International Workshop On The Assessment of Socio-economic Benefits of Meteorological and Hydrological Services

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Socio-economic Benefits of Malaysian Meteorological Services in Aviation

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21-29 November 2009

Country Description

Malaysia

- Location:

  Between latitude 2° & 7° N off Equator

  Malaysia consists of 13 states
- Population

  25.27 million
- Total Land Mass

  329,750 square km

COUNTRY DESCRIPTION

Culture

• Malaysia consists of multi racial society with majority of them are Malays, Chinese & Indians
- and also other indigenous groups

• Multiculturalism has not only made Malaysia a gastronomical paradise it has also made Malaysia home to hundreds of colorful festivals

Weather

• Tropical climate with warm & humid weather all year round
• Annual rainfall:2000-2500mm
• Temperature:15°C-25°C

Meteorological Services for Aviation

We are providing the following Meteorological Services for aviation purposes:

- continuous Meteorological Information and forecast for airline operators, Air Traffic Management Service (ATMS), Airport Operation Centre (AOC) and Search and Rescue (SAR) operations

- full meteorological documentation and briefing for all international & domestic flights out of the airport, & brief the clients about the weather whenever necessary

- Terminal Aerodrome Forecast (TAFOR) at six hour intervals and valid for 24 hours for all airport.

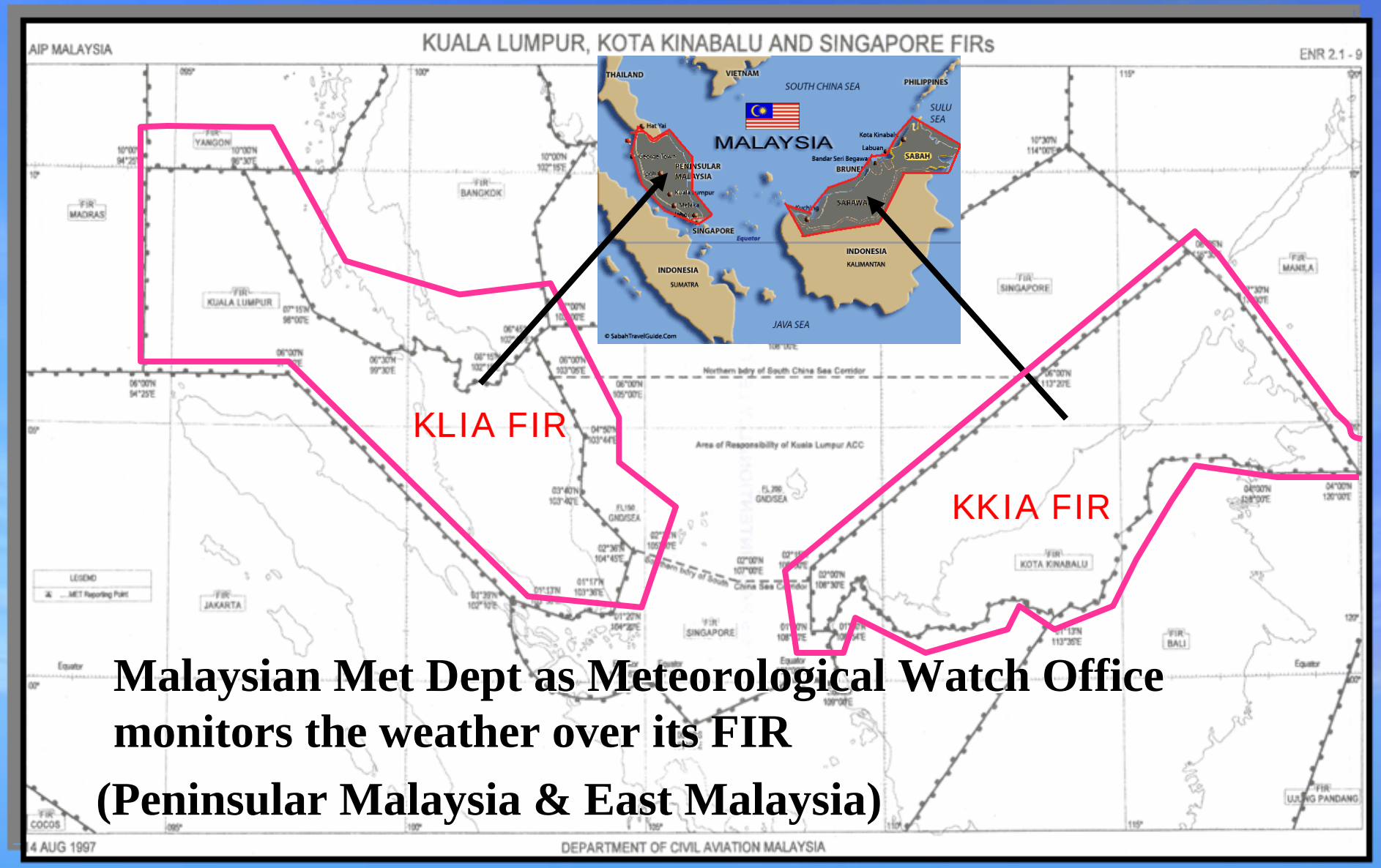
- Aerodrome warnings of significant meteorological parameters crucial for aircraft safety whenever necessary

- SIGMET (Significant Meteorological Events) warning for our Flight Information Region (FIR)for specific meteorological parameters crucial for the safety of the flight operation

Meteorological Services for Aviation

- Monitor thoroughly the weather that lies within our FIR to ensure safety of aviation operation
- Tropical storm, volcanic ash and radioactive emergency advisories and warnings
- Forecast for area QNH for our FIR
- Provide continuous information about the latest up to date and real time meteorological data for a safe take off and landing purposes of all aircraft

Flight Information Region (FIR) Of Malaysia



Products

METAR WMKK 080400Z 16008KT 9999
FEW018 BKN280 30/25 Q1009 NOSIG=

METAR (Routine Aviation Report)
SPECI (Special Weather Report)

TAF WMKK 080300Z 0806/0906 14008KT 9999
FEW017CB BKN280 TEMPO 0807/0811 4000
TSRA FEW015CB SCT018=

TAFOR (Aerodrome Forecast)

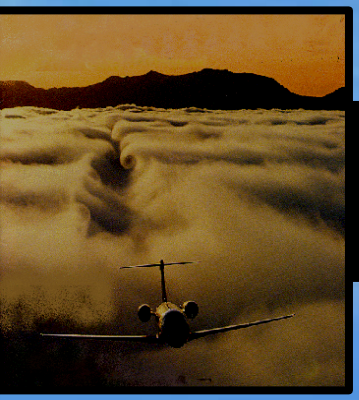
TAKEOFF CONDITIONS

ISSUED BY MALAYSIAN METEOROLOGICAL OFFICE KLIA

ON 182200 UTC AUGUST 2003

DAY/HOUR (UTC)	WIND DIR/SPEED (DEGREES/KNOTS)	AIR TEMP (DEG CELCIUS)	DEWPOINT (DEG CELCIUS)	QNH (hPA)
182300	16005			
182400	16005	27	25	1009
190100	16005	28	25	
190200	16005	29	25	1011
190300	16005	30	25	1010
190400	16005	30	25	1010

FORECAST TAKE OFF DATA



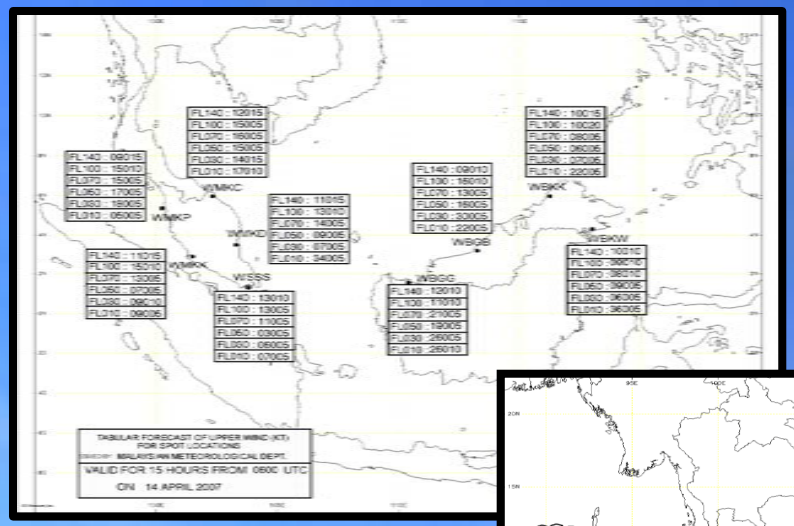
SIGMET

WSMS31 WMKK 091345
WMFC SIGMET 02 VALID 091345/091745 WMKK
WMFC KUALA LUMPUR FIR EMBD CB/TS OBS S OF
N0558 BTN E09909 AND E10046 FCST STNR INTST NC=

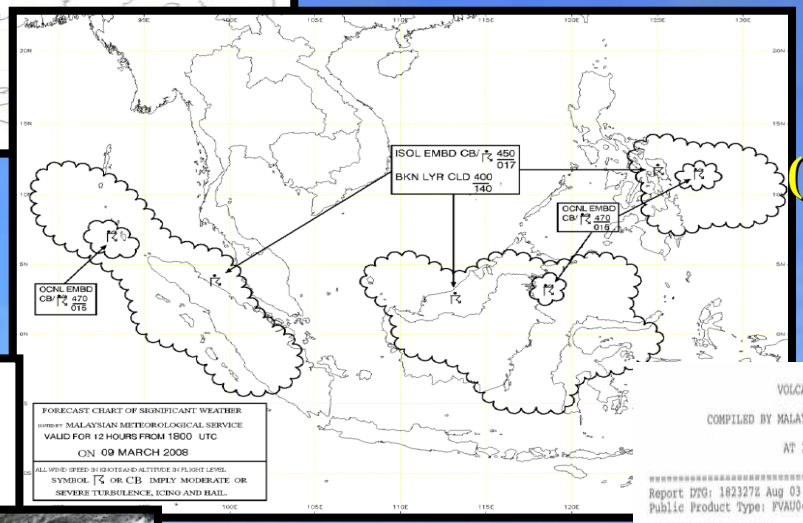
AD Warning (Aerodrome Warning)

WOMS31 WMKK 160915
WMKM AD WRNG 1 VALID 160915/161115
EMBD CB/TS OBS WI 20NM RAD OF WMKM AD MOD TO SEV TSRA IS
EXPECTED WITH VIS LESS THAN 3000M AND GUSTS UP TO 15KT=

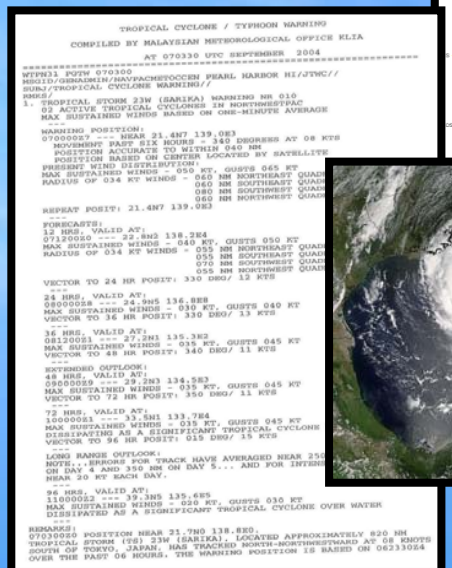
Products



SPOTWIND
(Upper Air Wind)



SIGCHART
(Significant Weather Chart)



Tropical Cyclone Advisory

Volcanic Ash Advisory

System and Facilities

• The technology today has enabled us to provide better forecast and significant weather warnings.

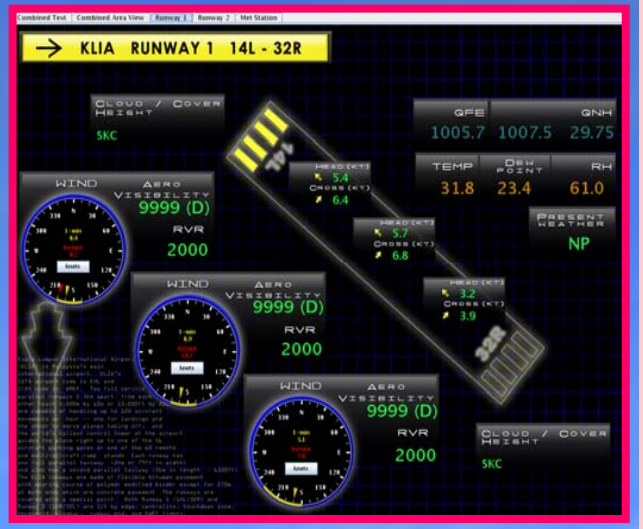
• MMD has introduced certain facilities which are exclusive to KLIAMO such as ABT, TDR , WPS, PLWS, AWOS & AWS.

AUTOMATED WEATHER OBSERVATION SYSTEM (AWOS)

- **are set up along Runway1 & 2 in KLIA**

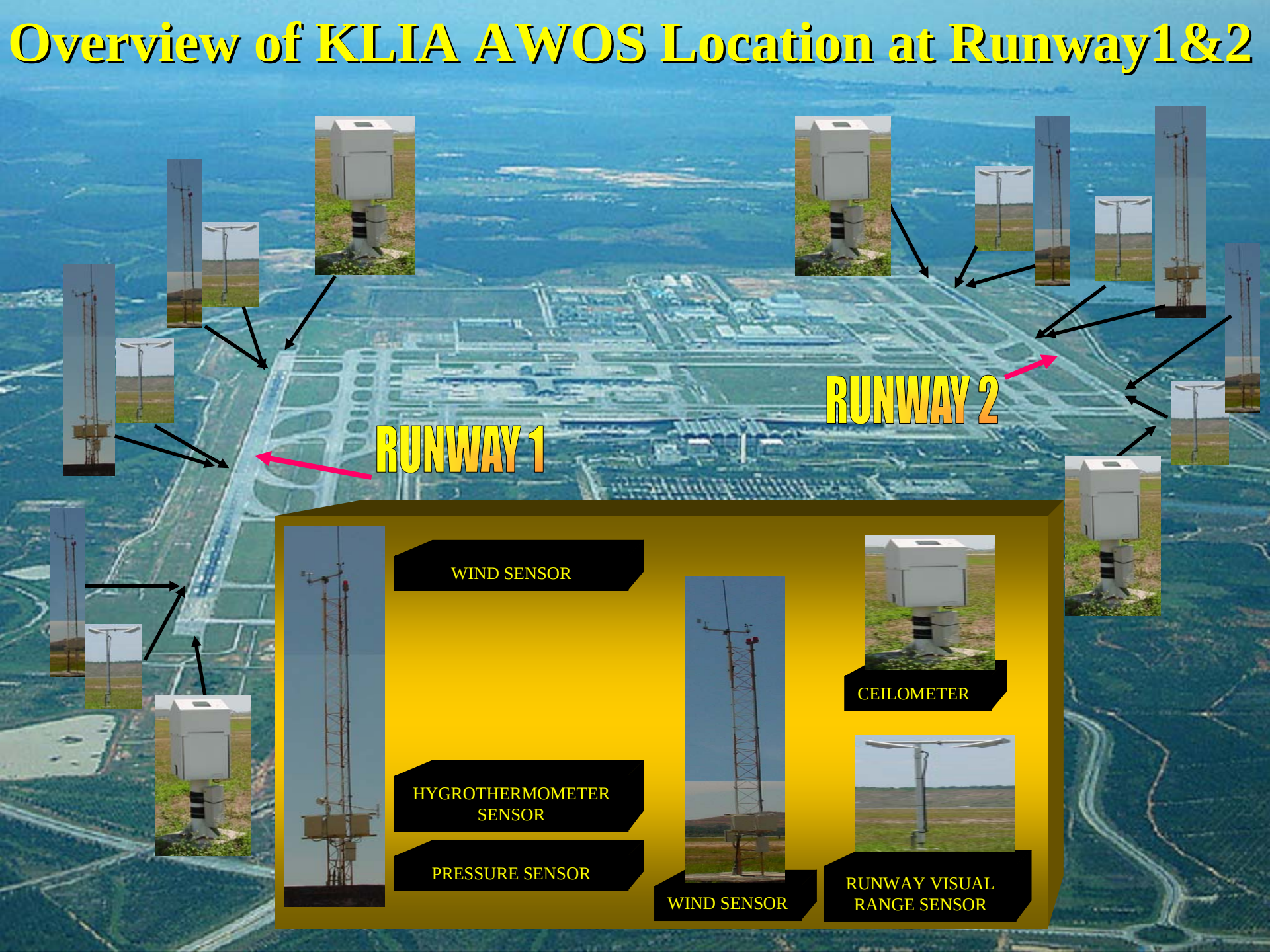
- **This system provides current information at real time from both runway**

- **Information such as runway Visibility, Wind Speed and Direction, Temperature, Pressure & Cloud Base Height is vital to the *Air Traffic Controller (*ATC) as it is important for a safe landing & take off**



The AWOS Display

Overview of KLIA AWOS Location at Runway1&2

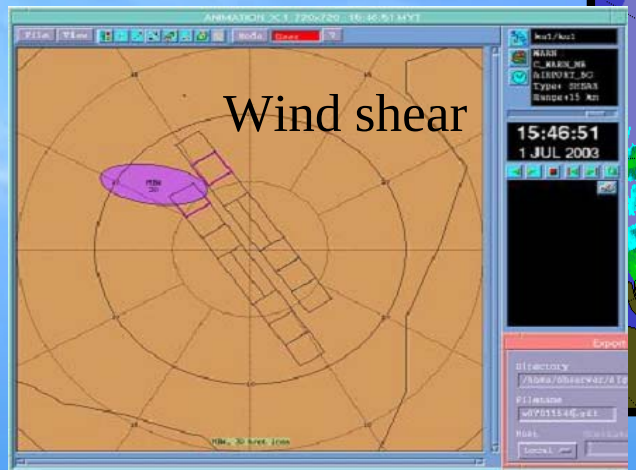


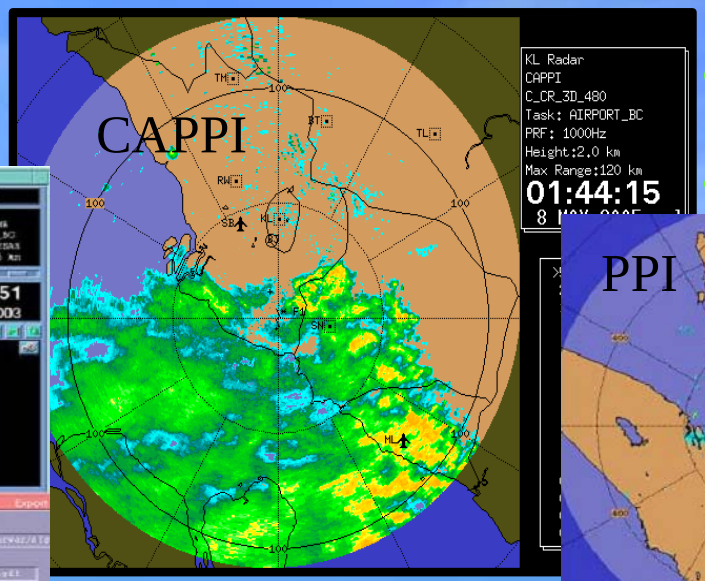
TERMINAL DOPPLER RADAR (TDR)

TDR provides precipitation intensity in terms of Rainfall Rate for CAPPI, PPI & Wind shear on KLIA Runway

To detect

- Wind shear
- Microburst



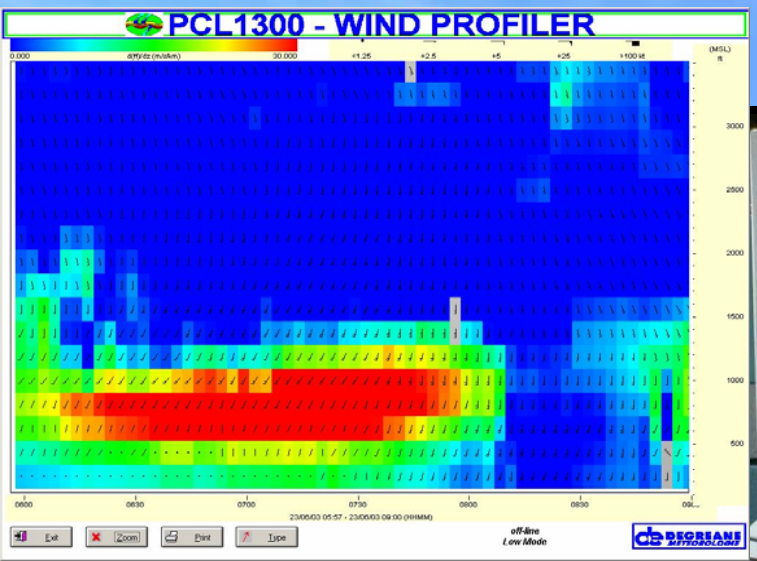


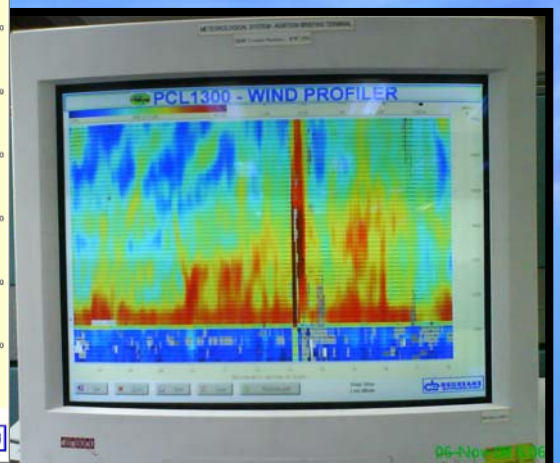
WIND PROFILER SYSTEM (WPS)

- To measure vertical wind profile
- To detect :-

(a) Turbulence

(b) Wind Shear





PLWS (Precision Lightning Warning System)

- To detect lightning that occurs within the aerodrome

Automated Weather System (AWS)

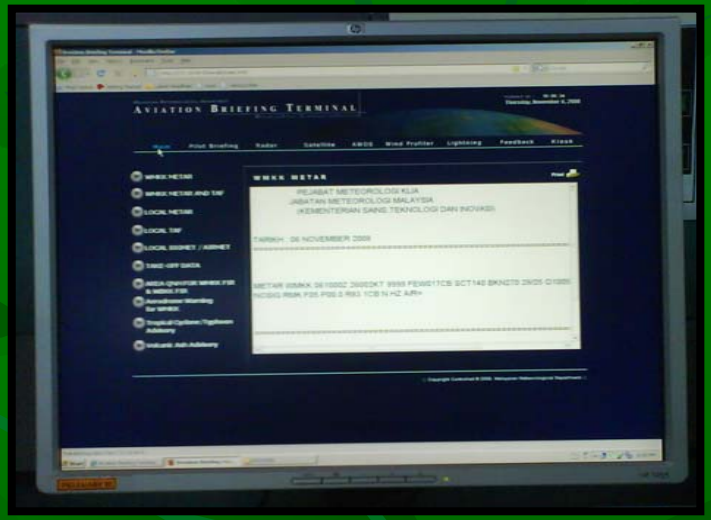
KLIA Met. Station

- This system provides meteorological data at every half hour interval
- These data such as wind speed and direction, precipitation, temperature, due point, pressure are used to compute into METAR & SPECI report

Aviation Briefing Terminal (ABT)

- Aviation Briefing Terminal (ABT) are set at crucial essential location surrounding KLIA where it could be accessed by pilots, airport operators and airlines to obtain relevant information & meteorological products compiled through Total Airport Management System (TAMS)

- It could also be accessed through the web with KLIA Met Office's consent



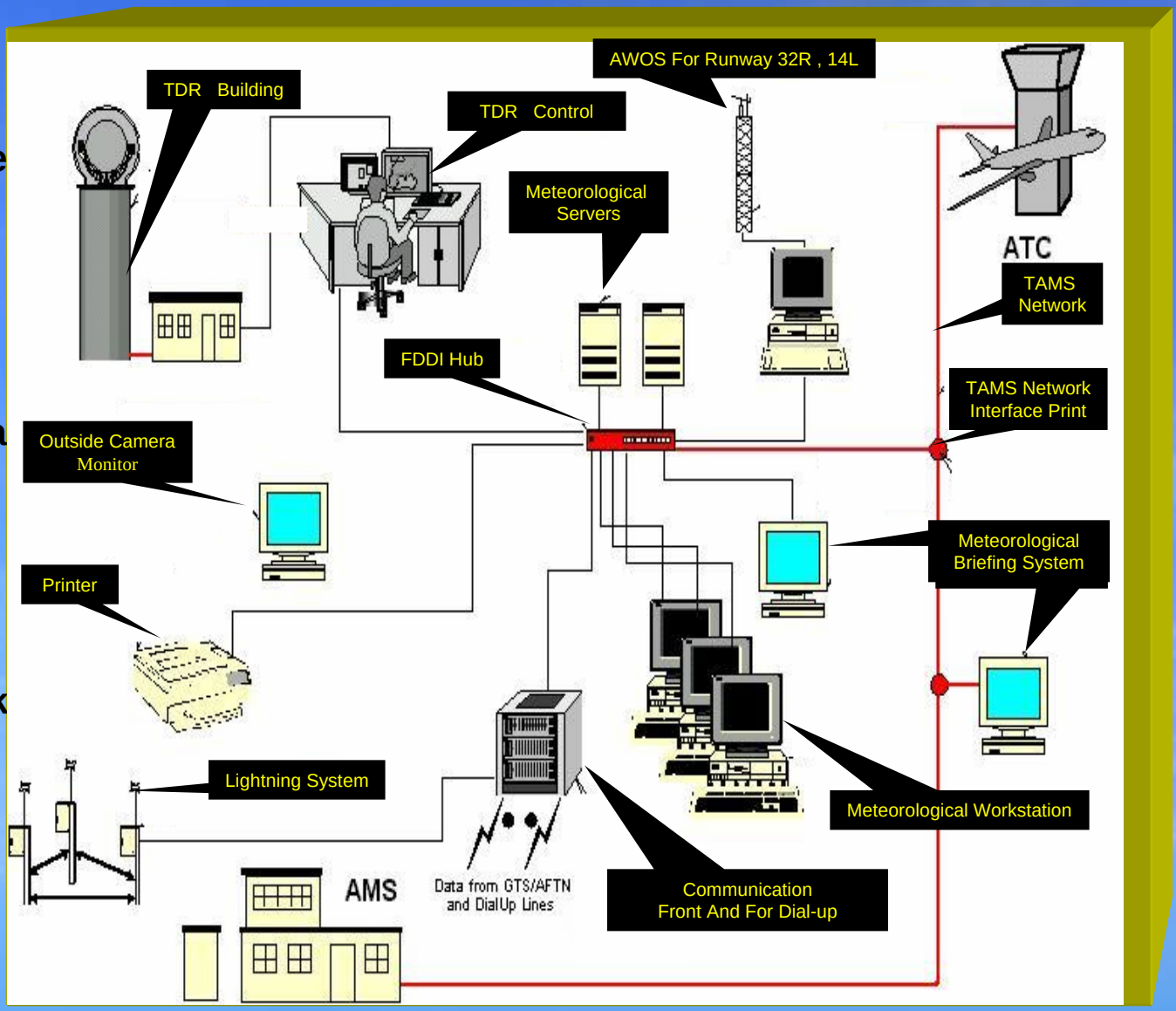
Meteorological Data Processing System (MDPS)

- Meteorological Data Processing System (MDPS) - main system used in KLIA Met Office
- Function

i. Collect, Process, Analyze & Integrate all data & products

ii. Data & met info are received through Globa Telecommunication System (GTS), Aeronautical Fixed Telecommunication Network (AFTN) & Weather Radar Network to produce & display them

iii. Disseminate all info & products through Total Airport Management System (TAMS) to be accessed by users & clients



KLIA Meteorological Office

OUR CLIENTS

ROYAL MALAYSIAN AIR FORCE

AIRLINES & FLYING ACADEMIES

DEPARTMENT OF CIVIL AVIATION (DCA)

PETRONAS "*FUEL FARM*" OPERATOR

"*TRACK TRANSIT SYSTEM*" OPERATORS

F1 CIRCUIT, SEPANG

SOCIOE-CONOMIC BENEFITS OF AVIATION SECTOR

Aviation sector drives economic and social progress

- **It connects people, countries and cultures**
- **It provides access to global markets**
- **It forges link between develop and developing nation**
- **It generates trade and tourism**
- **Serve as the only means of transportation to remote areas**

Socio-economic benefits of Meteorological Services in Aviation

Aviation directly benefited from precise forecasts and early warnings. Main benefits and impacts of Met information in Aviation ;

- **enhanced public / military / global aviation safety**
- **enhanced the efficiency of aviation operations**
- **Saving in Fuel**
- **Saving passenger times (reducing wait times on runways)**
- **Saving materials, properties and working times**
  (e.g airport maintenances)
- **Avoidance of sudden severe and hazardous weather events**

Future & on-going Plan

KLIAMO has all the up to date facilities and shall maintain and upgrade the services from time to time in tandem with new developments in technology and in accordance with ICAO and WMO requirements. Therefore To improve our services and to deliver better products and meteorological information

- **Installation Of Wind Sensors & Runway Visual Range (RVR) System in all airports in Malaysia under the 9th Malaysian Plan**

i. **Already implemented in military and civil aviation airports in West Malaysia & currently on going in the East Malaysia**

   i. **Could access the data display just like the AWOS display in KLIA runway through the web through KLIA Met Office's consent**

      e.g. : http://60.51.178.214:8088/home.php

- **Upgrade conventional radar around airports in Malaysia to Doppler radar just like in KLIA**

- **Aircraft Meteorological Data Relay (AMDAR) to be implemented by 2009**

- **Focus on Short-term weather forecasts rather than long-term forecasts**

Benefit-Cost Analysis

- Estimates cost needed for modernization and upgrading the Aviation meteorology facilities, software and equipments and human development in Malaysia is about RM35 mil (5-10yr plan)

Based on other studies (as a guide line**)**

- Air Transport Association estimates that the direct cost to airlines of flight delays (either mechanical or weather induced-) exceeds US$3.2 billion annually, in 2004 dollars (HayHurst, 2001).

- Aviation's global economic impact is estimated at US$ 3.5 trillion (2007) 7.5% of world GDP

Conclusions & Recommendations

- The Availability and usability of Meteorological Information in Aviation should be Improved, communications technology should be developed and awareness about the Benefits and possibilities of Meteorological Information should be Increased
- The economic value of meteorological information tends to increase with quality, accuracy and timeliness of information
- Better Understanding between Met services and the users will help to deliver services more effective and efficient

THANK YOU