



# COUNTRY REPORT

## RADAR NETWORK OF BANGLADESH METEOROLOGICAL DEPARTMENT

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# Outline

- ❑ About BMD
- ❑ Overview of the current radar system
- ❑ Specification of radar systems
- ❑ Maintenance of equipment
- ❑ Data processing
- ❑ Radar products
- ❑ Current technical problems
- ❑ Weather radar data QC
- ❑ Radar application
- ❑ Radar data publication and/ or exchange, and data format
- ❑ Challenges
- ❑ Future Plan

## About BMD

The meteorological activities started in this country in 1877 through the establishment of one observatory in Satkhira during the British rule. In 1947, the service was renamed as Pakistan Meteorological Services. After the independence in 1971, it became Bangladesh Meteorological Department (BMD).

Bangladesh Meteorological Department is a government organization under the administrative control of the Ministry of Defence. BMD is mainly responsible for recording the meteorological observations and providing forecast and warnings for disaster management and all social economic activities.



***BANGLADESH METEOROLOGICAL DEPARTMENT  
COMPLEX***



# BMD'S OBSERVATION SYSTEM



- ✓ Synoptic observatories : 35
  - ✓ MMO
  - ✓ DMO
  - ✓ Class 1 Observatories
  - ✓ Agrometeorological obs.
- ✓ Riverport Observatories: 14
- ✓ Pilot Observatories : 10
- ✓ Rawinsonde Observatories : 03
- ✓ Agrometeorological observatories : 12
- ✓ RADAR Stations: 05
  - ✓ Doppler 03
  - ✓ Conventional 02
- ✓ AWS: 60

BMD HEADQUARTER



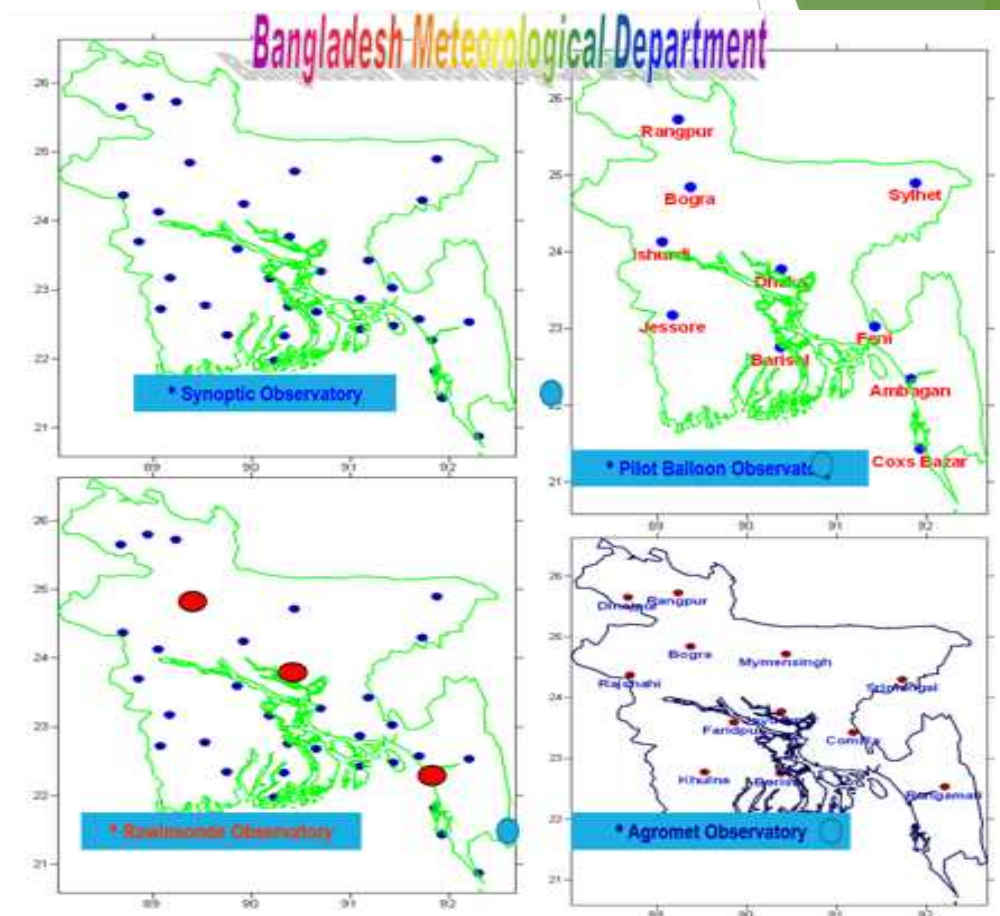




# BMD'S OBSERVATION SYSTEM



- ✓ Carbon Emission Real Time Monitoring Stations: 10
- ✓ Seismic Observatory and Research Center: 01
- ✓ Broadband Seismometer: 10
  - ✓ Analog: All airport 06
- ✓ Wind Measuring System: 06
  - ✓ Himawari
  - ✓ GEO Kompsat-02
- ✓ GTS: 10



# Overview of the current radar system

- ❑ Dhaka radar is replaced at Joidevpur, Gazipur as a Doplar radar. It is now in operation.
- ❑ Rangpur radar is not operational from 2008 due to thundering. It's replacement work is going on
- ❑ KHP, COX and MLV doplar radar is not in operation. These three radars are very old. Warranty period is already gone. Lacking of spare parts as JRC stopped productions. Also software not working.

# Doppler Radar in Bangladesh



Cox'sbazar Radar  
Station



Khepupara Radar  
Station



Moulvibazar Radar  
Station



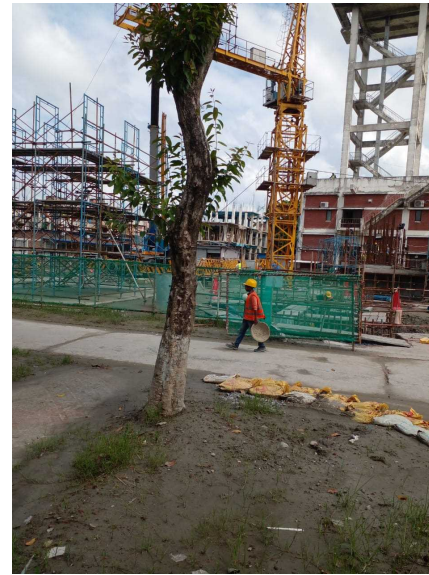


# DHAKA RADAR REPLACED BY GAZIPUR RADAR

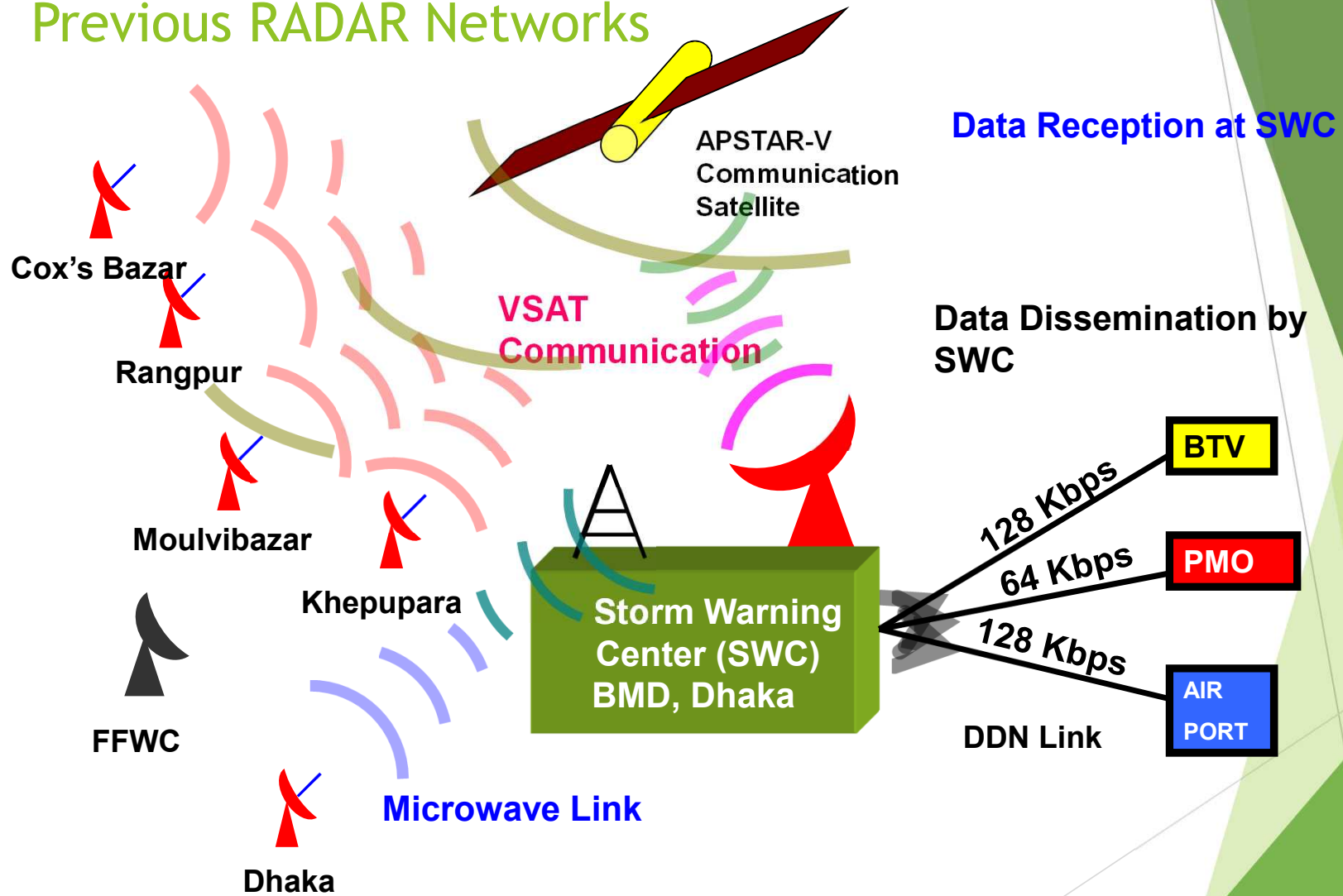




# CONSTRUCTION OF RANGPUR RADAR BUILDING



# Previous RADAR Networks



# Current Radar Observation and Basic Specifications

Sl.	Name of Radar Station	Types	Manufacturer	Special Purpose	Radar Parameters					
						DHK	RNG	COX	KHP	MLV
1	Dhaka Radar (2000)	Conventional	Mitsubishi, Japan	Civil Aviation						
2	Rangpur Radar (2000)	Conventional	Mitsubishi, Japan	Norwester Detection	Antenna Diameter	5 m	5 m	5 m	5 m	5 m
					Radar Range	400 km	400 km	400 km	400 km	400 km
					Radar Tower Height (These heights are up to Radom)	262 ft	-	170 ft	130 ft	175 ft
					Amplifier Unit	Magnetron	Magnetron	Klystron	Klystron	Klystron
3	Cox'sBazar Radar (2007)	Doppler	JRC, Japan	Storm Warning	Power supply Backup system	UPS Batery Bank/Generator	UPS Batery Bank/Generator	Fly Wheel UPS/Generator	Fly Wheel UPS/Generator	Fly Wheel UPS/Generator
					Tx Frequency	2.81Ghz	2.75 Ghz	2.85 Ghz	2.85 Ghz	2.77 Ghz
4	Khepupara Radar (2008)	Doppler	JRC, Japan	Storm Warning	Pulse width	2 us	2 us	1us-doppler 2us-Intensity	1us-Doppler 2us-Intensity	1us-doppler 2us-Intensity
					PRF	220 Hz	220 Hz	320Hz 720	320Hz 720	320Hz 720
5	MoulviBazar Radar (2009)	Doppler	JRC, Japan	Flash Flood Warning	S min	-112 dB	-112 dB	-102dB	-102dB	-102dB
					Tx Power	500kw (Rated)	500kw (Rated)	500kw (Rated)	500kw (Rated)	500kw (Rated)
					Software	IRIS	IRIS	IRIS	IRIS	IRIS
					OS	Linux/Wind ows	Linux	Linux	Linux	Linux
					Communication System	Microwave Link	Satellite	Satellite	Satellite	Satellite



# Current Radar Observation and Basic Specifications

Sl.	Name of Radar Station	Types	Manufacturer	Special Purpose	Radar Parameters					
					Parameter	Joidevpur	RNG	COX	KHP	MLV
6	Joidebpur Radar (2023)	Doplar	JRC, Japan	Meteorological	Antenna Diameter	5 m				
					Radar Range	400 km				
					Radar Tower Height (These heights are up to Radom)	262 ft				
					Amplifier Unit	SSPA				
					Power supply Backup system	Capacitor Bank/ Generator				
					Tx Frequency	2.80Ghz				
					Pulse width	2 us				
					PRF	220 Hz				
					S min	-112 dB				
					Tx Power	10kw (Rated)				
Software	J-BIRDS									
OS	Linux/Wind ows									





# MONITORING AND MAINTENANCE ORGANIZATION

Electronic and Instruments (E & I ) Division is responsible for

- ✓ Radar monitoring, maintenance, troubleshooting etc.
- ✓ AWS
- ✓ Wind measuring System
- ✓ RS
- ✓ AWOS etc.





# MAINTENANCE OF WEATHER RADARS

- ✓ Daily
- ✓ Weekly
- ✓ Monthly
- ✓ Semiannually
- ✓ Annually





# CAPACITY DEVELOPMENT EFFORTS



Bangladesh Meteorological department is only authorized organization for weather Radar. BMD personnel monitor and maintenance the weather Radar regularly. Some efforts for capacity development are mentioned below

- ✓ OJT ( On the Job Training).
- ✓ Attend foreign training.
- ✓ Adapt with new technology.
- ✓ Experience share with foreign expert.



# Previous Operation Schedule



- ✓ Observations are taken every synoptic hour/Day
  - ✓ 00:00 UTC
  - ✓ 03:00 UTC
  - ✓ 06:00 UTC
  - ✓ 09:00 UTC
  - ✓ 12:00 UTC
- ✓ Upon the request from SWC/DFO (Headquarter)
- ✓ 24 hours observation is taken during abnormal condition.



# Present Operation Schedule of Joidevpur radar(Gazipur)

- ✓ Observations are taken every 10 minutes .synoptic hour/Day







# DAILY CHECK SHEET



Daily Maintenance check sheet (2/2)

klystron No. 982	Check Item	TRANSMITTER		DEHYDRATOR		TASK CONTROLLER			Note	
		Operation time		Sensor	Counter	Alarm Indication				
		PRE HEAT (Hour)	RADIATE (Hour)	(kPa)		ANT	TX	RX		
Month/Year JUNE/2010										
Date/Time	Signature									
1 / :										
2 / :										
3 / :										
4 / :										
5 / :										
6 / :										
7 / :										
8 / :										
9 / :										
10 / :										
11 / :										
12 / :										
13 / :										
14 / :										
15 / :										
16 / :										
17 / :										
18 / :										
19 / :										
20 / 6/10	Attah	11882.2	03042.7	23.5	2801	No	No	No	No	260.1-H
21 / 6/10	Attah	11892.2	0243.1	21.5	2807	No	No	No	No	
22 / 6/10	Attah	11897.7	0244.3	21.2	2807	No	No	No	No	
23 / 6/10	Attah	11907.6	0247.1	22.8	2810	No	No	No	No	
24 / 6/10	Attah	11917.5	0249.3	26.5	2814	No	No	No	No	
25 / 6/10	Attah	11927.3	0251.3	15.7	2816	No	No	No	No	A.K.
26 / 6/10	Attah	11936.1	0253.3	22.6	2820	No	No	No	No	
27 / 6/10	Attah	11947.1	0255.5	22.4	2823	No	No	No	No	
28 / 6/10	Attah	11957.8	0257.5	25.6	2826	No	No	No	No	OK.
29 / 6/10	Attah	11967.2	0259.6	25.5	2828	No	No	No	No	OK.
30 / 6/10	Attah	11978.4	0261.7	26.2	2832	No	No	No	No	OK.
31 / :										

Present klystron reading: Total Radiate hours: 1



# WEEKLY CHECK SHEET



Weekly Maintenance Check Sheet (1/2)

Kivastan No. 982	Check Item	RADOME OHS Light Indication	ANTENNA		ANTENNA CONTROLLER					DRSP							Note		
			Operating condition		Meter Indication DC voltage					Rotation Speed (rpm)	Meter Indication DC voltage								
			visually	aurally	-15V (V)	+6V (V)	+12V (V)	+16V (V)	+24V (V)		+5V-RF (V)	+15V-RF (V)	-16V-RF (V)	+5V (V)	+12V (V)	-12V (V)		+24V (V)	
					+/-5%	+/-5%	+/-5%	+/-5%	+/-5%	+/-10%	+/-5%	+/-5%	+/-5%	+/-5%	+/-5%	+/-5%		+/-5%	
Year 2010	Month																		
Date/Time	Signature																		
30/6/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
27/6/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
04/7/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
11/07/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
18/07/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
25/07/2010	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
01/8/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
08/8/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
16/8/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
23/8/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
30/8/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
06/9/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
13/9/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
20/9/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
27/9/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
04/10/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
11/10/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
18/10/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
25/10/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
31/10/10	Atta	OK	OK	OK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

30/6/2010  
 27/6/2010  
 04/7/2010  
 11/07/2010  
 18/07/2010  
 25/07/2010  
 August 2010  
 01/8/10  
 08/8/10  
 16/8/10  
 23/8/10  
 30/8/10  
 September 2010  
 06/9/10  
 13/9/10  
 20/9/10  
 27/9/10  
 October 2010  
 04/10/10  
 11/10/10  
 18/10/10  
 25/10/10  
 31/10/10





# WEEKLY CHECK SHEET



Klycon No		Check		Weekly Maintenance Check Sheet (2/2)																												Note
Date		Time		TRANSMITTER/RTU																												
Year		Month		Meter Indication																												
				DC Voltage								KLYN Header				Power Cdd				Intensity Mode				Display Mode								
				-15V	+15V	-15V	+15V	+5V-1	+5V-2	-15V	-5V-2	+15V	Voltage	Current	Voltage	Current	Voltage	Current	MOD PS Voltage	MOD PS Current	KLY CATH Current	POWER METER	MOD PS Voltage	MOD PS Current	KLY CATH Current	POWER METER	MOD PS Voltage	MOD PS Current	KLY CATH Current	POWER METER		
				0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V
				±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%
Data Type		Signature																														
JUNE 2010		24/6/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.2	160.2	15.0A	32.0A	86.8	158.2	19.5	42.0	86.8	Remate						
		27/6/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.2	160.4	15.0A	32.0A	86.8	157.2	19.5	42.0	86.8	Remate						
JULY 2010		04/07/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.2	160.3	15.0A	32.0A	86.8	157.2	19.5	42.0	86.8	Remate						
		11/07/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.2	160.2	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		15/07/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.2	160.2	15.0A	32.0A	86.8	157.2	19.5	42.0	86.8	Remate						
		25/07/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.3	15.0A	32.0A	86.8	157.6	19.5	42.0	86.8	Remate						
August 2010		11/8/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.4	19.5	42.0	86.8	Remate						
		08/8/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.4	19.5	42.0	86.8	Remate						
		14/8/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.4	19.5	42.0	86.8	Remate						
		23/8/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		09/08/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.4	19.5	42.0	86.8	Remate						
September 2010		06/09/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.15	160.1	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		17/09/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.1	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		26/09/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		30/09/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
October 2010		4/10/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		11/10/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		18/10/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		25/10/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						
		31/10/10	Attan	✓	✓	✓	✓	✓	✓	✓	✓	✓	5.6	27.4	58.0	22.0	3.1	160.0	15.0A	32.0A	86.8	157.3	19.5	42.0	86.8	Remate						



# MONTHLY CHECK SHEET



Monthly Maintenance Check Sheet

Klystron No.	Check Item	TRANSMITTER/ATU								DRSP				DEHYDRATOR	Note	
		Frequency (MHz)	Intensity Mode			Doppler Mode			Power Meter Zeroing	Aging (for Spare Klystron)	Smin (dBm)	Dynamic Range (dB)	ZCAL (dB)	IP Signal Level Check (dB)		Silica gel Color Check
			PRF (Hz)	Pulse Width (µs)	Transmit Power (kW)	PRF (Hz)	Pulse Width (µs)	Transmit Power (kW)								
982		2850	320	2.0	500	720	1.0	500			-120	90	Long -42.79dB Short -37.18dB	6		
Month/Date	Signature	+/-5MHz	+/-10%	+20%,-0%	+/-10%	+/-10%	+20%,-0%	+/-10%			More than -110dBm	More than 80dB		+/-1dB		
Jan /																
Feb /																
Mar /																
Apr /																
May /																
Jun /																
Jul / 2010	Attahar	284988	3205	2.08	478kW	71942	1.07	8674 472kW	done	980	-1231	-81.51 -36.25	-40.73 -36.25	6.2	OK checked.	
Aug / 2010	Attahar	284987	3205	2.08	470kW	71942	1.07	8671 470kW	done	981	-1221	-81.5 -36.49	-42.32 -36.49	6.45	OK checked.	
Sep / 2010	Attahar	284988	3205	2.08	484kW	71942	1.08	867 468kW	done	979	-1231	-81.54 -35.57	-40.55 -35.57	6.40	OK checked.	
Oct / 2010	Attahar	284987	3205	2.04	490kW	71942	1.04	8687 485kW	done	980	-1221	-81.60 -36.53	-41.46 -36.53	6.3	OK checked.	
Nov / 2010	Attahar	284988	3205	2.04	483kW	71942	1.04	867 477kW	done	981	-1221	-81.52 -36.51	-41.39 -36.51	6.25	OK checked.	
Dec / 2010	Attahar	284988	3203	2.08	465kW	71942	1.08	867 457kW	done	979	-1221	-81.52 -36.51	-40.8 -36.51	6.3	OK checked.	





# SEMIANNUALLY CHECK SHEET



Semiannual Maintenance Check Sheet

Klystron No. 982	Check Item	ANTENNA										RADOME			ANTENNA	ANTENNA CONTROLLER			TRANSMITTER/TU				DRSP		Note	
		EL Section					AZ Section					Viewing Check			Replace Grease	Position Accuracy		Cleaning Air Filter	Klystron Input Level (dBm)	Tank oil Level	Cleaning Air Filter	Power Meter Calibration	Cleaning Air Filter	STALO Output Level (dBm)		COHO Output Level (dBm)
		Oil Level	Oil Leaking	Oil Color	Belt	Oil Level	Oil Leaking	Oil Color	Belt	Internal View	Panel Caulking	Base Caulking	EL	AZ												
		✓	✓	No	ok	2.8	✓	No	ok	9.78	✓	ok	ok	ok		ok	ok									
Date/Month/Year	Signature														less than 0.1degree	less than 0.1degree		33dBm +/-1dB							3.5 +/- 1dB	-0.2 +/-1dB





# PREVIOUS RADAR PRODUCTS



- ✓ Raw products: 03
  - ✓ Intensity
  - ✓ Doppler Velocity
  - ✓ Spectrum Width
- ✓ Various Products:
  - ✓ PPI
  - ✓ CAPPI
  - ✓ VVP
  - ✓ RTI
  - ✓ SRI
  - ✓ BASE
  - ✓ MAX
  - ✓ HMAX
  - ✓ RAIN ETC.



# DATA PROCESSING

Meteorologist are responsible for

- ✓ Receiving data.
- ✓ Processing the weather radar data.
- ✓ Analyzing those data
- ✓ Prepare nowcast, warning etc.
- ✓ Dissemination.







# DOMESTIC RADAR COMPOSITE

- ✓ Northern composite ( RNG and KHP radar)
- ✓ Southern Composite ( MLV and COX radar)
- ✓ Central Composite (All)

At present composite work is not working.





# UTILIZATION AND APPLICATION



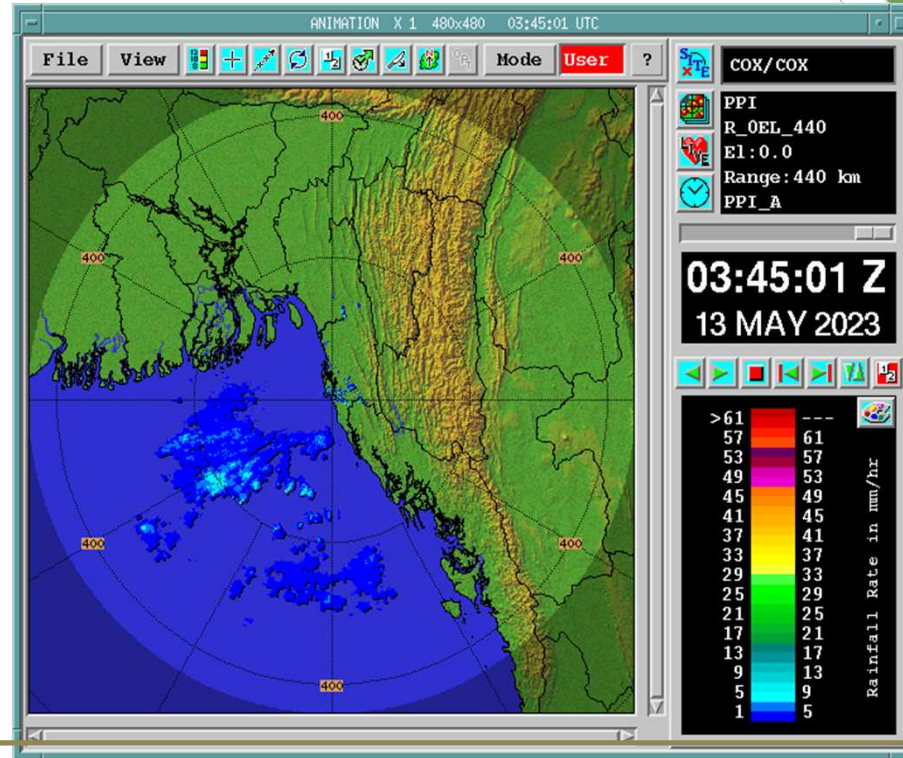
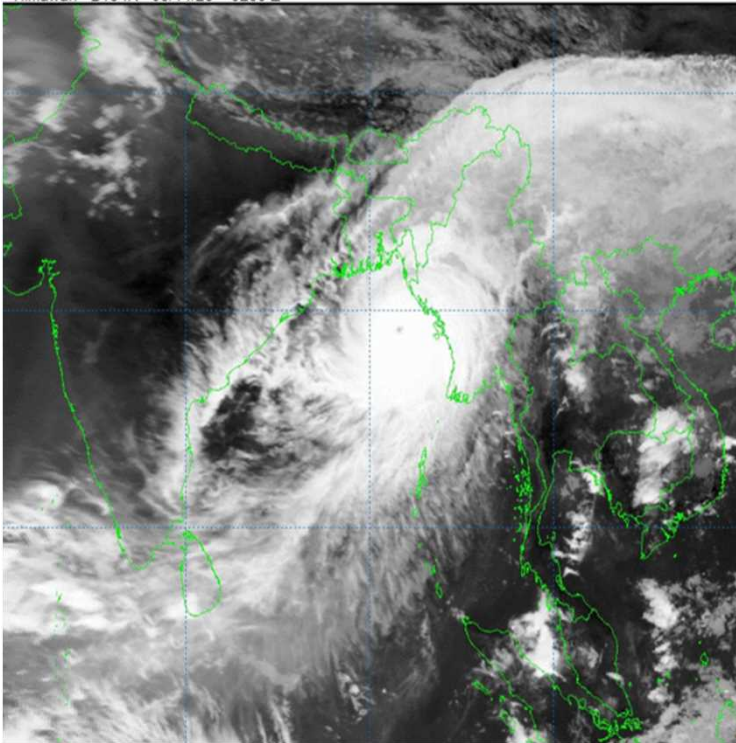
- ✓ Nowcast
- ✓ Cyclone warning
- ✓ Thunder lightning (EES)
- ✓ Rainfall (real time)
- ✓ Flash Flood warning
- ✓ Wind Speed and Direction



# CYCLONE MOKHA COVERED BY COX RADAR



Himawari B13 IR 05/14/23 0230 Z





# TECHNICAL CHALLENGES

- ✓ Lacking of Spare parts
- ✓ Lacking of skilled Manpower
- ✓ No institutional training
- ✓ Old age radar







# FUTURE PLAN

- ✓ Established New radar
- ✓ More Accurate Observation
- ✓ Data communication platform
- ✓ Skilled Manpower
- ✓ Adequate training
- ✓ Continuous supply chain of spare parts
- ✓ Data QC





# ISSUES

- ✓ Proposal for new radar (SSPA, Dual polarization)
- ✓ Radar training for capacity building
- ✓ Joining to radar network.
- ✓ Data/Information exchange
- ✓ Training on Operation, maintenance and troubleshooting



# QUESTION & ANSWER

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, with some extending towards the center. The overall aesthetic is modern and clean.

