

資 料

資料 1. 調査団員・氏名

<第一次現地調査>

| 氏名 | 担当 | 所属・役職 |
|--------|-----------------------------|---|
| 富田 洋行 | 総括 | (独) 国際協力機構 JICA バングラデシュ事務所 次長 |
| 勝間田 幸太 | 計画管理 | (独) 国際協力機構 JICA 地球環境部 水資源・防災グループ 防災第一課 |
| 内田 善久 | 業務主任/気象レーダー計画/運営・維持 管理計画 | (一財) 日本気象協会 |
| 猪又 裕之 | レーダー施設建築設計 | (株) 国際気象コンサルタント |
| 遠藤 肇秀 | 通信機器計画 | (株) 国際気象コンサルタント |
| 岩田 総司 | 調達計画/積算/施工計画 | (一財) 日本気象協会 |
| 矢切 義行 | 副業務主任/自然条件調査 | (株) 国際気象コンサルタント |

<第二次現地調査>

| 氏名 | 担当 | 所属・役職 |
|-------|-----------------------------|---|
| 富田 洋行 | 総括 | (独) 国際協力機構 JICA バングラデシュ事務所 次長 |
| 松元 秀亮 | 計画管理 | (独) 国際協力機構 JICA 地球環境部 水資源・防災グループ 防災第一課 |
| 内田 善久 | 業務主任/気象レーダー計画/運営・維持 管理計画 | (一財) 日本気象協会 |
| 猪又 裕之 | レーダー施設建築設計 | (株) 国際気象コンサルタント |
| 矢切 義行 | 副業務主任/自然条件調査 | (株) 国際気象コンサルタント |

資料 2. 調査行程

(1) 第一次現地調査

| 調査日程 | 官団員 | | | コンサルタント団員 | | | |
|-------|----------------------------|---------------------------------------|-------------------------|--|--|--|--|
| | 富田 洋行 | 勝間田 幸太 | 内田 善久 | 猪又 裕之 | 遠藤 肇秀 | 岩田 総司 | 矢切 義行 |
| 2014年 | 総括 JICAバングラデシュ事務所 次長 | 計画管理 JICA地球環境部 水資源・防災グループ 防災第一課 | 業務主任/気象レーダー計画/運営・維持管理計画 | レーダー施設建設設計 | 通信機器計画 | 調査計画/積算/施工計画 | 副業務主任/自然条件調査 |
| 1 | 3月24日 | 月 | | | 東京→バンコク | | 東京→バンコク |
| 2 | 3月25日 | 火 | | | バンコク→ダッカ JICAバングラデシュ事務所と協議 | | バンコク→ダッカ JICAバングラデシュ事務所と協議 |
| 3 | 3月26日 | 水 | | | BMDとの協議 | | BMDとの協議 |
| 4 | 3月27日 | 木 | | | 自然条件調査見取り依頼のため現地業者と協議、資料収集、建築材料単価調査 | | 自然条件調査見取り依頼のため現地業者と協議、資料収集、建築材料単価調査 |
| 5 | 3月28日 | 金 | | | ラングプール気象レーダー観測所でのサイト調査 | | ラングプール気象レーダー観測所でのサイト調査 |
| 6 | 3月29日 | 土 | | | ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査 | | ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査 |
| 7 | 3月30日 | 日 | | | 既設ダッカ気象レーダー観測所（IDB）でのサイト調査 | | 既設ダッカ気象レーダー観測所（IDB）でのサイト調査 |
| 8 | 3月31日 | 月 | | | BMD暴風雨警報センター（SWC）でのサイト調査 | | BMD暴風雨警報センター（SWC）でのサイト調査 |
| 9 | 4月1日 | 火 | | 東京→バンコク | ハズラット・シャージャラル国際空港（ダッカ）BMD気象ブリーフィング室でのサイト調査 | 東京→バンコク | BMD暴風雨警報センター（SWC）でのサイト調査 |
| 10 | 4月2日 | 水 | | バンコク→ダッカ BMDとの協議、既設ダッカ気象レーダー観測所（IDB）でのサイト調査、JICAバングラデシュ事務所と協議 | BMD暴風雨警報センター（SWC）でのサイト調査、JICAバングラデシュ事務所と協議 | BMDとの協議、既設ダッカ気象レーダー観測所（IDB）でのサイト調査、JICAバングラデシュ事務所と協議 | BMDとの協議、JICAバングラデシュ事務所と協議 |
| 11 | 4月3日 | 木 | | | BMD暴風雨警報センター（SWC）、ハズラット・シャージャラル国際空港（ダッカ）BMD気象ブリーフィング室でのサイト調査 | | |
| 12 | 4月4日 | 金 | | | 資料収集、内部打合せ | | |
| 13 | 4月5日 | 土 | | | 自然条件調査のため現地業者と協議 | 建築材料単価調査 | 自然条件調査のため現地業者と協議 |
| 14 | 4月6日 | 日 | | 東京→シンガポール→ダッカ | BMDとの協議 | | 資料収集、自然条件調査フォローアップ |
| 15 | 4月7日 | 月 | | ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査、JICAバングラデシュ事務所と協議、内部打合せ | BMDとの協議 | 建築材料単価調査、資料収集 | JICAバングラデシュ事務所と協議、内部打合せ |
| 16 | 4月8日 | 火 | | BMDとの協議 | BMDとの協議 | 通信管理委員会（BTRC）との協議 | BMDとの協議 |
| 17 | 4月9日 | 水 | | BMDとの協議、既設ダッカ気象レーダー観測所（IDB）でのサイト調査 | BMDとの協議、既設ダッカ気象レーダー観測所（IDB）でのサイト調査 | バングラデシュ通信会社（BTCL）との協議 | BMDとの協議 |
| 18 | 4月10日 | 木 | | ミニッツの最終版作成、JICAバングラデシュ事務所へ報告 | ミニッツの最終版作成、JICAバングラデシュ事務所へ報告 | BMDとの協議、バングラデシュ通信会社（BTCL）と協議 | ミニッツの最終版作成、JICAバングラデシュ事務所へ報告 |
| 19 | 4月11日 | 金 | | シンガポール→東京 | ラングプール気象レーダー観測所でのサイト調査 | | BMD暴風雨警報センター（SWC）において資料収集 |
| 20 | 4月12日 | 土 | | | ラングプール気象レーダー観測所、ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査 | | ラングプール気象レーダー観測所、ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査 |
| 21 | 4月13日 | 日 | | | BMDとの協議 | 建築材料単価調査、資料収集 | BMDとの協議 |
| 22 | 4月14日 | 月 | | | 通信管理委員会（BTRC）との協議 | 資料収集、BMDとの協議 | 通信管理委員会（BTRC）との協議 |
| 23 | 4月15日 | 火 | | | BMDとの協議 | ダッカーバンコク | BMDとの協議 |
| 24 | 4月16日 | 水 | | | BMDとの協議 | バンコク→東京 | BMDとの協議 |
| 25 | 4月17日 | 木 | | | BMDとの協議 | | ダッカーバンコク |
| 26 | 4月18日 | 金 | | | ジョイデブール（ダッカ気象レーダー観測所）でのサイト調査 | | バンコク→東京 |
| 27 | 4月19日 | 土 | | | 資料収集、内部打合せ | | |
| 28 | 4月20日 | 日 | | | BMDとの協議、国防省（MOD）表敬 | | |
| 29 | 4月21日 | 月 | | | BMDとの協議 | | |
| 30 | 4月22日 | 火 | | | BMDとの協議、JICAバングラデシュ事務所への報告 | | |
| 31 | 4月23日 | 水 | | | ダッカーバンコク | | |
| 32 | 4月24日 | 木 | | | バンコク→東京 | | |

資料2-1

資料 2. 調査行程

(2) 第二次現地調査

| 調査日程 | | | 官団員 | | コンサルタント団員 | | |
|------|-------|---|--|--|--|------------|----------------------------|
| | | | 富田 洋行 | 松元 秀亮 | 内田 善久 | 猪又 裕之 | 矢切 義行 |
| | | | 総括 JICA Bangladesh 事務所 次長 | 計画管理 JICA 地球環境部 防災第一課 | 業務主任/気象レーダー計画/運 営・維持管理計画 | レーダー施設建築設計 | 副業務主任/自然条件調査 |
| 1 | 9月8日 | 月 | | | 東京→バンコク | | |
| 2 | 9月9日 | 火 | | | バンコク→ダッカ BMDとの協議、JICA Bangladesh 事務所との協議 | | |
| 3 | 9月10日 | 水 | | | BMDとの協議、準備調査報告書(案)説明 | | |
| 4 | 9月11日 | 木 | | 東京→シンガポール→ダッカ | BMDとの協議、準備調査報告書(案)説明 | | |
| 5 | 9月12日 | 金 | | ラングブール気象レーダー観測所でのサイト調査、ラングブール市役所との協議、電源開発局(ラングブール)との協議 | ラングブール気象レーダー観測所でのサイト調査、ラングブール市役所との協議、電源開発局(ラングブール)との協議 | | 東京→バンコク |
| 6 | 9月13日 | 土 | | ジョイデプール(ダッカ気象レーダー観測所)でのサイト調査、ガジブール市役所との協議 | ジョイデプール(ダッカ気象レーダー観測所)でのサイト調査、ガジブール市役所との協議 | | バンコク→ダッカ |
| 7 | 9月14日 | 日 | BMDとのミニッツの協議、準備調査報告書(案)説明、BMDとのミニッツの最終版作成、電源開発局(ダッカ本局)との協議 | | BMDとのミニッツの協議、準備調査報告書(案)説明、BMDとのミニッツの最終版作成、電源開発局(ダッカ本局)との協議 | | BMD 暴風雨警報センター(SWC)において資料収集 |
| 8 | 9月15日 | 月 | BMDとの協議、国防省との協議、首都開発局との協議 | | BMDとの協議、国防省との協議、首都開発局との協議 | | BMD 暴風雨警報センター(SWC)において資料収集 |
| 9 | 9月16日 | 火 | BMDとの協議、地方政府庁との協議 | | BMDとの協議、地方政府庁との協議 | | BMD 暴風雨警報センター(SWC)において資料収集 |
| 10 | 9月17日 | 水 | BMDとの協議、日本大使館及びJICA Bangladesh 事務所への報告 ダッカ→シンガポール | | BMDとの協議、日本大使館及びJICA Bangladesh 事務所への報告、資料収集、BMDとの協議 | | BMD 暴風雨警報センター(SWC)において資料収集 |
| 11 | 9月18日 | 木 | | シンガポール→東京 | ダッカ→バンコク | | 資料収集、BMDとの協議 |
| 12 | 9月19日 | 金 | | | バンコク→東京 | | 資料収集 |
| 13 | 9月20日 | 土 | | | | | 資料収集 |
| 14 | 9月21日 | 日 | | | | | 資料収集、BMDとの協議 |
| 15 | 9月22日 | 月 | | | ダッカ→バンコク | | |
| 16 | 9月23日 | 火 | | | | | バンコク→東京 |

資料 3. 関係者(面会者)リスト

- 国防省 (Ministry of Defense: MOD)

| | |
|-------------------------|------------------------|
| Mr. Kazi Habibul Awal | Secretary |
| Mr. Md. Moazzem Hossain | Joint Secretary |
| Mr. Md. Shamimuzzaman | Senior Assistant Chief |

- 地方政府庁 (Local Government Division, Ministry of Local Government, Rural Development & Cooperation)

| | |
|-----------------------|----------------------|
| Mr. Ashoke Madhab Roy | Additional Secretary |
|-----------------------|----------------------|

- バングラデシュ気象局 (Bangladesh Meteorological Department: BMD)

ダッカ本局 (Dhaka Head Office)

| | |
|---------------------------------|---|
| Mr. Md. Shah Alam | Director |
| Mr. Shamsuddin Ahamed | Deputy Director (Storm Warning Centre) |
| Mr. Md. Muzammel Haque Tarafder | Deputy Director (Engineering) |
| Mr. Ahmed Arif Rashid | Senior Mechanical Engineer (Planning Division) |
| Mr. Md. Abdul Matin | Senior Communication Engineer (Storm Warning Centre) |
| Ms. Ayesha Khatun | Assistant Director (Storm Warning Centre) |
| Mr. S.M. Mahmudul Huq | Meteorologist (Storm Warning Centre) |
| Mr. Md. Shadekul Alam | Meteorologist (Storm Warning Centre) |
| Mr. S.M. Quamrul Hassan | Meteorologist (Storm Warning Centre) |
| Mr. Md. Rashaduzzaman | Meteorologist (Storm Warning Centre) |
| Mr. Md. Abdur Rahman Khan | Meteorologist (Storm Warning Centre) |
| Mr. Md. Bazlur Rashid | Meteorologist (Storm Warning Centre) |
| Mr. Md. Abul Kalam Mallik | Meteorologist (Storm Warning Centre) |
| Ms. Taslima Imam | Meteorologist (International Meteorological Division) |
| Ms. Nawma Batem | Meteorologist (Climate Division) |
| Mr. Md. Akram Hossain | Meteorological Assistant (Climate Division) |
| Mr. Debashish Chakraborty | Senior Observer (Climate Division) |

ダッカ気象レーダー観測所 (Dhaka Meteorological Radar Observation Station)

| | |
|----------------------|-------------------------------|
| Mr. Md. Abdul Hannan | Assistant Electronic Engineer |
| Mr. Md. Jasim Uddin | Electronic Assistant |

ラングプール気象レーダー観測所 (Rangpur Meteorological Radar Observation Station)

| | |
|-----------------------|---------------|
| Mr. Md. Atikur Rahman | Meteorologist |
|-----------------------|---------------|

| | |
|-------------------------|----------------------|
| Mr. Mohammed Ali | Electronic Assistant |
| Mr. Abdus Subhan | Electronic Assistant |
| Mr. Nurunnabi Paiker | Electronic Assistant |
| Mr. Nur Mohammed | Electronic Assistant |
| Mr. Md. Mozaharul Islam | Mechanic-II |
| Mr. Md. Mahaful Islam | Mechanic-II |

ジョイデプール農業気象観測所 (Joydevpur Agro-Meteorological Observatory)

| | |
|---------------------|-----------|
| Mr. Md. Jalal Uddin | Assistant |
|---------------------|-----------|

ハズラット・シャージャラル国際空港 (ダッカ) BMD 気象ブリーフィング室

(BMD Meteorological Briefing Room in Hazrat Shah Jalal International Airport (Dhaka))

| | |
|----------------------|--------------------|
| Mr. Md. Abdur Rahman | Assistant Director |
| Mr. Md. Nurul Karim | Meteorologist |

● **バングラデシュ通信会社 (Bangladesh Telecommunications Company Limited: BTCL)**

| | |
|-----------------------------------|---|
| Mr. Md. Shafique Hossain Siddique | Divisional Engineer (Telex & Technical) |
| Mr. Abu Zafar Md. Ahasanul Hoque | Assistant Divisional Engineer (ITMC) |

● **バングラデシュ通信管理委員会 (Bangladesh Telecommunication Regulatory Commission: BTRC)**

| | |
|------------------------|----------------------|
| Mr. M.A. Taleb Hossain | Director (Licensing) |
|------------------------|----------------------|

● **ガジプール市役所 (Gazipur City Corporation)**

| | |
|-----------------------------|---|
| Mr. Md. Akbar Hossain | Superintending Engineer (Acting Chief Engineer) |
| Mr. Kabir Al Asad | Chief Conservancy Officer |
| Mr. A.B.M. Siddiqur Rahaman | Executive Engineer |
| Mr. Md. Abdul Matin | Executive Engineer |
| AKM Harunur Rashid | Executive Engineer |
| Mr. Md. Ashraf Hossain | Assistant Engineer |
| Mr. Md. Moinul Islam | Town Planner |

● **ラングプール市役所 (Rangpur City Corporation)**

| | |
|-------------------------|--|
| Mr. Md. Ruhul Amin Khan | Chief Executive Officer (Deputy Secretary) |
| Mr. Md. Emdad Hossain | Superintending Engineer |
| Mr. Md. Azam Ali | Executive Engineer |
| Mr. Md. Ruhul Amin Khan | Executive Officer |
| Mr. Nazrul Islam | Town Planner |

- 電源開発局（ダッカ本局）(Power Development Board (Dhaka))

Mr. K. M. Hassan

Member (Distribution)

- 電源開発局（ラングプール）(Power Development Board, Rangpur)

Mr. Z.M. Golam Mahboob

Executive Engineer, Sale and Distribution-1

- 首都開発局（Rajdhani Unnayan Kartripakkha: RAJUK, Capital City Development Authority)

Mr. Sheikh Abdul Mannan

Member (Planning), Joint Secretary

Mr. Md. Ashraful Islam

Deputy Director (Town Planning)

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR ESTABLISHMENT OF METEOROLOGICAL RADAR SYSTEM
IN
DHAKA AND RANGPUR
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH

In response to a request from the Government of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh"), the Government of Japan decided to conduct the Preparatory Survey (hereinafter referred to as "the Survey") on the Project for Establishment of Meteorological Radar Systems in Dhaka and Rangpur (hereinafter referred to as "the Project") and entrusted the Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Hiroyuki Tomita, Senior Representative of the JICA Bangladesh Office, and was scheduled to stay in the country from March 25th to April 23rd 2014.

The Team held discussions with the officials concerned of the Government of Bangladesh and conducted a field survey at the Survey areas.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

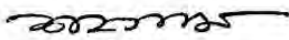
Dhaka, June 2nd, 2014



Hiroyuki Tomita
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan



Mahbubur Rahman
Deputy Secretary
Economic Relations Division
Ministry of Finance
The People's Republic of Bangladesh



Md. Shah Alam
Director
Bangladesh Meteorological Department
The People's Republic of Bangladesh



Md. Shamimuzzaman
Senior Assistant Chief
Ministry of Defence
The People's Republic of Bangladesh

ATTACHMENT

1. Objective of the Project

Both sides agreed that the objective of the Project is to improve and strengthen the capabilities of forecasting and issuance of warnings for severe meteorological phenomena by establishment of the meteorological radar system in Dhaka and Rangpur.

2. Contents of the Inception Report

The Team submitted and explained the Inception Report to the Bangladesh Meteorological Department (hereinafter referred to as "BMD"). BMD agreed and accepted the contents of the Inception Report.

3. Project Title

Both sides agreed to the Project Title as "the Project for Establishment of Meteorological Radar Systems in Dhaka and Rangpur".

4. Project Sites

Both sides confirmed that the project sites are Capital & Suburb Territory Radar Observation Station in Joydevpur (hereinafter referred to as "Joydevpur"), BMD Rangpur Observatory (hereinafter referred to as "Rangpur"), Storm Warning Centre of BMD Head Office in Dhaka (hereinafter referred to as "SWC") and Dhaka International Airport. The locations of the sites are shown in Annex 1.

5. Items requested by BMD

Through discussions between the Team and BMD, the requested components were confirmed as shown in Annex 2.

6. Responsible and Implementing Agency

The responsible and implementing agencies for the Project are as follows.

Responsible Agency: Ministry of Defence (MoD)

Implementing Agency: Bangladesh Meteorological Department (BMD)

The Organization Chart is shown in Annex 3.

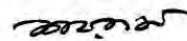
Both sides agreed that BMD will assign "Project Director" who has ample experience with the Japan's Grant Aid Project and the Technical Cooperation Project between JICA and BMD for smooth implementation of the Project until completion of the Project.

7. Japan's Grant Aid Scheme

7-1 The Bangladesh side understood the Japan's Grant Aid Scheme explained by the Team, as described in Annex 4. The Bangladesh side also understood the procedures of the Japan's



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Grant Aid from the application of a request to follow-up of the Project as illustrated in Annex 5.

7-2 The Bangladesh side will take the necessary measures, as described in Annex 6, for smooth implementation of the Project, as the condition for the Japan's Grant Aid to be implemented.

8. Schedule of the Survey

8-1 The Team will proceed for further surveys in Bangladesh until the end of April 2014.

8-2 Based on the Survey, the Team will conduct analysis in Japan such as designing, cost estimation, etc. until the end of August 2014.

8-3 Based on a result of the Survey, the Team will prepare the draft preparatory survey report in English and dispatch a mission in order to explain its contents to the Bangladesh side in September 2014.

8-4 Based on a result of the Survey, the Team will finalize the report and send it to the Bangladesh side around January 2015.

9. Undertakings to be taken by the Bangladesh side

Both sides confirmed that the Bangladesh side shall complete the following undertakings shown in accordance with the implementation schedule of the Project;

- (1) To provide the Team with available relevant data, information and materials necessary for the execution of the Survey;
- (2) To provide furnished rooms with computers, photocopies and internet facilities for the Team;
- (3) To prepare the answers for the Questionnaire presented by the Team;
- (4) To assign full-time counterparts to the Team during their stay in Bangladesh, to play the following roles as the coordinator to the Team;
 - To make the appointments, set up the meetings with the authorities, departments and all other organizations whatever the Team intends to visit.
 - To attend all the site surveys and any other visiting place with the Team and to make any convenience on accommodation, working room, adequate transportation, getting the permissions if required, etc.
 - To assist and to advise the Team for their collection of data and information as much as possible.
- (5) To take any measures deemed necessary to secure the safety of the members of the Team;
- (6) To ensure necessary budget for the estimated cost as follows for smooth implementation of the Project.
 - To handle duty (Tax) exemption procedures (payment of Custom Duty Value Added Tax: CDVAT), provide requisite legal and/or administrative documentations for customs clearance to customs broker/forwarder to be employed by the Contractor and make payment of all demurrage and internal transportation (if required) required at the port of disembarkation for the materials and equipment imported for the Project.

- To exempt goods of Japanese and other foreign nationals from internal taxes (VAT) and other fiscal levies which may be imposed by the Government of Bangladesh with respect to their supply (products) and services under the signed contracts.
 - To obtain necessary permissions from the relevant agencies for the construction of the Radar Tower Buildings in the Joydevpur and Rangpur Radar Observation Stations.
 - To provide the commercial power (400V, 3-phase, 4-wire, 50Hz) supply (capacity: 100kVA) along with electric poles/wires, etc. from the main supply line to the proposed site for the Joydevpur and Rangpur Radar Tower Buildings before installation of equipment.
 - To install the required step-down transformer as well as service entrance connections for the commercial power supply at Joydevpur and Rangpur Radar Tower Buildings before installation of equipment.
 - To obtain the required frequency for Joydevpur meteorological radar system (the existing frequency of Rangpur meteorological radar system is utilized for a new radar system) by end of December 2014.
 - To obtain the required VSAT user license from the Bangladesh Telecommunication Regulatory Commission (BTRC) for the use of satellite communication for the meteorological data satellite communication system (VSAT) to be installed by end of December 2014.
 - To establish the Internet Protocol Virtual Private Network (IP/VPN) between the BMD Storm Warning Centre (SWC) and the Joydevpur Radar Observation Station as a backup data communication link before installation of equipment.
 - To ensure transport for the counterparts and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc.
- (7) To ensure necessary staff shown in Annex 7 for Joydevpur and Rangpur Meteorological Radar Observation Stations.

10. Other relevant issues

10-1 Environmental and Social Considerations

The Bangladesh side promised to clear necessary procedures for environmental and social considerations and obtain a necessary approval by relevant authorities before commencement of the procurement in accordance with the relevant guidelines in Bangladesh, including Environmental Impact Assessment (EIA), if required.

10-2 Necessary Budget and Adequate Number of Specialized Staff for Operation and Maintenance

Necessary budget and adequate number of specialized staff for operation and maintenance of the Project after the completion of the Project will be estimated through the Survey. The Bangladesh side promised to ensure necessary budget and staff for proper operation and maintenance.

10-3 Confidentiality of the Project

The Team explained that the preparatory survey report to be prepared at the end of the Survey shall be disclosed to the public in principle in Japan. However, the Team also explained that a confidential part which might affect bidding process such as cost estimation should be kept undisclosed until the bidding has been completed.

10-4 Tax Exemption

The tax exemption including Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in Bangladesh which is to be arisen from the Project activities shall be ensured by BMD. BMD shall take procedures necessary for tax exemption at their responsibility, or keep budget to reimburse upon VAT receipts.

10-5 Approval of the Executive Committee for the National Economic Council (ECNEC)

For allocation of the required budget above, the Project Proposals (Technical Project Proposal and Development Project Proposal) for the Project to be prepared by the BMD and to submit through the Ministry of Defence so that the Project Proposals shall be approved by the Competent Authorities / ECNEC prior to the commencement of the Project.

10-6 Government Registration

After the completion of the Project, the BMD shall apply to the authorities to register all of the equipment and facilities of the project as government property for a budget (to cover operations, maintenance and salary expenses) to be included in the Government budget.

- Annex 1: Project Sites
- Annex 2: Items Requested by BMD
- Annex 3: Organization Chart of BMD
- Annex 4: JAPAN'S GRANT AID
- Annex 5: Flow Chart of JAPAN'S GRANT AID Procedure
- Annex 6: Major Undertakings to be taken by Each Government
- Annex 7: Necessary Staff for Joydevpur and Rangpur



Project Sites



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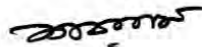
Items Requested by BMD

Table: Items requested by BMD

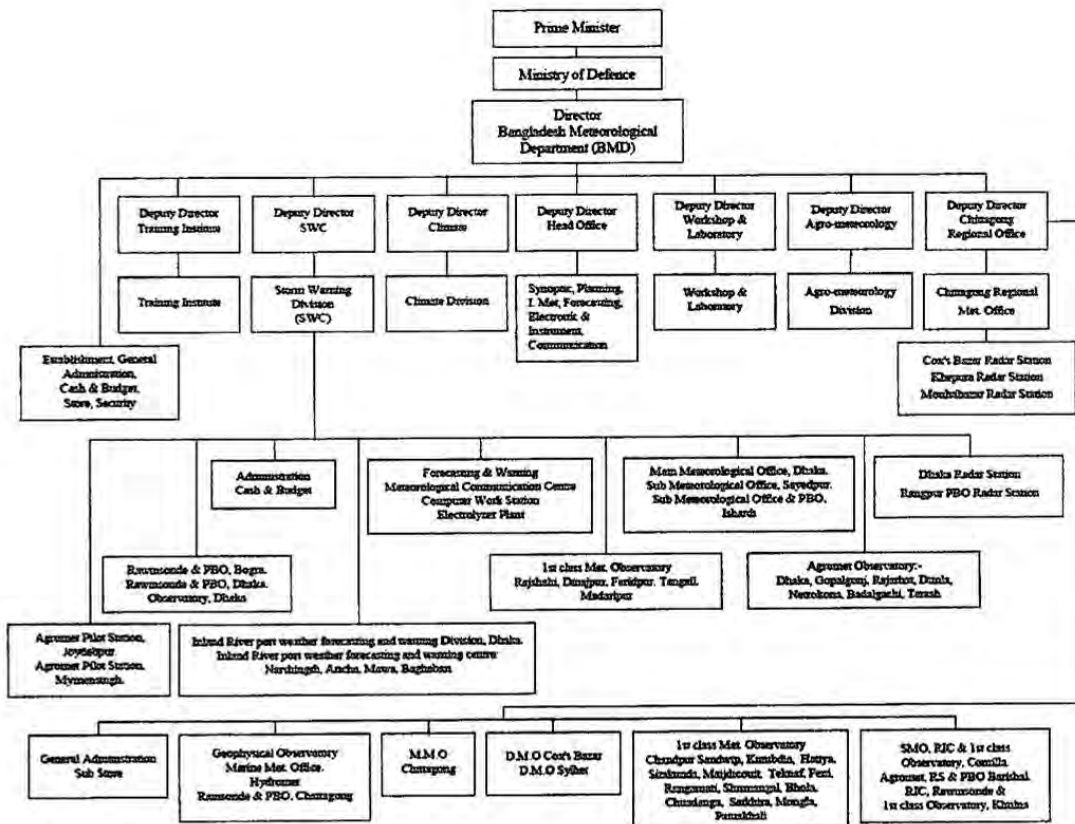
| Component / Site | SWC | Joydevpur (New Dhaka Radar Observation Station) | Rangpur | Dhaka International Airport * |
|---|-----|--|---------|-------------------------------------|
| Procurement and Installation of Equipment | | | | |
| S-Band Doppler Pulse Compression Solid State Radar System including Isolation Transformer, Power Supply Capacitor, Power Back-up System, Lightning System Measuring Equipment and Spare Parts | - | 1 | 1 | - |
| Meteorological Rader Data Display System | 2 | 1 | 1 | 1 |
| Meteorological Data Satellite Communication System (VSAT) | - | 1 | - | - |
| Modification of the existing Meteorological Data Satellite Communication System (Hub VSAT System) | 1 | - | - | - |
| Construction of Radar Tower Building | | | | |
| Radar Tower Building | - | 1 | 1 | - |

* Hazrat Shah Jalal International Airport, Dhaka






Organization Chart of BMD



- D.M.O : Dependent Meteorological Office
- SMO : Supplementary Meteorological Office
- RIC : Regional Inspection Centre
- PBO : Pilot Balloon Observatory
- RS : Regional Station

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JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as “the GOJ”) is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

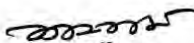
- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as “the G/A”)
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.



The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

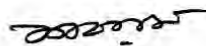
In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.



(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

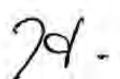
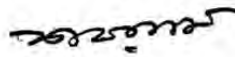
b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

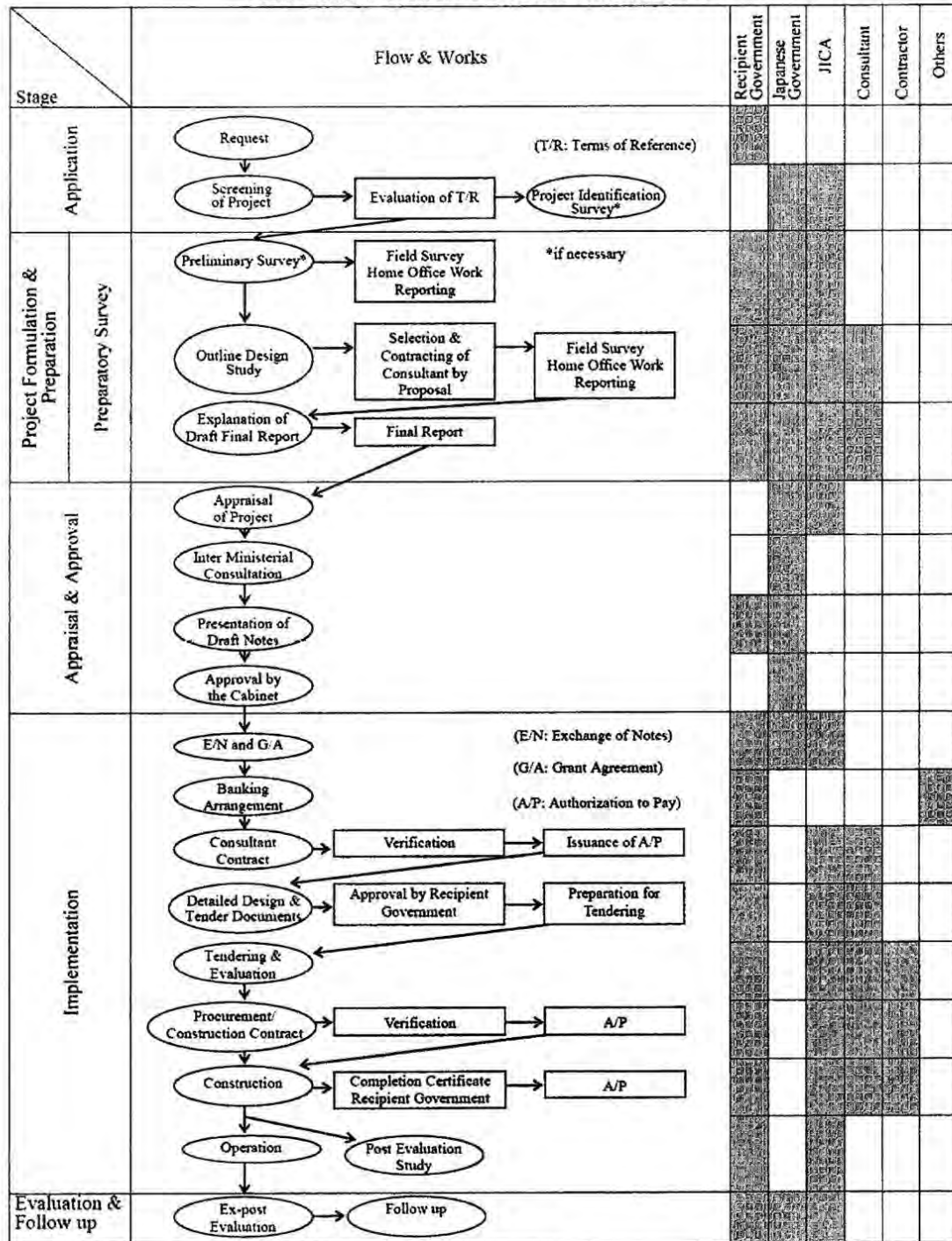
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.



Flow Chart of JAPAN'S GRANT AID Procedure



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Major Undertakings to be taken by Each Government

| No. | Items | To be covered by Grant Aid | To be covered by Recipient Side |
|-----|--|----------------------------|---------------------------------|
| 1 | To secure necessary land for the implementation of the Project and to clear the sites | | ● |
| 2 | To construct the following facilities | | |
| | i) The building | ● | |
| | ii) The gates and fences in and around the sites | | ● |
| | iii) The parking lot | ● | |
| | iv) The road within the site | ● | |
| | v) The road outside the site | | ● |
| 3 | To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the sites | | |
| | i) Electricity | | |
| | a. The distributing power line to the site | | ● |
| | b. The drop wiring and internal wiring within the site | ● | |
| | c. The main circuit breaker and transformer | ● | |
| | ii) Water Supply | | |
| | a. The city water distribution main to the site | | ● |
| | b. The supply system within the site (receiving and elevated tanks) | ● | |
| | iii) Drainage | | |
| | a. The city drainage main (for storm sewer and others to the site) | | ● |
| | b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site | ● | |
| | iv) Gas Supply | | |
| | a. The city gas main to the site | | ● |
| | b. The gas supply system within the site | ● | |
| | v) Telephone System | | |
| | a. The telephone trunk line to the main distribution frame/panel (MDF) of the building | | ● |
| | b. The MDF and the extension after the frame/panel | ● | |
| | vi) Furniture and Equipment | | |
| | a. General furniture | | ● |
| | b. Project equipment | ● | |
| 4 | To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country | | |
| | i) Marine (Air) transportation of the Products from Japan to the recipient country | ● | |
| | ii) Internal transportation from the port of disembarkation to the project site | (●) | (●)* |
| 5 | To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted | | ● |
| 6 | To accord Japanese physical persons and / or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work | | ● |
| 7 | To ensure that the Facilities and the products be maintained and used properly and effectively for the implementation of the Project | | ● |
| 8 | To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project | | ● |
| 9 | To bear the following commissions paid to the Japanese bank for banking services based upon the B/A | | |
| | i) Advising commission of A/P | | ● |
| | ii) Payment commission | | ● |
| 10 | To give due environmental and social consideration in the implementation of the Project. | | ● |

(B/A : Banking Arrangement, A/P : Authorization to pay)

* Internal transportation to the sites where Japanese nationals cannot enter due to the security situation would be covered by the Bangladesh Side.

Annex 7

Necessary Staff for Joydevpur and Rangpur

Table: Current and Required Number of Staff after the Project Completion

| Engineers/Staff | Current Man Power | Proposed Man Power | Current Man Power | Proposed Man Power |
|----------------------------------|---|---|---|--|
| | Existing Dhaka Meteorological Radar Observation Station | Dhaka (Joydepur) Meteorological Radar Observation Station | Existing Rangpur Meteorological Radar Observation Station | Rangpur Meteorological Radar Observation Station |
| Senior Electronic Engineer | 0 | 1 | 0 | 1 |
| Electronic Engineer | 0 | 1 | 0 | 1 |
| Assistant Electronic Engineer | 2 | 2 | 1 | 2 |
| Assistant Communication Engineer | 0 | 1 | 0 | 1 |
| Assistant Meteorologist | 0 | 1 | 0 | 1 |
| Electronic Assistant | 6 | 6 | 3 | 6 |
| Foreman | 0 | 1 | 0 | 1 |
| Mechanic- II | 2 | 2 | 0 | 2 |
| MLSS (Peon) | 1 | 1 | 0 | 1 |
| Guard | 4 | 5 | 4 | 5 |
| Gardener | 0 | 1 | 0 | 1 |
| Sweeper | 0 | 1 | 0 | 1 |
| Total | 15 | 23 | 8 | 23 |

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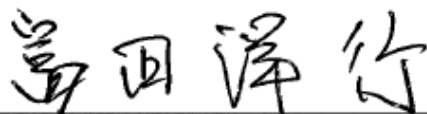
MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON THE PROJECT FOR ESTABLISHMENT OF METEOROLOGICAL RADAR
SYSTEM IN DHAKA AND RANGPUR
IN THE PEOPLE'S REPUBLIC OF BANGLADESH

In response to a request from the Government of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh"), the Government of Japan decided to conduct the Preparatory Survey (hereinafter referred to as "the Survey") on the Project for Establishment of Meteorological Radar Systems in Dhaka and Rangpur (hereinafter referred to as "the Project") and entrusted the survey to Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent the Preparatory Survey Team for the Inception Report, which is headed by Mr. Hiroyuki Tomita, Senior Representative of JICA Bangladesh Office, from March 25 to April 23, 2014. The said Preparatory Survey Team held discussions with the officials concerned of the Bangladesh and conducted a field survey at the survey area. In the course of discussions and field survey, both parties confirmed the main items and the Minutes of Discussions signed on June 2, 2014.

According to the Minutes of Discussions above, JICA conducted series of field survey and discussion among related organizations, and finally prepared the draft report of the Survey. In order to explain and consult with Bangladesh Meteorological Department (hereinafter referred to as "BMD") on the components of the draft report, JICA sent the Draft Report Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Hiroyuki Tomita, Senior Representative of JICA Bangladesh Office JICA from September 9 to 22, 2014.

As a result of the discussions, both parties confirmed the items described on the attached sheets.

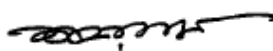
Dhaka, September 25, 2014



Hiroyuki Tomita
Leader
Preparatory Survey Team
Japan International Cooperation Agency



Monoranjan Biswas
Deputy Secretary
Economic Relations Division
Ministry of Finance
The People's Republic of Bangladesh



Md. Shah Alam
Director
Bangladesh Meteorological Department
The People's Republic of Bangladesh



Md. Shamimuzzaman
Senior Assistant Chief
Ministry of Defence
The People's Republic of Bangladesh

ATTACHMENT

1. Components of the Draft Report

BMD agreed and accepted in principle the components of the Draft Report explained by the Team. The components of the Project are shown in Annex-1. JICA will finalize the Final Report according to the comments from BMD.

2. Tentative Schedule of the Project

The Team explained and BMD agreed the tentative implementation schedule as shown in Annex-2.

3. Confidentiality of the Project

3-1 Detailed Specifications

Both sides confirmed all the information related to the Project including technical specifications and drawings and other technical information shall not be released to any other party(ies) before the signing of all the Contract(s) for the Project.

3-2 Project Cost Estimate

The Team explained the estimated project cost to be borne by the Government of Japan as attached in Annex-3

BMD agreed to allocate necessary budget in order to bear requested undertakings as shown in Annex-3 and Annex-4. The Team also explained that these cost estimations are subject to change since they are provisional and need to be examined further.

Both sides agreed that the Project Cost Estimate should never be duplicated in any form nor disclosed to any other part(ies) before the signing of all the Contract(s) for the Project. This confidentiality of the estimated project cost is necessary to ensure fairness of the tender procedure.

4. Undertakings by Bangladesh

Both sides confirmed that following necessary measures as well as measures mentioned in Annex-4 shall be undertaken by BMD for the implementation of the Project.

5. Confirmation of the issues discussed at the last mission

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5-1 Necessary permissions construction of the Radar Tower Buildings

Both sides confirmed that the Bangladesh side shall obtain necessary permissions from the relevant agencies for the construction of the Radar Tower Buildings in the Dhaka (Joydevpur) and Rangpur Radar Observation Stations before signing of the Contract.

5-2 Power supply for the Radar Tower Buildings

Both sides confirmed that the Bangladesh side shall arrange the commercial power (400V, 3-phase, 4-wire, 50Hz) supply (capacity: 100kVA) along with a step-down transformer as well as service entrance connections, electric poles/wires, a power meter, etc. required for operation of the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings from the main power grid to the Dhaka (Joydevpur) and Rangpur Radar Observation Stations before the commencement of the equipment installation work.

5-3 Frequency for the Meteorological Radar Systems

Both sides confirmed that the existing frequency of the Dhaka (Joydevpur) and Rangpur meteorological radar system will be utilized to new radar system. BMD agreed to complete all the required procedures in Bangladesh by the finalization of the tender documents.

5-4 VSAT user license

Both sides confirmed that Bangladesh side shall obtain the required satellite communication (Very Small Aperture Terminal: VSAT) system user license of the Bangladesh Telecommunication Regulatory Commission (BTRC) and space segment for the VSAT at BMD Dhaka (Joydevpur) Radar Observation Station by the commencement of the equipment installation work.

5-5 Internet Protocol Virtual Private Network (IP/VPN): Digital Data Network (DDN)

Both sides confirmed that the Bangladesh side shall establish the Digital Data Network (DDN) between BMD Storm Warning Centre (SWC) and the Dhaka (Joydevpur) Radar Observation Station as a backup data communication link by the commencement of the equipment installation work. In addition, Bangladesh side agreed to upgrade the data transmission speed of 64kbps to 128kbps for the existing DDN between the SWC at BMD Head Office and BMD Meteorological Briefing Room in the Hazrat Shah Jalal International Airport (Dhaka) by the commencement of the equipment installation work.

5-6 Staff arrangement

 2   

The Team strongly recommended upgrading the Electronic and Instrument Division and establishing the central control and overall maintenance of the radar network (5 meteorological radar observation systems) and remote weather monitoring equipment such as automatic weather observation system & rain gauge, etc. by the responsible personnel of the Electronic and Instrument Division in accordance with Annex-5.

In addition, the Team explained about the required budget and staff for operation and maintenance of the radar tower buildings and the equipment to be supplied under the Project, and the Bangladesh side agreed to ensure the required budget and staff for the Dhaka (Joydevpur) and Rangpur Meteorological Radar Observation Stations.

5-7 Environmental and Social Considerations

The Bangladesh side explained that there is no necessary procedure for environmental and social considerations to the Project.

5-8 Tax Exemption

The tax exemption including Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in Bangladesh which is to be arisen from the Project activities shall be ensured by BMD. BMD promised to take procedures necessary for tax exemption at their responsibility, or keep budget to reimburse upon VAT receipts.

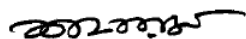
5-9 Schedule of the Project and Approval of the Executive Committee for the National Economic Council (ECNEC)

The Team explained that cabinet approval for the part of detail design will be scheduled in December 2014 and the part of construction, equipment, supervision and soft component will be scheduled in April 2015.

The Bangladesh side promised that the Project Proposals (Technical Project Proposal: TPP and Development Project Proposal: DPP) for the Project shall be prepared by BMD and submitted through the Ministry of Defence so that the Project Proposals shall be approved by the Competent Authorities/ECNEC prior to the commencement of the Project.

5-10 Government Registration

After the completion of the Project, BMD shall apply to the authorities to register all of the equipment and facilities of the project as government property for a budget (to cover operations, maintenance and salary expenses) to be included in the Government budget.

 3







6. Height Restriction of Building

The Team strongly recommended that BMD shall request RAJUK, Rangpur City Corporation and Gajipur City Corporation for considering the construction height up to 12 storied buildings within 5 km radius from the radar tower in order to ensure appropriate radar observation.

In addition, if required, BMD shall request the respective ministries through the Ministry of Defence to resolve the issues.

- Annex-1: Components of the Project
- Annex-2: Tentative Implementation Schedule
- Annex-3: Project Cost Estimation
- Annex-4: Major Undertakings to be taken by Government of Bangladesh
- Annex-5: Necessary Staff for the Electronic and Instrument Division

Related Document to the Minutes of Discussions: Draft Report of the Preparatory Survey

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Components of the Project

Table : Components of the Project

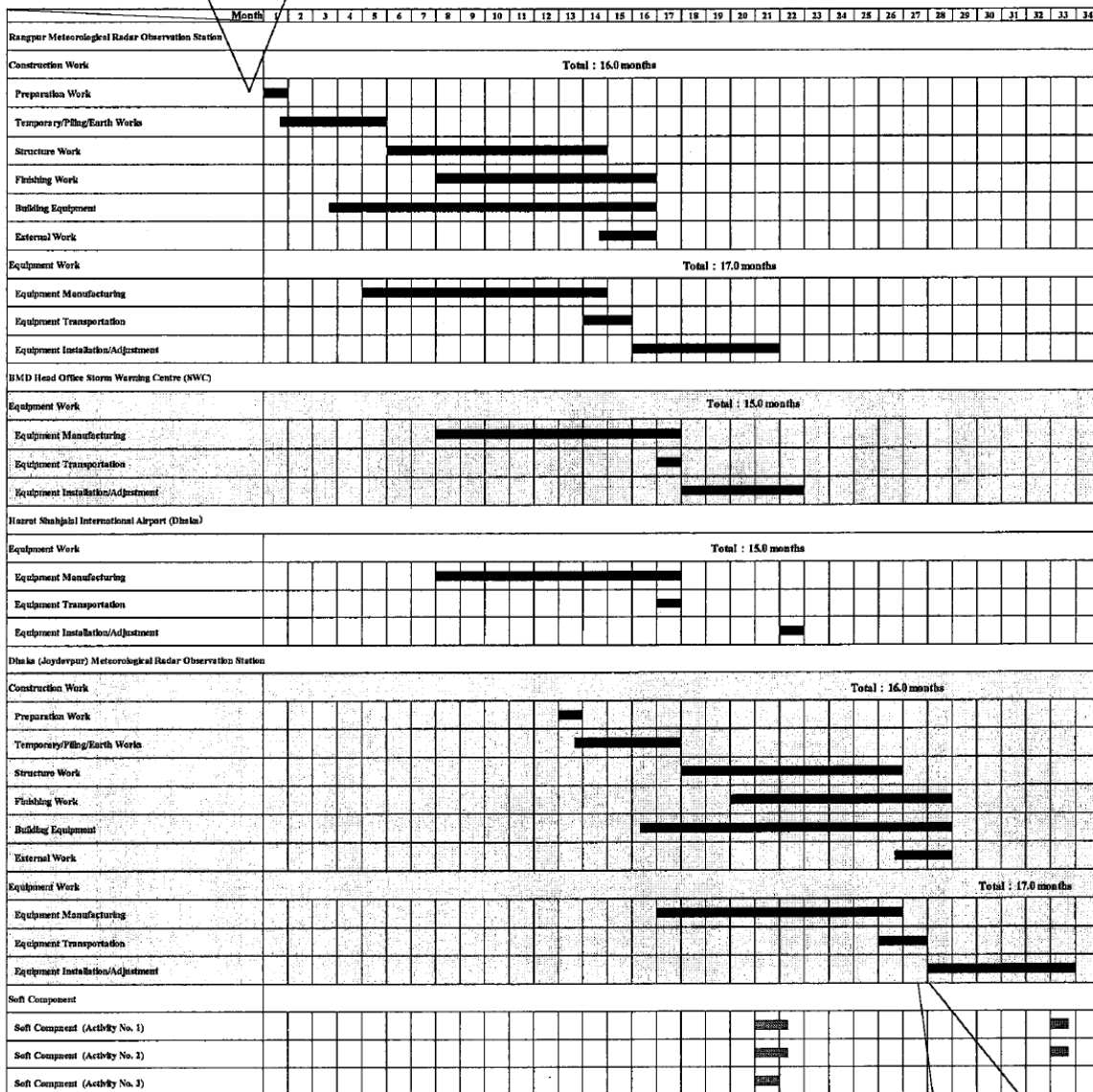
| Component | BMD Joydevpur Observatory (Dhaka Radar Observation Station) | BMD Rangpur Observatory (Rangpur Radar Observation Station) | Storm Warning Centre (SWC) at BMD Head Office | BMD Meteorological Briefing Room in Hazrat Shah Jalal International Airport (Dhaka) |
|---|---|---|---|---|
| Procurement and Installation of Equipment | | | | |
| S-Band Doppler Pulse Compression Solid State Radar System including Isolation Transformer, Power Supply Capacitor, Power Back-up System, Lightning System Measuring Equipment and Spare Parts | 1 | 1 | - | - |
| Meteorological Radar Data Display System | 1 | 1 | 1 | 1 |
| Meteorological Data Satellite Communication System (VSAT) | 1 | 1 | - | - |
| Modification of the existing Meteorological Data Satellite Communication System (Hub VSAT System) | - | - | 1 | - |
| Construction of Radar Tower Building | | | | |
| Radar Tower Building | 1 | 1 | - | - |
| Technical Training | Initial operation guidance in the contract of manufacturer | | | |
| Soft Component | | | | |



Tentative Implementation Schedule

Dead Line of Frequency for the Meteorological Radar Systems: by the finalization of the tender documents

Dead Line of Permissions Construction of the Radar Tower Buildings: before signing of the Contract



Dead Line of Power supply for the Radar Tower Buildings: before the commencement of the equipment installation work

Dead Line of VSAT user license: by the commencement of the equipment installation work

Dead Line of Establishment of the Digital Data Network (DDN): by the commencement of the equipment installation work

Annex-2 - 1

Project Cost Estimation

1. Project Cost to be borne by Japan's Grant Aid

This item is closed due to confidentiality

2. Project Cost to be borne by BMD

Total Project Cost: 455,280,000 Taka (approx. 600 Million JP Yen)

Table: Estimated Capital Cost to be borne by BMD

| No. | Items | Capital Cost (Taka) |
|-----|--|---|
| 1 | To handle duty (Tax) exemption procedures (payment of Custom Duty Value Added Tax : CDVAT), provide requisite legal and/or administrative documentations for customs clearance to customs broker/forwarder to be employed by the Contractor and make payment of all demurrage required at the port of disembarkation for the materials and equipment imported for the Project. | 247,100,000 245,600,000 (CDVAT: 30% of the equipment & transport cost) + 1,500,000 (Demurrage) |
| 2 | To exempt goods of Japanese and other foreign nationals from internal taxes (VAT) and other fiscal levies which may be imposed by the Government of Bangladesh with respect to their supply (products) and services under the signed contracts. | 96,900,000 15% of the Local Portion of the Direct & Indirect Building Construction Cost |
| 3 | To pay bank commission for the issuance of the Authorization to Pay (A/P) and amendments of A/P, if required, for the Consultant and the Contractor. | 60,400,000 3% of the Total Project Cost |
| 4 | To obtain necessary permissions from the relevant agencies for the construction of the Radar Tower Buildings in the Dhaka (Joydevpur) and Rangpur Radar Observation Stations. | 300,000 |
| 5 | To provide the commercial power (400V, 3-phase, 4-wire, 50Hz) supply (capacity: 100kVA) along with electric poles/wires, etc. from the main supply line to the proposed site for the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. | 2,000,000 |
| 6 | To install the required step-down transformer as well as service entrance connections for the commercial power supply at the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. | 10,000,000 |
| 7 | To provide incidental facilities, such as telephone lines and internet provision, for the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. | 1,500,000 |
| 8 | To undertake incidental outdoor works such as a guard shed, gardening, fencing, gates, boundary walls of the respective offices and exterior lightings and to renovate the existing building in the Joydevpur Observatory. | 22,500,000 |
| 9 | To renovate the existing gates, boundary walls, exterior lightings and Rangpur radar tower building and to shift the existing observation field in the Rangpur Observatory. | 9,000,000 |

Annex-3 - 1

  26.


| | | |
|--------------|--|--------------------|
| 10 | To obtain the required frequency for the Dhaka (Joydevpur) meteorological radar system (the existing frequency of Rangpur meteorological radar system is utilized for a new radar system). | 500,000 |
| 11 | To obtain the required VSAT user license from the BTRC for the use of satellite communication for the meteorological data satellite communication system (VSAT) to be installed. | 380,000 |
| 12 | To establish the Internet Protocol Virtual Private Network (IP-VPN) between the SWC at BMD Head Office and the Joydevpur Radar Observation Station as a backup data communication link. | 200,000 |
| 13 | To ensure transport for BMD personnel and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc. | 4,500,000 |
| Total | | 455,280,000 |

Applied Exchange Rate: US\$ 1 = 103.76 JP Yen, 1 Taka = 1.32 JP Yen

3. Recurrent Cost to be borne by BMD

Table: Recurrent Cost of Dhaka (Joydevpur) Meteorological Radar Observation

Recurrent Cost of Dhaka (Joydevpur) Meteorological Radar Observation Station

Estimated Recurrent Cost

| Equipment | Item | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks | |
|------------------------|-------------------------|------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|
| 1 | Antenna | Cross (16kg/cm. For AZ/EL) | 1 | 0 | 0 | 0 | 0 | 18,300 | 0 | 0 | 0 | 0 | 21,300 | Every 5 years |
| | | Tuning bolt (For AZ/EL) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16,800 | 0 | 0 | Every 8 years |
| 2 | Antenna controller | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years | |
| 3 | Transmitter | AC fan | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 361,700 | Every 10 years | |
| 4 | Receiver | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years | |
| 5 | Product Modem | CD for data storage (30kbytes/lot) | 2 | 2,900 | 3,100 | 3,200 | 3,400 | 3,500 | 3,700 | 3,900 | 4,100 | 4,300 | 4,500 | |
| 6 | Printer | Printer ink cartridge | 2 | 5,200 | 5,500 | 5,800 | 6,100 | 6,400 | 6,700 | 7,000 | 7,400 | 7,700 | 8,100 | |
| | | Paper (30kbytes/lot) | 4 | 1,300 | 1,500 | 1,300 | 1,400 | 1,500 | 1,500 | 1,600 | 1,700 | 1,800 | 1,900 | |
| 7 | Power Supply Capacitor | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years |
| | | Asseter | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104,300 | Every 10 years |
| 8 | Diesel Engine Generator | Oil seal | 2 | 0 | 3,000 | 3,100 | 3,200 | 3,300 | 3,400 | 3,500 | 4,000 | 4,200 | 4,400 | Every 1 year |
| | | Filter | 2 | 0 | 0 | 11,500 | 0 | 12,700 | 0 | 14,000 | 0 | 15,500 | 0 | Every 3 years |
| | | Battery for engine start | 2 | 0 | 0 | 0 | 0 | 0 | 15,200 | 0 | 0 | 0 | 18,600 | Every 3 years |
| Sub total (BDT) | | | 9,300 | 12,900 | 24,900 | 14,200 | 45,800 | 30,800 | 30,300 | 34,000 | 33,500 | 662,300 | | |

Others

| Cost Item | Details | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks |
|------------------------|---------------------|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------|
| 1 | Electricity charge | | 652,762 | 683,400 | 719,670 | 751,654 | 780,436 | 803,108 | 814,764 | 818,502 | 866,427 | 1,011,648 | *1 |
| 2 | Fuel cost | Fuel consumption of DEG | 124,938 | 131,185 | 137,744 | 144,631 | 151,883 | 159,456 | 167,429 | 175,800 | 184,590 | 193,810 | *2 |
| 3 | Water supply charge | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *3 |
| 4 | Special maintenance | System break-up by manufacturer's engineer | 1 | 0 | 0 | 516,800 | 0 | 0 | 667,700 | 0 | 0 | 773,000 | *4 |
| 5 | Radeco | Coaling repair | 1 | 16,400 | 17,300 | 18,100 | 19,000 | 20,000 | 21,000 | 22,000 | 23,100 | 24,300 | 25,500 |
| 6 | Post-control | Estimating verification | 1 | 14,800 | 15,500 | 16,300 | 17,100 | 18,000 | 18,900 | 19,800 | 20,800 | 21,900 | 23,000 |
| Sub total (BDT) | | | 824,900 | 849,385 | 1,468,614 | 896,385 | 982,299 | 1,700,164 | 1,083,993 | 1,138,202 | 1,968,217 | 1,234,968 | |
| Total (BDT) | | | 918,200 | 962,285 | 1,493,514 | 962,585 | 1,028,099 | 1,730,964 | 1,114,293 | 1,172,202 | 2,001,717 | 1,917,268 | |
| Total (JPY) | | | 97,096,215 | 11,154,131 | 19,999,349 | 11,272,577 | 11,377,643 | 18,317,221 | 11,491,691 | 11,846,213 | 22,679,676 | 22,666,424 | |

Estimate of annual electricity charge

Annual power consumption (kWh) 75,709
 Annual power consumption by commercial power (90%) 68,138
 Annual power consumption by DEG (10%) 6,971
 Annual fuel consumption 1,895

Fuel consumption of DEG = 0.25 Liter/kWh

Electrical charges = 0.52 BDT/kWh

Fuel cost = 62.50 BDT/Liter

Exchange rate = 0.947 BDT/JPY

*1 Annual electricity charge of commercial power (BDT) 652,762

*2 Annual fuel cost of DEG (BDT) 124,938

*3 Annual water supply charge (BDT) 0

*4 Inflation: 5% per year considered

Annex-3 - 2

Table: Recurrent Cost of Rangpur Meteorological Radar Observation Station

Recurrent Cost of Rangpur Meteorological Radar Observation Station

Estimated Recurrent Cost

| Equipment | Item | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks |
|-----------------|-------------------------|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------------|
| 1 | Antenna | Grasse (16kg/ism, For AZ/EL) | 1 | 0 | 0 | 0 | 0 | 18,200 | 0 | 0 | 0 | 23,200 | Every 5 years |
| | | Timing belt (For AZ/EL) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 16,800 | 0 | 0 | Every 8 years |
| 2 | Antenna controller | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years |
| 3 | Transmitter | AC fan | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 361,200 | Every 10 years |
| 4 | Receiver | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years |
| 5 | Product Monitor | CD for data storage (20sheets/lot) | 2 | 2,900 | 3,100 | 3,200 | 3,400 | 3,500 | 3,700 | 3,900 | 4,100 | 4,300 | 4,500 |
| 6 | Printer | Printer ink cartridge | 2 | 5,200 | 5,500 | 5,800 | 6,100 | 6,400 | 6,700 | 7,000 | 7,400 | 7,700 | 8,100 |
| | | Paper (500sheets/lot) | 4 | 1,200 | 1,300 | 1,300 | 1,400 | 1,500 | 1,600 | 1,700 | 1,800 | 1,900 | |
| 7 | Power Supply Capacitor | AC fan | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45,200 | Every 10 years |
| | | Arrestor | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104,300 | Every 10 years |
| 8 | Diesel Engine Generator | Oil seal | 2 | 0 | 3,000 | 3,100 | 3,300 | 3,500 | 3,600 | 3,800 | 4,000 | 4,200 | 4,400 |
| | | Filter | 2 | 0 | 0 | 11,300 | 0 | 12,700 | 0 | 14,000 | 0 | 15,300 | 0 |
| | | Battery for engine start | 2 | 0 | 0 | 0 | 0 | 0 | 15,300 | 0 | 0 | 0 | 18,600 |
| Sub total (BDT) | | | | 9,300 | 12,900 | 24,900 | 14,200 | 45,800 | 30,800 | 30,300 | 34,000 | 33,500 | 662,300 |

Others

| Cost Item | Details | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks |
|-----------------|---------------------|--|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------------|
| 1 | Electricity Charge | | 589,017 | 618,468 | 649,391 | 681,861 | 715,954 | 751,752 | 789,339 | 828,806 | 870,246 | 913,759 | *1 |
| 2 | Fuel cost | Fuel consumption of DEG | 112,728 | 118,364 | 124,283 | 130,497 | 137,022 | 143,873 | 151,066 | 158,620 | 166,551 | 174,878 | *2 |
| 3 | Water supply charge | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *3 |
| 4 | Special maintenance | System brush-up by manufacturer's engineer | 1 | 0 | 0 | 575,800 | 0 | 607,700 | 0 | 0 | 773,000 | 0 | For 3 days at site |
| 5 | Radome | Coating repair | 1 | 16,400 | 17,300 | 18,100 | 19,000 | 20,000 | 21,000 | 22,000 | 23,100 | 24,300 | 25,500 |
| 6 | Pest-control | Fermenting vermination | 1 | 14,800 | 15,500 | 16,300 | 17,100 | 18,000 | 18,900 | 19,800 | 20,800 | 21,900 | 23,000 |
| Sub total (BDT) | | | 732,945 | 769,632 | 1,384,874 | 848,458 | 890,976 | 1,403,225 | 982,205 | 1,031,326 | 1,855,997 | 1,137,137 | |
| Total (BDT) | | | 742,248 | 782,533 | 1,099,774 | 862,638 | 936,776 | 1,634,028 | 1,012,508 | 1,065,326 | 1,889,497 | 1,799,437 | |
| Total (JPY) | | | ¥993,638 | ¥1,047,866 | ¥1,887,249 | ¥1,154,830 | ¥1,284,081 | ¥2,187,450 | ¥1,365,428 | ¥1,426,139 | ¥2,529,447 | ¥1,418,888 | |

Estimate of annual electricity charge

| | | |
|--|---------|--------|
| Annual power consumption | (kWh) | 68,316 |
| Annual power consumption by commercial power (90%) | (kWh) | 61,484 |
| Annual power consumption by DEG (10%) | (kWh) | 6,832 |
| Annual fuel consumption | (Liter) | 1,798 |

Fuel consumption of DEG = 0.25 Liter/kWh

- *1 Annual electricity charge of commercial power (BDT) 589,017
- *2 Annual fuel cost of DEG (BDT) 112,728

Electrical charge = 9.58 BDT/kWh
Fuel cost = 66.00 BDT/Liter

- *3 Annual water supply charge (BDT) 0
- *4 Inflation: 5%/year considered

Exchange rate = 0.747 BDT/JPY

Table: Recurrent Cost of BMD Head Office

Recurrent Cost of BMD Head Office

Estimated Recurrent Cost

| Equipment | Item | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks |
|---|-----------------|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|---------|
| Storm Warning Centre (SWC) | | | | | | | | | | | | | |
| 1 | Product Monitor | CD for data storage (20sheets/lot) | 2 | 2,900 | 3,100 | 3,200 | 3,400 | 3,500 | 3,700 | 3,900 | 4,100 | 4,300 | 4,500 |
| 2 | Printer | Printer ink cartridge | 4 | 10,500 | 11,000 | 11,500 | 12,100 | 12,700 | 13,400 | 14,000 | 14,700 | 15,500 | 16,200 |
| | | Paper (500sheets/lot) | 10 | 3,400 | 3,500 | 3,700 | 3,900 | 4,100 | 4,300 | 4,500 | 4,700 | 5,000 | 5,200 |
| 3 | Compact UPS | Battery | 9 | 0 | 0 | 66,000 | 0 | 0 | 76,400 | 0 | 0 | 88,400 | 0 |
| 4 | 3KVA UPS | Battery | 1 | 0 | 0 | 123,600 | 0 | 0 | 143,100 | 0 | 0 | 165,600 | 0 |
| Meteorological Briefing Room in Hazrat Shahjalal International Airport | | | | | | | | | | | | | |
| 1 | Compact UPS | Battery | 3 | 0 | 0 | 22,000 | 0 | 0 | 25,500 | 0 | 0 | 29,500 | 0 |
| Sub total (BDT) | | | 16,800 | 17,600 | 230,000 | 19,400 | 20,300 | 266,400 | 22,400 | 23,500 | 304,300 | 25,900 | |

Others

| Cost Item | Details | Qty | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year | 9th year | 10th year | Remarks |
|-----------------|-----------------------|---------------------------------------|----------|----------|----------|----------|----------|------------|----------|----------|------------|-----------|---------|
| 1 | Electricity Charge | | 164,738 | 172,973 | 181,624 | 190,705 | 200,240 | 210,252 | 220,785 | 231,803 | 243,393 | 255,563 | *1 |
| 2 | Fuel cost | Fuel consumption of Existing DEG | 14,916 | 15,662 | 16,445 | 17,267 | 18,130 | 19,037 | 19,989 | 20,988 | 22,038 | 23,140 | *2 |
| 3 | Communication charge | IP-VPN, Jopydayar - Dhaka (SWC) | 1 | 56,400 | 59,300 | 62,300 | 65,300 | 68,500 | 72,000 | 75,600 | 79,400 | 83,400 | 87,500 |
| 4 | Frequency License Fee | for Joydeypur Satellite Communication | 1 | 200,000 | 210,000 | 220,500 | 231,500 | 243,100 | 255,300 | 268,000 | 281,400 | 295,500 | 310,300 |
| Sub total (BDT) | | | 436,054 | 457,937 | 480,769 | 504,772 | 530,070 | 556,587 | 584,354 | 613,591 | 644,331 | 676,503 | |
| Total (BDT) | | | 482,854 | 478,537 | 710,769 | 824,172 | 880,370 | 822,980 | 606,754 | 637,091 | 953,631 | 702,403 | |
| Total (JPY) | | | ¥606,230 | ¥636,594 | ¥951,498 | ¥701,703 | ¥736,774 | ¥1,101,726 | ¥812,254 | ¥852,866 | ¥1,275,276 | ¥940,299 | |

Estimate of annual electricity charge

| | | |
|--|---------|--------|
| Annual power consumption of Storm Warning Centre (SWC) | (kWh) | 13,608 |
| Annual power consumption of Meteorological Briefing Room in Hazrat Shahjalal International Airport | (kWh) | 4,493 |
| Total annual power consumption | (kWh) | 18,101 |
| Annual power consumption by commercial power (95%) | (kWh) | 17,196 |
| Annual power consumption by DEG (5%) | (kWh) | 905 |
| Annual fuel consumption | (Liter) | 226 |

Fuel consumption of DEG = 0.25 Liter/kWh

- *1 Annual electricity charge of commercial power (BDT) 164,738
- *2 Annual fuel cost of DEG (BDT) 14,916

Electrical charge = 9.58 BDT/kWh
Fuel cost = 66.00 BDT/Liter

- *3 Inflation: 5%/year considered

Exchange rate = 0.747 BDT/JPY

Annex-3 - 3

Major Undertakings to be taken by Government of Bangladesh

Table: Major Undertakings to be done by BMD under Implementation of the Project

| No. | Items |
|--|---|
| General Items | |
| 1 | To undertake all necessary institutional and juridical procedures in Bangladesh. |
| 2 | To undertake the Environmental Impact Assessment procedures in Bangladesh, if required. |
| 3 | To handle duty (Tax) exemption procedures (payment of Custom Duty Value Added Tax : CDVAT), provide requisite legal and/or administrative documentations for customs clearance to customs broker/forwarder to be employed by the Contractor and make payment of all demurrage required at the port of disembarkation for the materials and equipment imported for the Project. |
| 4 | To provide necessary working spaces with Internet Connection at BMD Head Office for the Consultant and the Contractor for the implementation of the Project. |
| 5 | To accord Japanese and other foreign nationals including their dependent/s (if any), whose services may be required in connection with the supply of products and services under the signed contracts, such facilities as may be necessary for their entry into Bangladesh and stay therein for the smooth and uninterrupted performance of their work (i.e. to secure the Multiple Visa for more than 1 year including its extension/s required by the recipient country in connection thereof). |
| 6 | To exempt goods of Japanese and other foreign nationals from internal taxes (VAT) and other fiscal levies which may be imposed by the Government of Bangladesh with respect to their supply (products) and services under the signed contracts. |
| 7 | To pay bank commission for the issuance of the Authorization to Pay (A/P) and amendments of A/P, if required, for the Consultant and the Contractor. |
| 8 | To bear all the expenses, other than those to be borne by the Japan's Grant Aid, necessary for the implementation of the Project. |
| 9 | To ensure the security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project prior to the commencement of and during Project implementation. |
| For the Construction of the Radar Tower Buildings | |
| 10 | To clear, level and reclaim the land prior to the commencement of construction work. |
| 11 | To secure sufficient spaces at the respective Project site/s for temporary facilities such as a contractor's office, workshop, building materials storage, etc. needed for the construction work. |
| 12 | To obtain necessary permissions from the relevant agencies for the construction of the Radar Tower Buildings in the Dhaka (Joydevpur) and Rangpur Radar Observation Stations. |
| 13 | To provide the commercial power (400V, 3-phase, 4-wire, 50Hz) supply (capacity: 100kVA) along with electric poles/wires, etc. from the main supply line to the proposed site for the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. |
| 14 | To install the required step-down transformer as well as service entrance connections for the commercial power supply at the Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. |
| 15 | To provide incidental facilities, such as water supply, telephone lines and internet provision, for Dhaka (Joydevpur) and Rangpur Radar Tower Buildings. |
| 16 | To provide temporary facilities for the availability or accessibility of electricity, water, etc. for the construction work. |
| 17 | To undertake incidental outdoor works such as a guard shed, gardening, fencing, gates, boundary walls and exterior lightings and to renovate the existing building in the Joydevpur Observatory. |
| 18 | To renovate the existing gates, boundary walls, exterior lightings and Rangpur radar tower building and to shift the existing observation field in the Rangpur Observatory. |
| 19 | To ensure transport for BMD personnel and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc. |
| For Installation Work of the Equipment | |
| 20 | To remove and relocate the existing facilities if available for the installation of the equipment, if necessary. |
| 21 | To provide and allocate secure temporary storage area/room for the materials, tools and equipment needed during the installation process. |

Annex-4 - 1

Handwritten signatures and initials, including a large signature on the left, a signature in the middle, and the initials 'JG.' on the right.

| | |
|--|--|
| 22 | To obtain the required frequency for the Dhaka (Joydevpur) meteorological radar system (the existing frequency of Rangpur meteorological radar system is utilized for a new radar system). |
| 23 | To obtain the required VSAT user license from the Bangladesh Telecommunication Regulatory Commission (BTRC) for the use of satellite communication for the meteorological data satellite communication system (VSAT) to be installed. |
| 24 | To ensure the required space segment for the use of satellite communication for the meteorological data satellite communication system (VSAT) at BMD Dhaka (Joydevpur) Radar Observation Station. |
| 25 | To establish the Internet Protocol Virtual Private Network (IP/VPN) between the SWC at BMD Head Office and the Joydevpur Radar Observation Station as a backup data communication link. |
| 26 | To ensure the data transmission speed of 128kbps for the existing Digital Data Network (DDN) between the SWC at BMD Head Office and BMD Meteorological Briefing Room in the Hazrat Shah Jalal International Airport (Dhaka). |
| 27 | To set up new assigned IP addresses in the computing equipment supplied under the Project. |
| 28 | To secure ample and strategically located space/s at the existing facilities (the SWC at BMD Head Office and BMD Meteorological Briefing Room in the Hazrat Shah Jalal International Airport (Dhaka)) for the installation of the equipment (PC terminals and peripherals) to be supplied under the Project. |
| 29 | To ensure transport for BMD personnel and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc. |
| After the completion of the Project | |
| 30 | To renovate the existing gates, boundary walls and exterior lighting in and around the sites as if and when required. |
| 31 | To assign the required staff for the smooth operation and maintenance of the equipment. |
| 32 | To procure the required spare parts and consumables for the smooth operation and maintenance of the equipment. |
| 33 | To provide adequate maintenance of the Radar Tower Building constructed under the Project so that they may function long lasting and effectively. |
| 34 | To properly operate and maintain, and also effectively utilize the facilities constructed and the equipment procured/installed under the Project. |
| 35 | To allocate the necessary budget for the smooth conduct of meteorological radar observation and forecasting works. |
| 36 | To take necessary steps for creating proposed new posts and recruiting the required man power immediately after the Project Completion. |
| 37 | To periodically update all the operation/antivirus/application software(s). |

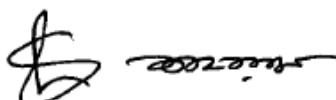






Table: Current and Required Number of Staff for the Electronic and Instrument Division after the Project Completion

| Engineers/Staff | Current Man Power | Proposed Man Power after the Project Completion |
|---|-------------------|---|
| Deputy Director (Electronic and Instrument) | 0 | 1 |
| Senior Electronic Engineer | 1 | 1 |
| Senior Mechanical Engineer | 0 | 1 |
| Electronic Engineer | 1 | 1 |
| Mechanical Engineer | 1 | 1 |
| Assistant Electronic Engineer | 1 | 1 |
| Assistant Communication Engineer | 0 | 1 |
| Assistant Meteorologist | 1 | 1 |
| Electronic Assistant | 1 | 3 |
| Chemist | 1 | 1 |
| Mechanical Assistant | 1 | 1 |
| Senior Observer | 1 | 1 |
| Mechanic- Grad II | 1 | 1 |
| Laboratory Attendant | 1 | 1 |
| MLSS (Peon) | 1 | 1 |
| Total | 12 | 17 |





ソフトコンポーネント計画書

(1) ソフトコンポーネントを計画する背景

バングラデシュ国（以下「バ」国）は、ガンジス川、ブラマプトラ川、メグナ川の3大河川によって形成されるデルタ地帯に位置し、国土の大部分が標高10m以下の低平地である。3大河川の上流域は世界でも屈指の多雨地帯で、モンスーン期には流域で降った大量の雨水が「バ」国に流入し、大規模な洪水を引き起こす。このほか、北西部から進入する暴風雨「ノーウェスタ」や竜巻、ベンガル湾から襲来する熱帯サイクロン等、「バ」国は様々な気象災害に見舞われる地理的条件が揃っており、世界有数の自然災害多発国となっている。近年では、2004年の大洪水（推定被害総額22億米ドル）や2007年の熱帯サイクロン「Sidr」（死者約14万人、推定被害総額23億米ドル）により、国全体の社会経済活動が麻痺するほどの甚大な被害が発生した。

「バ」国には日本の無償資金協力により整備された5基の気象レーダーシステムがあり、「バ」国全土及び隣国国境周辺地域で発生する気象現象を把握することが可能となっている。「バ」国の気象機関であるバングラデシュ気象局（Bangladesh Meteorological Department: BMD）は、これら5基の気象レーダーシステムによる観測と地上気象観測及び高層観測をもとに、気象予警報の作成を行っている。自然災害の危険を事前に予測し、適切な対策を講じるためには、タイムリーな精度の高い予警報の作成・提供が必須であり、「バ」国の気象レーダー観測網はその重要な役目を果たしている。

しかしながら、ダッカ及びラングプールの両気象レーダーシステムは、完成から約15年が経過し、老朽化が進んでおり、レーダーメーカー側のスペアパーツの供給も年々困難となっている。ダッカ気象レーダーシステムは、BMD技術者の修理点検により、現在も稼働を続けているが、送信出力低下により探知範囲が狭くなり、十分な観測業務が遂行できない状況にある。しかし「バ」国で最も重要な気象レーダーであるため、現在も日々稼働している。ラングプール気象レーダーシステムはこれまで度重なる復旧作業が行われてきたが、2012年にBMD及びJICA技術協力プロジェクトの専門家により再調査を実施した結果、再稼働困難と判明した。

「バ」国の中心に位置し、国土の8割を観測可能なダッカ気象レーダーシステムは、ダッカ首都圏の防災及び国際空港の安全を守る役割を担っている。またラングプール気象レーダーシステムは、北西から進入する暴風雨（ノーウェスタ）の監視及び洪水の引き金となるメガラヤ山脈、ヒマラヤ山麓の降雨監視を行っている。そのためダッカ及びラングプール気象レーダーシステムは、「バ」国の気象災害による被害を軽減する上で極めて重要であり、両レーダーシステムの更新及び施設の整備は喫緊の課題である。

本プロジェクトにおいて、我が国が供与した5基の気象レーダーシステムの内、アナログシステムである既設のダッカ及びラングプール気象レーダーシステムをデジタルの気象ドップラーレーダーシステムに更新して、気象ドップラーレーダーシステム5基による「バ」国気象レーダー観測網を再強化して、気象災害による被害の軽減に寄与することを本プロジェクトの目標とするものである。

既設のダッカ及びラングプール気象レーダーシステムは、アナログ通常気象レーダーシステムであるため、本プロジェクトで導入予定のデジタル固体化電力増幅式気象ドップラーレーダーシステムの運用維持管理の経験を有するBMD技術者はいない。導入される気象レーダーシステムの円滑な運用維持管理技術を短期間において効率的に伝授するため、既設気象レーダーシステムの運用維持管理経験を有する技術者を中心として、本プロジェクト実施中において、本計画書に記載したソフトコンポーネントを投入することが、プロジェクト成果の持続性を確保する上においても妥当であると判断した。

(2) ソフトコンポーネントの目標

BMDが気象ドップラーレーダーシステムを独自で確実な運用ができるようになること。

(3) ソフトコンポーネントの成果

ソフトコンポーネントの成果は下表の通りである。

表1 ソフトコンポーネントの成果

| No. | 活動（技術移転）項目 | 成果 | 成果指標 | 成果達成度の確認方法 |
|-----|---|------------------------------|--|---|
| 1 | 気象ドップラーレーダー点検、調整、軽微な故障の探究・処置・復旧及び重大な故障発生時の対応 | BMD職員が気象レーダー機器のメンテナンス方法を習得する | BMD独自による点検、調整、軽微な故障の探究・処置・復旧（a. 測定器類を用いた定期保守点検、b. 予備品の実機への組入れ後の気象ドップラーレーダーシステムの動作確認（観測状況）、c. 故障探求・処置・復旧確認作業及び重大な故障発生時の対応（コンサルタント及び製造メーカーへの情報伝達、技術アドバイス受領等） | 1) 測定器類を用いた定期保守点検、2) 予備品の実機への組入れ後の動作確認（観測状況）、3) 軽微な故障の探求・処置・復旧確認作業、4) 重大な故障発生時の対応に関する習熟度を、目視及びインタビューにより確認する |
| 2 | 気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳を活用した迅速且つ適切な気象レーダー運用・管理 | BMD職員が気象レーダーの運用・管理方法を習得する | 気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳を活用した、迅速且つ適切な運用・管理技術 | 気象ドップラーレーダーシステムマニュアル概要の利用頻度、レーダーシステム保守管理台帳の活用を記載内容（各日、週、月）及びインタビューにより確認する |
| 3 | 雨量強度及びドップラー速度観測のシークエンス・スケジュールに従った気象レーダー観測 | BMD職員が気象レーダーを適切に操作できる | 気象現象を的確に把握し、気象レーダー観測データを予報業務に活用するため、雨量強度及びドップラー速度観測のシークエンス・スケジュールに従った気象レーダー観測 | 観測シークエンス・スケジュールに沿った気象レーダー観測の実施を、雨量強度及びドップラー速度観測データにより確認する |

(4) 成果達成度の確認方法

ソフトコンポーネントの成果達成度の確認方法は表1に示した通りである。

(5) ソフトコンポーネントの活動（投入計画）

ソフトコンポーネントの活動（投入計画）は以下の通りである。

表2 ソフトコンポーネントの活動(投入計画)

| 成果 | 必要とされる技術・業種 | 現況の技術と必要とされる技術レベル | ターゲットグループ | 実施方法 | 実施リソース | 成果品 | |
|---|---|---|-----------|---|---|---|---|
| 成果1:点検、調整、軽微な故障の探究・処置・復旧技術をBMD技術者が習得する | 気象レーダー調整・故障探求を行える技術者を有する技術者 | BMDは、アナログ気象レーダーシステムの調整・故障探求の実施経験のみであるため、デジタル気象レーダーシステムの技術が必要 | 次表に示した通り | 測定器類を用いた定期保守点検研修 | <第1回> 気象レーダー調整・故障探求技術担当 コンサルタント: 1.20人月(現地技術移転期間:36日) 直接支援型 | 測定器類を用いた定期保守点検実施手順書 | |
| | | | | 納入された予備品の実機への組入れ後の動作確認(観測状況)研修 | | | 予備品の実機への組入れ後の動作確認(観測状況)手順書 |
| | | | | 故障状態を想定し、故障探求・処置・復旧確認研修 | | | |
| | | | | 重大な故障発生時の対応研修 | | | |
| 実施手順書の作成 | 重大な故障発生時の対応手順書 | | | | | | |
| 成果2:BMD技術者が、マニュアル概要及び保守管理台帳を活用した迅速且つ適切な運用・管理技術を習得する | 気象レーダー運用・管理を行える技術者を有する技術者 | BMDは、アナログ気象レーダーシステムの運用・管理を行った経験のみであるため、デジタル気象ドップラーレーダーシステムのマニュアル概要及び保守管理台帳に沿った運用・管理が実施できる技術が必要 | 次表に示した通り | BMD技術者との技術ディスカッション | <第1回> 気象レーダー運用・管理技術担当 コンサルタント:1.20人月 (現地技術移転期間:36日) 直接支援型 | 気象ドップラーレーダーシステムマニュアル概要 レーダーシステム保守管理台帳 ・システム障害/トラブルの発生日時 ・システム障害/トラブルの原因(異音、部分的な劣化、その他) ・実施した復旧手順 ・交換した部品の名称及び数量 ・復旧/トラブルシューティングを行ったエンジニアの氏名 | |
| | | | | 気象ドップラーレーダーシステムマニュアルから最重要部分の選出 | | | |
| | | | | 気象ドップラーレーダーシステムマニュアル概要の作成 | | | |
| | | | | レーダーシステム保守管理台帳の作成 | | | <第2回> 気象レーダー運用・管理技術担当 コンサルタント:0.77人月 (現地技術移転期間:23日) 直接支援型 |
| BMD技術者による気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳の使用 | | | | | | | |
| 成果3:雨量強度及びドップラー速度観測のシークエンス・スケジュールに従った気象レーダー観測が開始される | 気象レーダー観測データよりクラッター及びブラインドエリアの特定が行え且つパングラデシュの気象現象に即した観測のシークエンス・スケジュールの作成を行える技術者を有する技術者 | 既設アナログ気象レーダーシステムにはCAPPI機能がいないことから、BMDはCAPPIによる観測を実施した経験がないため、CAPPIによる雨量強度及びドップラー速度観測のシークエンス・スケジュール作成に関する技術が必要 | 次表に示した通り | BMD予報官及び技術者との技術ディスカッション及び座学 | 気象レーダー観測技術担当 コンサルタント:1.03人月 (現地技術移転期間:31日) 直接支援型 | 雨量強度及びドップラー速度観測のシークエンス・スケジュール | |
| | | | | 気象ドップラーレーダーシステムのクラッター及び各アンテナ仰角時(0.5度間隔、1~3度間)のブラインドエリアの特定 | | | |
| | | | | 各アンテナ仰角時(0.5度間隔、1~3度間)のブラインドエリア図の作成 | | | |
| | | | | 雨量強度及びドップラー速度観測のシークエンス・スケジュールの | | | |

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 ダッカ及びラングプール気象レーダー整備計画準備調査

| | | | | | | |
|--|--|--|--|---|--|--|
| | | | | 作成 雨量強度及びドップラ ー速度観測のシーケ ンス・スケジュールに 従った気象レーダー観 測の実施 | | |
|--|--|--|--|---|--|--|

各成果のターゲットグループを以下の表に示す。

表 3 成果 1 及び 2 のターゲットグループのターゲットグループ

| 技術者／職員 | BMD 本局 (暴風雨警報センターを含む) | ダッカ (ジョイデプール) 気象レーダー観測所 | ラングプール 気象レーダー観測所 |
|----------|--------------------------|----------------------------|---------------------|
| 主任電子技師 | 1 | 0 | 0 |
| 電子技師 | 1 | 0 | 0 |
| 電子技師補 | 2 | 2 | 1 |
| 通信技師補 | 4 | 0 | 0 |
| 電子アシスタント | 5 | 6 | 3 |
| 機械アシスタント | 3 | 0 | 1 |
| 機械工 II | 3 | 2 | 0 |

表 4 成果 3 のターゲットグループ

| 技術者／職員 | BMD 本局 (暴風雨警報センターを含む) | ダッカ (ジョイデプール) 気象レーダー観測所 | ラングプール 気象レーダー観測所 |
|--------|--------------------------|----------------------------|---------------------|
| 主任電子技師 | 1 | 0 | 0 |
| 電子技師 | 1 | 0 | 0 |
| 予報官補佐 | 10 | 0 | 2 |

活動日程詳細計画は以下の通りである。

第1回活動（ラングプール気象レーダーシステム設置工事完了時）

表5 第1回活動日程詳細計画

| | 活動 No. 1 | 活動 No. 2 | 活動 No. 3 |
|----|--|---|---|
| 日 | 気象ドップラーレーダー点検、調整、軽微な故障の探究・処置・復旧及び重大な故障発生時の対応 | 気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳作成 | 雨量強度及びドップラー速度観測のシークエンス・スケジュール |
| 1 | 日本発 | 日本発 | 日本発 |
| 2 | ダッカ着 金曜日 | ダッカ着 金曜日 | ダッカ着 金曜日 |
| 3 | ラングプールへ移動 土曜日 | ラングプールへ移動 土曜日 | 事前準備 土曜日 |
| 4 | ラングプール気象レーダー塔施設において準備作業 | ラングプール気象レーダー塔施設において準備作業 | BMD 暴風雨予警報センター予報官及び技術者との技術ディスカッション及び座学 |
| 5 | | | |
| 6 | 測定器類を用いた定期保守点検の実施研修 | BMD 技術者との技術ディスカッション及び気象ドップラーレーダーシステムマニュアルから最重要部分の選出 | 気象ドップラーレーダーシステムのクラッター及び各アンテナ仰角時（0.5度間隔、1～3度間）のブラインドエリアの特定 |
| 7 | 及び実施手順書の作成 | | |
| 8 | | | |
| 9 | 金曜日（休日） | 金曜日（休日） | 金曜日（休日） |
| 10 | 土曜日（休日） | 土曜日（休日） | 土曜日（休日） |
| 11 | 実施手順書の作成 | | 各アンテナ仰角時（0.5度間隔、1～3度間）のブラインドエリア図の作成 |
| 12 | | 気象ドップラーレーダーシステムマニュアル概要（案）の作成 | 雨量強度及びドップラー速度観測のシークエンス・スケジュール（案）作成 |
| 13 | 納入された予備品の実機への組入れ後の動作確認（観測状況）研修及び実施手順書の作成 | レーダーシステム保守管理台帳（案）の作成 | 雨量強度及びドップラー速度観測のシークエンス・スケジュールに従った気象レーダー観測の実施 |
| 14 | | | |
| 15 | | | |
| 16 | 金曜日（休日） | 金曜日（休日） | 金曜日（休日） |
| 17 | 土曜日（休日） | 土曜日（休日） | 土曜日（休日） |
| 18 | 実施手順書の作成 | 気象ドップラーレーダーシステムマニュアル概要（案）の作成 | 雨量強度及びドップラー速度観測のシークエンス・スケジュール（案）見直し |
| 19 | | | |
| 20 | 故障状態を想定し、故障探求・処置・復旧確認研修及び実施手順書の作成 | BMD 技術者による気象ドップラーレーダーシステムマニュアル概要（案）及びレーダーシステム保守管理台帳（案）の使用 | 雨量強度及びドップラー速度観測のシークエンス・スケジュールに従った気象レーダー観測の実施 |
| 21 | | | |
| 22 | | | |
| 23 | 金曜日（休日） | 金曜日（休日） | 金曜日（休日） |
| 24 | 土曜日（休日） | 土曜日（休日） | 土曜日（休日） |
| 25 | 実施手順書の作成 | 気象ドップラーレーダーシステムマニュアル概要（案）及びレーダーシステム保守管理台帳（案）見直し | 雨量強度及びドップラー速度観測のシークエンス・スケジュールの完成 |
| 26 | 重大な故障発生時の対応研修 | | |
| 27 | BMD による研修復習 | BMD 技術者による気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳の使用 | 完了報告書の作成 |
| 28 | 実施手順書の作成 | | |
| 29 | | | BMD との技術ディスカッション |
| 30 | ダッカへ移動 金曜日（休日） | ダッカへ移動 金曜日（休日） | ダッカ発 |
| 31 | 土曜日（休日） | 土曜日（休日） | 日本帰国 |
| 32 | | | |
| 33 | 完了報告書の作成 | 完了報告書の作成 | |
| 34 | BMD 暴風雨予警報センター（ダッカ）との技術ディスカッション | BMD 暴風雨予警報センター（ダッカ）との技術ディスカッション | |
| 35 | ダッカ発 | ダッカ発 | |
| 36 | 日本帰国 | 日本帰国 | |

第2回活動（ダッカ（ジョイデプール）気象レーダーシステム設置工事完了時）

表 6 第2回活動日程詳細計画

| | 活動 No. 1 | 活動 No. 2 |
|----|--|--|
| 日 | 気象ドップラーレーダー点検、調整、軽微な故障の探究・処置・復旧及び重大な故障発生時の対応 | 気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳作成 |
| 1 | 日本発 金曜日 | 日本発 金曜日 |
| 2 | ダッカ着 事前準備 土曜日 | ダッカ着 事前準備 土曜日 |
| 3 | ダッカ（ジョイデプール）気象レーダー塔施設において準備作業 | ダッカ（ジョイデプール）気象レーダー塔施設において準備作業 |
| 4 | 測定器類を用いた定期保守点検の実施研修及び実施手順書の作成（ラングプール気象ドップラーレーダーシステムの実施手順書を参照） | BMD 技術者との技術ディスカッション及び気象ドップラーレーダーシステムマニュアルから最重要部分の選出 |
| 5 | | |
| 6 | | |
| 7 | 納入された予備品の実機への組入れ後の動作確認（観測状況）研修及び実施手順書の作成（ラングプール気象ドップラーレーダーシステムの実施手順書を参照） | |
| 8 | 金曜日（休日） | 金曜日（休日） |
| 9 | 土曜日（休日） | 土曜日（休日） |
| 10 | 納入された予備品の実機への組入れ後の動作確認（観測状況）研修及び実施手順書の作成（ラングプール気象ドップラーレーダーシステムの実施手順書を参照） | ラングプール気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳をダッカ（ジョイデプール）気象ドップラーレーダーシステム用に改定 |
| 11 | | |
| 12 | 故障状態を想定し、故障探求・処置・復旧確認研修及び実施手順書の作成（ラングプール気象ドップラーレーダーシステムの実施手順書を参照） | BMD 技術者による気象ドップラーレーダーシステムマニュアル概要（改定案）及びレーダーシステム保守管理台帳（改定案）の使用及び見直し |
| 13 | | |
| 14 | | |
| 15 | 金曜日（休日） | 金曜日（休日） |
| 16 | 土曜日（休日） | 土曜日（休日） |
| 17 | 重大な故障発生時の対応研修 | BMD 技術者による気象ドップラーレーダーシステムマニュアル概要及びレーダーシステム保守管理台帳の使用 |
| 18 | BMD による研修復習 実施手順書の作成（ラングプール気象ドップラーレーダーシステムの実施手順書を参照） | |
| 19 | 完了報告書の作成 | 完了報告書の作成 |
| 20 | | |
| 21 | BMD との技術ディスカッション | BMD との技術ディスカッション |
| 22 | ダッカ発 金曜日（休日） | ダッカ発 金曜日（休日） |
| 23 | 日本帰国 土曜日（休日） | 日本帰国 土曜日（休日） |

(6) ソフトコンポーネントの実施リソースの調達方法

実施リソースは、本プロジェクトの機材調達に関わる本邦コンサルタントによる直接支援型とする。その理由は以下の通りである。

- 気象業務及び導入される気象レーダーシステムに関する高度な技術及び知識を有している人材が不可欠であること。
- 通常、上述のような技術や知識を豊富に有している人材は、気象コンサルティング業務を実際に行っている組織に在籍していること。
- 計画されている技術移転と同様の経験を有する人材が必要であること。

これより、本邦コンサルタントの直接支援型とする。

(7) Software Component Implementation Process

The project overall process and software component implementation process are shown below. The software component is, after the meteorological radar system foundation is completed, an adjustment stage and, as the completion of this project, the implementation plan as of the time before.

表 7 ソフトコンポーネント実施工程

| | 月 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | | | | | |
|--|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|--|--|
| Rangpur Meteorological Radar Station | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 建設工事 | 計: 16.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 工事準備 | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 仮設・杭・土工等 | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 躯体工事 | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| 仕上工事 | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| 電気・空調・衛生設備工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 外構工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材調達・据付工事 | 計: 17.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材製作 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材輸送 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材据付/調整 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dhaka Meteorological Radar Station (SVC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材調達・据付工事 | 計: 15.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材製作 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材輸送 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材据付/調整 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hazrat Shahjalal International Airport (Dhaka) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材調達・据付工事 | 計: 15.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材製作 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材輸送 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材据付/調整 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dhaka (Joydebpur) Meteorological Radar Station | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 建設工事 | 計: 16.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 工事準備 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 仮設・杭・土工等 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 躯体工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 仕上工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 電気・空調・衛生設備工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 外構工事 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材調達・据付工事 | 計: 17.0ヶ月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材製作 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材輸送 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 機材据付/調整 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Software Component | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ソフトコンポーネント (活動 No. 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ソフトコンポーネント (活動 No. 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ソフトコンポーネント (活動 No. 3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(8) ソフトコンポーネントの成果品

ソフトコンポーネントの成果品は以下の通り。

表 8 ソフトコンポーネントの成果品(アウトプット)

| 資料名 | | 提出時期 | ページ数 |
|--|---|-----------------|------|
| 1) 測定器類を用いた定期保守点検、2) 予備品の実機への組入れ後の動作確認 (観測状況)、3) 故障探求・処置・復旧確認作業実施手順書、4) 重大な故障発生時の対応手順書 | | 技術移転実施後 | 20 |
| 気象ドップラーレーダーシステムマニュアル概要 | | | 30 |
| レーダーシステム保守管理台帳 | | | 10 |
| 雨量強度及びドップラー速度観測のシーケンス・スケジュール | | | 10 |
| 資料名 | 内容 | 提出時期 | ページ数 |
| ソフトコンポーネント実施完了報告書 | <ul style="list-style-type: none"> ● 活動計画と実績 ● 計画した成果と成果の達成度 ● 成果の達成度に影響を与えた要因 ● 効果の持続・発展のための今後の課題・提言等 ● 成果品一式 | ソフトコンポーネント実施完了時 | 50 |

(9) 相手国側の責務

ソフトコンポーネントの実施に関して BMD 側の責務は、以下の通りである。

- 1) 人的資源開発
 - a) 継続的に次世代を担う人材を雇用する。
 - b) 研修と人的資源開発計画を通じて、より優れた人材の育成を行う。
- 2) プロジェクトにおいて調達された機材の長期運用
 - a) 定期的にシステム運用維持管理に必要な予算を確保し、プロジェクトで供給された全ての気象機材の交換部品、消耗品の調達を計画的に行う。
 - b) 盗難や破損から機材を保護する。

上述に記述した BMD 側の責務に関しては、BMD の組織的且つ人的能力を鑑みると、十分に実施可能であると考えている。特に「継続的に次世代を担う人材を雇用」に関しては、気象レーダーの維持管理面において BMD が自立的発展するためには、電子関連技術者を継続的に補充し、補助業務を行う職員から電子技師に至る全てのスタッフに気象レーダーの維持管理能力を継承していくことが必要不可欠である。

資料 6. 参考資料

調査名：バングラデシュ国ダッカ及びラングプール気象レーダー整備計画準備調査

| 番号 | 名 称 | 形態 図書・ビデオ 地図・写真等 | オリジナル ／コピー/ 電子ファイル | 発行機関 | 発行年 |
|----|--------------------------|------------------------|--------------------------|--|--------|
| 1 | Bangladesh Building Code | 図書 | 電子ファイル | Housing and Building Research Institute | 2012 年 |