3 The data shall eventually be either pushed to, or pulled by, other systems such as the ASEAN radiation monitoring network and the IAEA IRMIS system;
- 2.3.4 The subscription to the IT-package shall be minimum 1-year duration (desirable 3-year subject to funding availability).

Once deployed, the System shall:

- 2.3.5 initiate the communication with the monitoring station(s);
- 2.3.6 store the data from the monitoring station(s) on the server;
- 2.3.7 make the data available, in IRIX format, on the server;
- 2.3.8 follow the agreed naming pattern (YYYYMMDDHHMMSS) when placing files in the dedicated folders;
- 2.3.9 place one data file in each folder at a frequency of once per hour;
- 2.3.10 push the data available, in IRIX format, to IRMIS using the IRMIS Connect Service/IRIX Web Services using the certificate authentication or alternatively, the data is pushed from the server to an SFTP Server from where the data can be pulled by IRMIS.

The Contractor shall provide a fully integrated System including software and monitoring stations.

3. Marking

The System shall have all safety markings in English language.

4. Packing

- 4.1 The System shall be packed in accordance with international standards that are applicable for the shipment of this category of equipment. The packing in the rugged boxes shall ensure safe and secure transportation by air freight.

5. Quality, Warranty and Spare Parts Requirements

- 5.1 The System shall be manufactured and installed in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system, as specified in the Contractor's Proposal.
- 5.2 The Contractor shall document the compliance with the quality assurance system and submit this documentation to the IAEA.
- 5.3 The Contractor shall provide a one-year warranty for the System. The warranty period shall commence on the End-User's approval date (signature) of the Acceptance Protocol mentioned in Section 6.2 (Operational Acceptance Test) below.
- 5.4 Software updates shall be provided free of charge during the warranty period.

6. Testing and Acceptance

The System acceptance shall contain the following procedures:

- 6.1 A Factory Acceptance Test (FAT) shall be carried out by the Contractor at their premises prior to shipment. The FAT shall include a technical performance test (dose rate measurements in required range, transfer via mobile telephone network (2G, 3G, 4G) in time intervals in IRIX compatible format, storing of data on local server) made by the Contractor in his premises. The Contractor shall summarize the results in a brief FAT Report provided to the IAEA. The System shall be delivered only after IAEA's approval of the FAT Report.
- 6.2 An Operational Acceptance Test of the System shall be performed by the Contractor together with the End-User immediately after on-site installation and in accordance with approved test procedures (dose rate measurements in required range, transfer via mobile telephone network (2G, 3G, 4G) in time intervals in IRIX compatible format, storing of data on local server). The System will only be accepted upon successful completion of the on-site tests. The acceptance of the System shall be documented in an Operational Acceptance Test Report (acceptance protocol) that shall be provided by the Contractor to the End-User.

7. Installation and Training

- 7.1 The Contractor shall install and commission the radiation monitoring stations, server and communication channels for the transfer of the radiation monitoring stations at the End-User's site.
- 7.2 The Contractor shall provide one day of on-site training for the End-User's staff in the operation and maintenance of the System at the End-User's location in English language.

8. Deliverable Data Items

- 8.1 The Contractor shall submit to the End-User the technical drawings, a complete set of operation manuals including maintenance standard operating procedures and basic troubleshooting section in the English language.

9. Maintenance Services

- 9.1 At the request of the IAEA and the End-User, the Contractor shall be able to provide maintenance services, commencing after successful Operational Acceptance Test pursuant to Chapter 6.2 (Operational Acceptance Test). Such maintenance services shall include, at a minimum, the following:
 - 9.1.1 Priority technical support which includes priority access by email or phone to Contractor's technical support centre;
 - 9.1.2 Remote technical support available 365 days per year to receive service requests;
 - 9.1.3 Preventive maintenance consisting of regular System maintenance tasks by Contractor's certified personnel; and
 - 9.1.4 Contractor's personnel shall start their travel to address on-site visits for unforeseen maintenance or repair within 10 business days of the request being made by the End-User.

10. Required Delivery Timeline

The Contractor shall ensure that the System is made available for delivery in accordance with this Specification within 6 months after the Contractor has received export authorization for the System by their government, or after acceptance of the Purchase Order, whichever is most applicable to the situation.