

WMO/ASEAN

*Training Workshop on Weather Radar Quality Control & Radar Data
Exchange (Bangkok, 28 Jan – 2 Feb 2014, Thailand)*

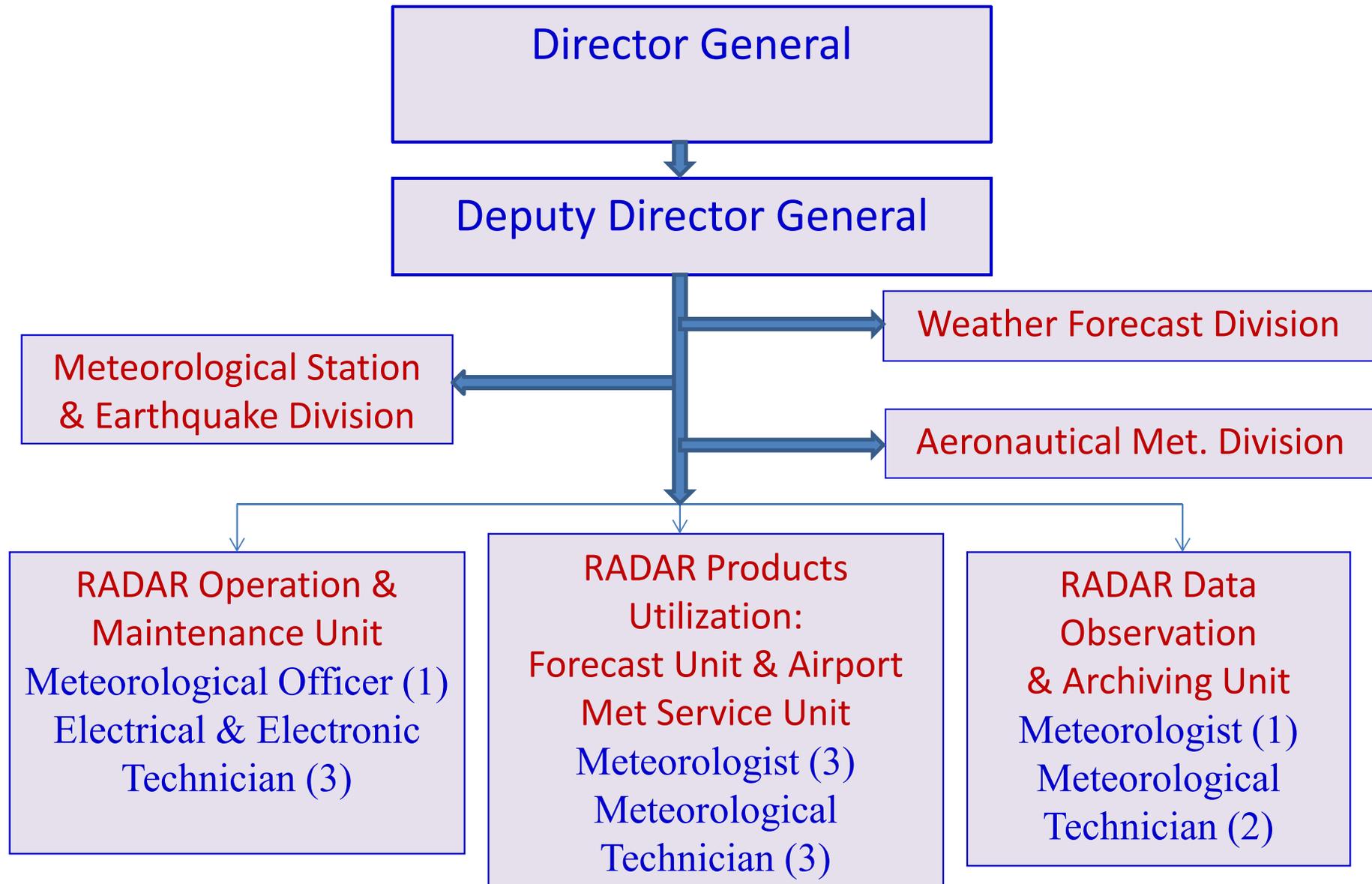
Current Status of Weather Radar, Maintenance, and Utilization in Lao PDR

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Outline :

- 1. DMH Organization**
- 2. Overview of the Current Radar System in Lao PDR;**
- 3. Specification of Radar System**
- 4. Maintenance of Equipment**
- 5. Current Challenging.**
- 6. Future Development Plans ;**

1. Organization DMH

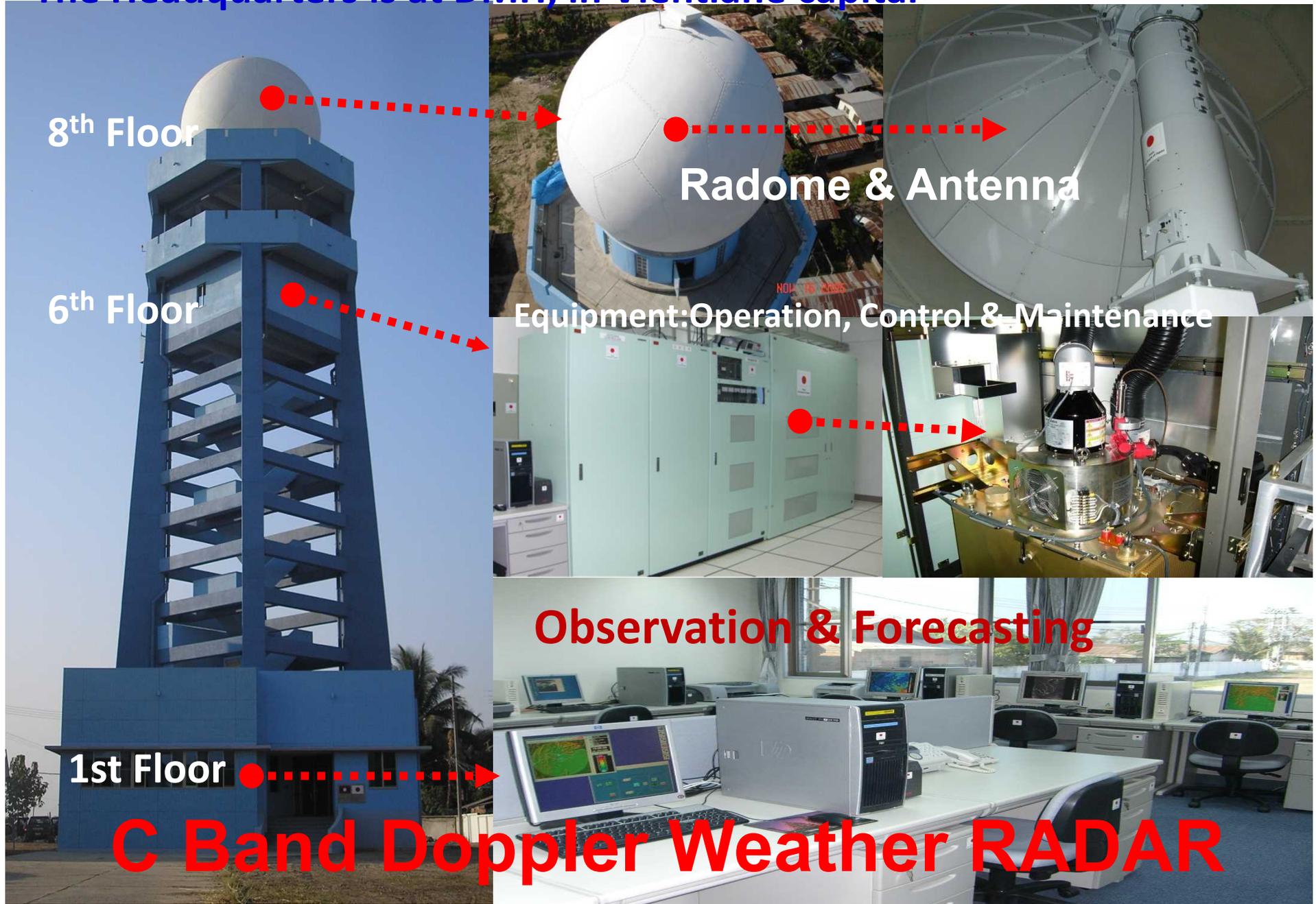


2. Introduction/Overview

- Lao PDR has only one Doppler Weather Radar, C Band, located at DMH , Vientiane capital
- Supported by Government of Japan (Grant Aid)
- Started operation in March 2006, and followed by :
 - ✓ JICA Technical Cooperation Project (TCP), July 2007 to Jan 2010 for radar operation, maintenance, trouble shooting, and data analysis
 - ✓ JICA senior volunteer Radar expert: from Mar 2010 to Jun 2014
- Radar Tower Building Structure: 8-storey/Floor, Maximum Height: 45m, Total floor area: 310 m square

3. Radar System.

The Headquarters is at DMH, in Vientiane capital



➤ High Data Rate Spread Spectrum Transceiver

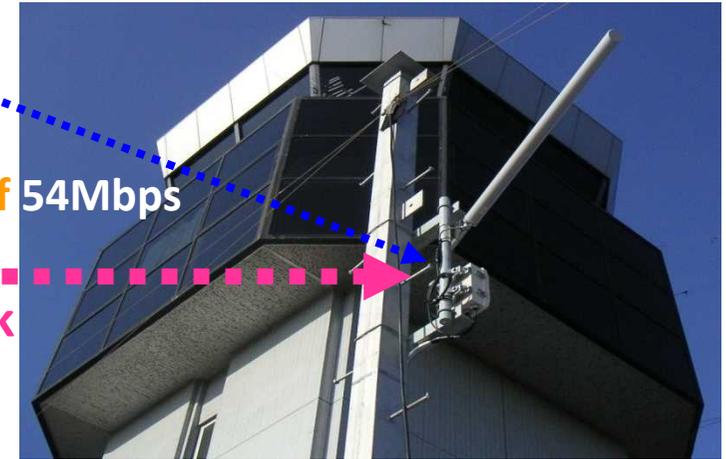
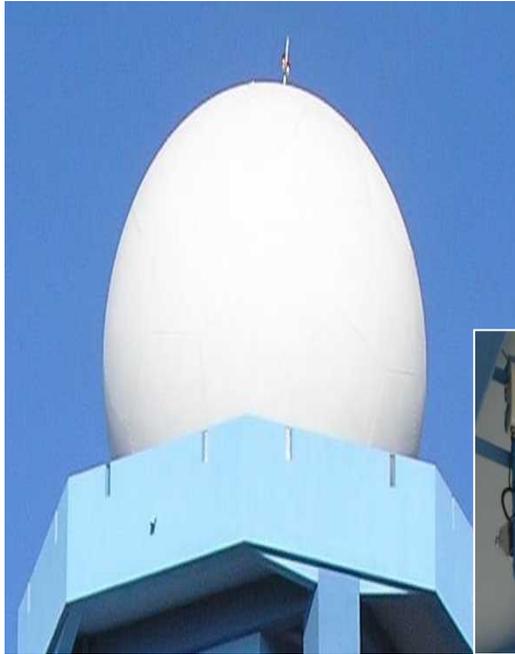
(SST)

Hi-speed Data TX & RX of 54Mbps

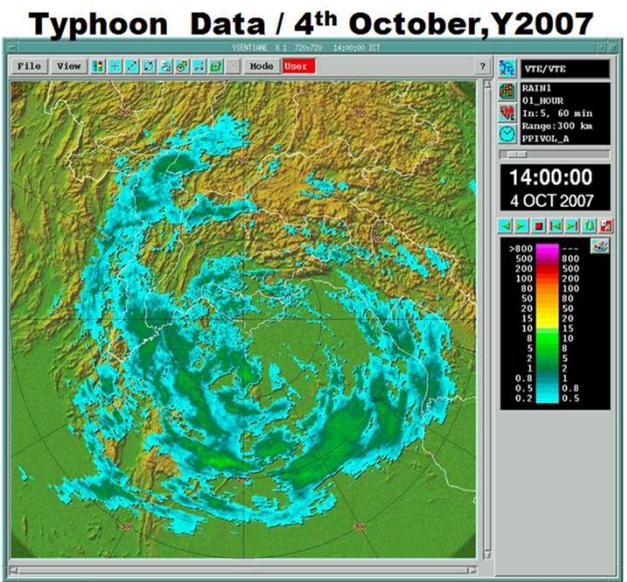
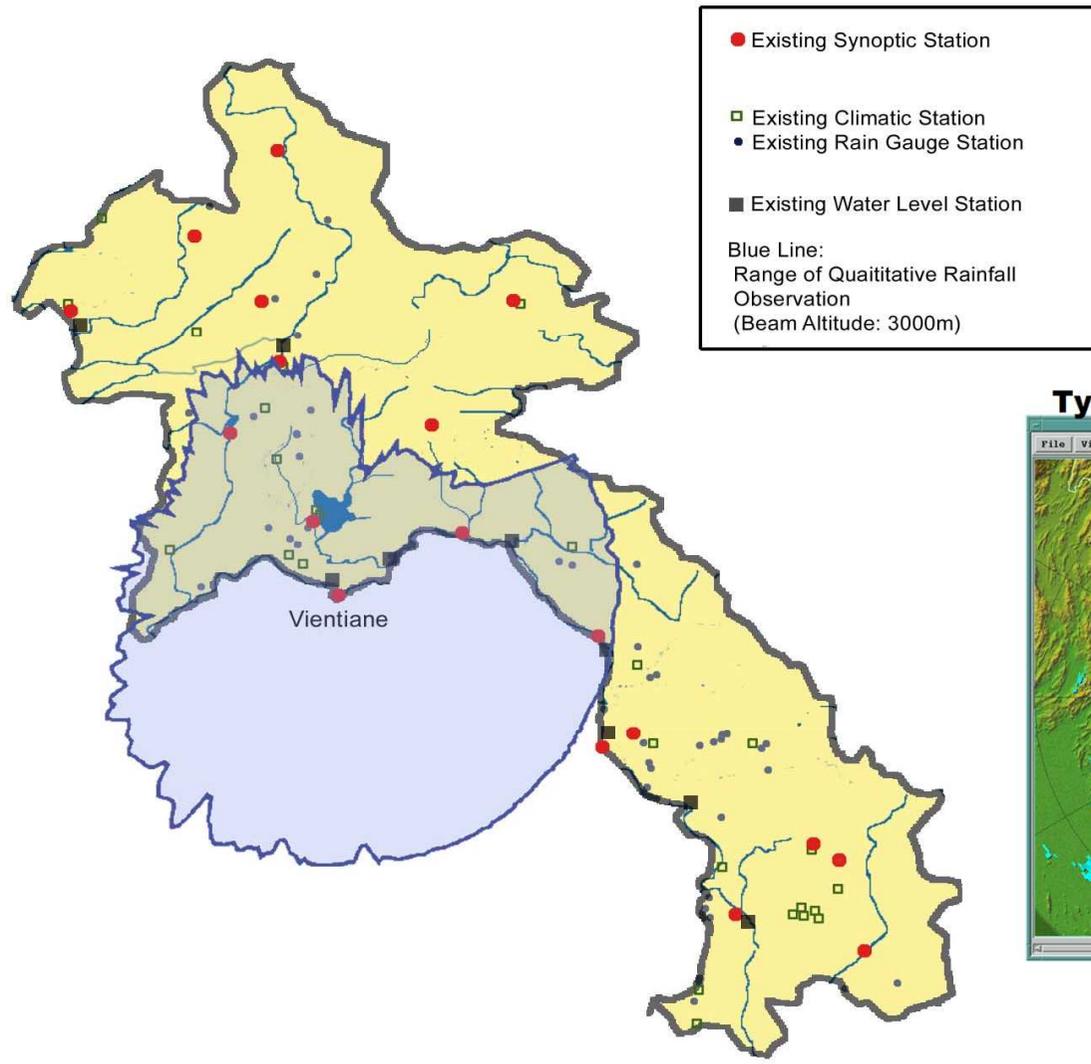
2.4GHz, Wireless Link
(Point to Point)

Main targeted
Service For
Safety Air
Navigation

Air Traffic Control Tower Site
International Airport (Wattay)



➤ Radar Coverage



4. Maintenance of Equipment

- The radar equipment is routinely maintained by staffs of DMH Laos & Operation Unit with the assistance of supervisor by Japanese Senior Expert.
- As Lao practice, the following steps have been adopted for practical tasks :
 - (1) The daily check and taking notes of metering for records is considered as Preventive maintenance measures;
 - (2) Semi-annual scheduled maintenance covers following activities;

- In case of one equipment abnormal or breakdown, the maintenance team of DMH will consult with Japanese expert and will carry out the repairing tasks. In the situation that DMH staff cannot resolve the failure cases, they have to request for expertise guidance or technical instructions from the radar manufacturer (Japan Radio Company) through e-mail.
- In case there is a need engineers team from radar manufacturer to visit and help repairing a big severe failure or faulty radar system, DMH has to submit a formal request for JICA support and arrangement.
- Following slides show photos of actual maintenance.

Assembling scaffold for maintenance Antenna



Replenish grease, replace oil, check belt tension and function switch of antenna



Replace Klystron & Inspection



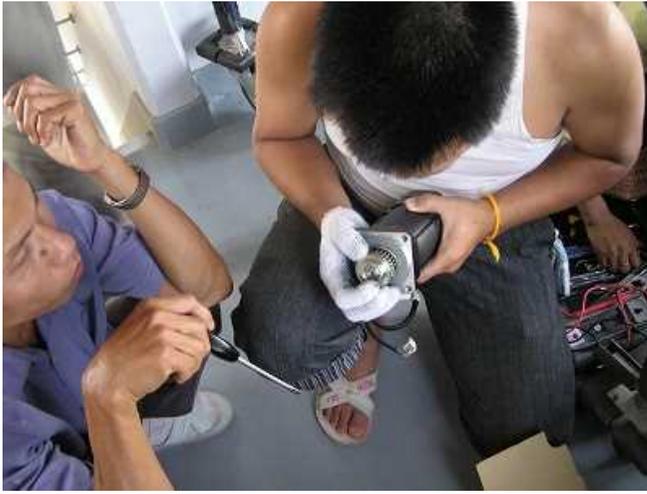
Check the Transmitter & Radar Control Unit



Cleaning Radome & Water Leakage Protection Calking



Repair antenna control system : Azimuth & Elevation Motors and belts



5. Current Challenging

(i). A serious problem is radio frequency interference signal from outside to the Vientiane Radar.

Remark: According to ITU (International Telecommunication Union) regulations, weather radar must employ allowable frequency band, normally 5,600 MHz, but the Vientiane Doppler weather radar frequency is 5,300 MHz, it is acceptable for an exception only;

➤ **Technical Problems**

- The observation range of the current Vientiane radar is too small for precipitation areas of the whole country;
- Potential generation of a shadow area due to obstacle to the radar radiation beam by taller buildings under urban development in near future;
- Expensive spare parts lead to limitation of availability of spare in stock which will result in delay of recovering failure cases;
- Air leakage of the waveguide system, Dehydrator abnormal compressor or increased as compared to the initial installation period;
- Severe Lightning hit, can damage almost hardware and software of radar system in the last few years ;

6. Future Development Plans

- To expand the radar observation area or coverage area through the bilateral cooperation with Thailand (TMD) and Vietnam NHMS to establish the radar data exchange and application of data composite techniques;
- To implement countermeasures against the radio frequency interference from outside. DMH has to make a concrete effort and submit a request to JICA for potential support on technical and expert;

Future Development Plans (Contd.,)

- To execute or conduct an educational program for radar maintenance staff to upgrade their skill in electronics technology , computer O.S and radar applications software.
- To perform the evaluation of wind data observed by radar, aiming to be able to provide wind shear data to the Air Traffic Control (ATC) at the airport authority.

Thank You for
Your Attention