

**Terms of Reference (ToR)**  
**of**  
**the Consultant (Firm) to conduct the Feasibility Study**  
**for the project**  
**‘Urgent Upgradation of Cox’s Bazar, Khepupara and Moulvibazar**  
**Meteorological Radars’**

**1 Background**

There are five meteorological radar systems in Bangladesh established under the grant aid of Japan to monitor meteorological phenomena occurring around the country and along the borders shared with neighbouring countries. BMD prepares weather forecasts/warnings based on the data from surface weather observation and upper air observation as well as data from these five meteorological radar systems. In order to predict possible disaster risks and adopt the appropriate countermeasures, the timely provision of highly accurate meteorological forecasts/warnings to the public is fundamental. The meteorological radar observation network plays an important role for the realization of this goal.

Major Roles of the Five Meteorological Radar Systems in Bangladesh		
Sl.	Name of Site	Role
1	Khepupara	Surveillance of tropical cyclones approaching from the Bay of Bengal
2	Cox’s Bazar	Surveillance of tropical cyclones approaching from the Bay of Bengal
3	Moulvibazar	Surveillance of precipitation in the Meghalaya Mountains which has the potential to bring about flashfloods or floods
4	Rangpur	Surveillance of storms called “Nor’wester” approaching from the northwest and producing precipitation in the Meghalaya Mountains as well as the foothills of the Himalayan Mountains
5	Dhaka	Wider range observation of the country, Disaster prevention in the Dhaka Capital Territory, Aviation Security in the international airport

Despite these important roles, the existing Cox’s Bazar, Khepupara and Moulvibazar meteorological radar systems are dysfunctional or non-operational due to their age. In addition, the procurement of spare parts for these radars from the manufacturer has also become difficult. The meteorological radar systems are still not operational even after the maintenance, repair and overhaul done by the BMD engineers and technicians.

**2 Objective of the Assignment**

The objective of the assignment is to conduct the feasibility study and collect the data and information to form the project to upgrade the meteorological radar systems and renovate the radar tower building with optimal cost so that the BMD can contribute to the safety and security of the people in Bangladesh by providing timely and accurate weather forecast and alert based on precipitation and wind observations by the meteorological radar network consisting of the five meteorological radars including the upgraded three radars and monitoring of hazardous meteorological events.

Bangladesh occupies a unique geographic location, spanning a relatively short stretch of land between the mighty Himalayan mountain chain and the Bay of Bengal. Because of this peculiar geographical

situation, Bangladesh is one of the major atmospheric disaster-prone areas of the world. It is frequently hit by tropical cyclones, storm surge, heavy rain, floods, droughts, thunderstorms, nor'westers, tornadoes, etc. and has experienced enormous loss of lives and property. Security and safety of life and property in the country is undoubtedly the most important contribution to be made by meteorological services, and provision of more accurate weather forecasts and warnings is in high demand to meet a wide range of requirements to alleviate the impact of natural disasters. Re-strengthening of the radar observation network by this Project will empower the BMD with high resolution rainfall and wind data composite of 5 radar observations to provide accurate weather forecasts and warnings for the people in the country.

### 3 Scope of Services

The work of the Consultant consists of:

- a. Conduct the field survey and summarise the result in the feasibility study report.
- b. Assess BMD's existing human, financial and infrastructure resources and its capacity to operate and maintain the upgraded meteorological radars and include the recommendations in the feasibility study report as needed.
- c. Prepare the technical specification, design documents, clarification of BMD's responsibilities, project cost estimation, and other required data and information for tendering.
- d. Timely communicate with the BMD on the progress and any risks during the assignment, and support BMD to report the progress and status to other stakeholders.

The feasibility study should include the following study items:

- Upgrade/replacement of the radar equipment to modern equipment aiming for lower running cost and higher durability.
- Modification and renovation of the radar tower buildings to accommodate the new radar equipment.
- Integration of the new radar equipment to the existing radar display systems for image composition.
- Identification of the required training for smooth operation and maintenance of the new meteorological radars.

The locations of the feasibility study are BMD Cox's Bazar, Khepupara and Moulvibazar Radar Stations according to the table below.

Meteorological Radar Observation Station	Information	
Cox's Bazar Meteorological Radar	Latitude and Longitude	N 21° 26' 03" E 91° 58' 35"
	Frequency (MHz)	2,850Mhz
Khepupara Meteorological Radar	Latitude and Longitude	N 21° 59' 21" E 90° 13' 07"
	Frequency (MHz)	2,850MHz
Moulvibazar Meteorological Radar	Latitude and Longitude	N 24° 29' 08.2" E 91° 46' 30.3"
	Frequency (MHz)	2,770MHz

## 4 Transfer of Knowledge

The knowledge to be transferred shall be identified during the assessment of BMD staff members in the feasibility study and the plan of transfer of knowledge shall be included in the feasibility study report.

## 5 Period of Assignment

The feasibility study shall be carried out within a period of 06 (six) months from the signing of the contract with the consultant i.e. from the date of commencement.

## 6 Deliverables

The list of deliverables and the submission schedule are as follows:

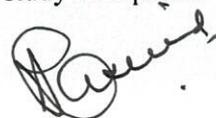
Sl.	Reports / Deliverables	Deadline
D-1	Inception Report including methodology: 10 copies	Within one month after signing the contract
D-2	Architectural, Electrical, Plumbing and Ventilation/AC Drawings for modification/renovation (Cox's Bazar, Khepupara and Moulvibazar): 10 copies	Within 04 months after signing the contract
D-3	Estimated Structural Calculation Sheets for building strength confirmation of the existing radar tower buildings including concrete piles (Cox's Bazar, Khepupara and Moulvibazar) after replacement of all the radar equipment and building modification/renovation: 10 copies	Within 04 months after signing the contract
D-4	Draft Technical Specifications, Draft Estimate, Draft Drawing/ Equipment Drawings and Draft Training Pan & Module: 10 copies	Within 04 months after signing the contract
D-5	Final Technical Specifications, Final Estimate, Final Drawing/ Equipment Drawings and Final Training Pan & Module: 10 copies	Within 05 months after signing the contract
D-6	Draft Development Project Proposal (DPP): 10 copies Complete Feasibility study report including Project Implementation Schedule and all above deliverables: 10 copies	Within 06 months after signing the contract

The deliverables shall be submitted to the focal point of the BMD for endorsement by email. After endorsement, hard and soft copies (along with CD/DVD) of all the reports, documents, drawings, time plans, presentations, data, files, etc. must be handed over to the BMD. The deliverables indicated in the above table will be copyright property of the BMD. No part of this report may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the BMD.

The Project Director, the BMD, Dhaka will be representing the BMD and will receive all the deliverables mentioned above. The office of the Project Director will communicate with other line departments, and all concerned for consultation, sharing of ideas and to discuss the findings as well as to resolve disputes.

## 7 Facilities and Support provided by the Client

The Consultant shall work under the direct supervision of the Project Director/ Director, BMD, Dhaka. BMD will provide the following facilities and support for the feasibility study if required.



- Assistance by the relevant engineers of BMD, particularly with regard to the study at the BMD Cox's Bazar, Khepupara and Moulvibazar meteorological radars.
- Workspace in BMD for the Consultant team to work on the data and information analysis and report writing.
- BMD's data and information necessary to complete the feasibility study.

## 8 Qualifications and Experiences

### 8.1 General Requirement of Consultant

The Consultant will have at least 10 years of working experience in the field of weather and climate in developing countries. Experiences in Bangladesh is desirable.

The Consultant will have experience with the survey, design, cost estimation and implementation supervision and training in 5 or more meteorological radar projects.

The Consultant in the form of a Joint Venture (JV) will be allowed with submitting the Letter of Intent signed by all partners of JV. In case of JV, leading partner and/or any other partner of the JV must meet the above requirements jointly/separately to qualify for the assignment.

### 8.2 Indicative Team Composition

It is estimated that to carry out the study, the Consultant may require 26 man-months comprising a team of 2 international professionals and 6 national professionals. The composition of the team and their estimated man-months are given below.

#### Key Expert for the Feasibility Study:

Sl.	Position	Nos.	Man-month directly involved in the FS
1	Team Leader (International)	1	4
2	Meteorological Radar and ICT Engineer (International)	1	3
3	Senior Architect	1	3
4	Senior Civil/ Structural Engineer	1	3
5	Financial Analyst/ Cost Estimator	1	3
	<b>Total</b>	<b>5</b>	<b>16</b>

#### Non-Key Expert for the Feasibility Study:

Sl.	Position	Nos.	Man-month directly involved in the FS
1	Senior Team Coordinator	1	5
2	Auto Cad Expert	1	2
3	Computer Operator	1	3
	<b>Total</b>	<b>3</b>	<b>10</b>

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## Qualifications and Experiences of the Experts

Sl.	Experts	Experiences and Qualifications
1	Team Leader (International)	<p>General Experience: More than 15 years of job experience</p> <p>Specific Experience: As a consultant in total management on study, survey, planning, design, cost estimate, supervision and training of international projects including meteorological radar projects for improving meteorological observation &amp; forecasting capability in 15 projects or more. 15 years of experience in managing the development/improvement of meteorological services capability in an international context.</p> <p>Educational Qualification: Master's degree or higher degree in the relevant field Doctor's degree (PhD) in the relevant field</p>
2	Meteorological Radar and ICT Engineer (International)	<p>General Experience: More than 10 years of job experience</p> <p>Specific Experience: 5 years of experience in planning, procurement, integration, supervision and training of meteorological radar projects as a consultant. 10 years of experience in designing, developing and integrating computer systems and IP and telecommunication networks including meteorological observation and/or forecasting and/or application systems. Profound understanding of radar observation data and products are essential. Skills and experiences to convert radar observation data into another format are essential.</p> <p>Educational Qualification: Master's degree or higher degree in Meteorology/ Physics/ Computer Science/ or relevant field.</p>
3	Senior Architect	<p>General Experience: More than 10 years of job experience.</p> <p>Specific Experience: 10 years of experience as a consultant in planning, design and supervision of construction of high-rise tower buildings.</p> <p>Educational Qualification: Bachelor or higher degree in Architecture or Structural engineering. Preferably a licensed Architect / Civil / Structural Engineer.</p>
4	Senior Civil/ Structural Engineer	<p>General Experience: More than 10 years of job experience.</p> <p>Specific Experience: years of experience as a consultant in planning, design and supervision of construction of high-rise tower buildings.</p> <p>Educational Qualification: Bachelor or higher degree in Civil or Structural engineering. Preferably a licensed Architect / Civil / Structural Engineer.</p>

Sl.	Experts	Experiences and Qualifications
5	Financial Analyst/ Cost Estimator	General Experience: More than 08 years of job experience. Specific Experience: 06 years of work experience in preparation of cost estimates of construction works / high-rise tower buildings. Educational Qualification: Diploma in Civil Engineering.
6	Auto CAD Expert	General Experience: More than 08 years of job experience. Specific Experience: 06 years of work experience in preparation of necessary design and drawing for construction works / high-rise tower buildings. Educational Qualification: Diploma in Architecture / Civil Engineering.
7	Computer Operator	General Experience: More than 05 years of job experience. Specific Experience: 03 years of computer operating experience. Educational Qualification: HSC / Diploma in any subject.
8	Team Coordinator	General Experience: More than 12 years of job experience. Specific Experience: Above 5 years of experience as consultant in technical coordinator position in projects funded by development partner. Educational Qualification: Master's Degree in any subject. PhD / Certification in Project Management Professional (PMP) / Master's in Business Administration will be preferable.

## 9 Payment Terms

Payments will be made in accordance with the following schedule:

1. 1<sup>st</sup> Payment: 10% (Ten Percent) after submission of the deliverable D-1 as specified in Deliverables Section within one month after signing the contract;
2. 2<sup>nd</sup> Payment: 30% (Thirty Percent) after submission of the deliverables D-2 and D-3 as specified in Deliverables Section within four months after signing the contract;
3. 3<sup>rd</sup> Payment: 40% (Forty Percent) after submission of the deliverables D-4 and D-5 as specified in Deliverables Section within five months after signing the contract;
4. 4<sup>th</sup> Payment: 20% (Twenty Percent) after submission of the deliverable D-6 as specified in Deliverables Section within six months after signing the contract;

