WWW Technical Progress Report for 2004

1. Summary of highlights :-

* *Jan. 2003:* EMA upgraded internet speed using SDSL (1Mbps).⊓

   March 2003: Replaced the IBM mainframe S/390 by a new system.

2. Computing facilities :-

A.

* **H/W Equipment**
  * *The IBM Mainframe :-*
     * CENTERAL PROCESSOR UNIT:
  ⇒ Power 80 MIPS
  ⇒ Processor based on z-architecture , 64bit
  ⇒ Dynamic I/O reconfigurations management for peripherals
  ⇒ Dynamic memory sparing feature
  ⇒ Partitioning the processor resources into logical partitions
  ⇒ Crypto control
  ⇒ Console support controller to be attached to the processor
  ⇒ Availability of ESCON channels to connect peripherals that use ESCON
  ⇒ Availability of FICON channels to connect peripherals that use FICON
  ⇒ OSA cards with deferent options, OSA-FAST ETHERNET, and OSA-GB ETHRNET
  ⇒ Errors correction code capability
  ⇒ Support up to 50 channels for connectivity between the processors and currently existing peripherals
  ⇒ Connect a wide range of network protocols, including ATM, Token Ring, Ethernet and FDDI
  ⇒ Full compatibility with IBM operating system(VSE/ESA and OS/390)
  ⇒ Communicate with the already existing computers in the center of the existing databases of the various units of EMA (According to site survey)
     * STORAGE UNIT:

  ⇒ 3 ESCON channels and one FICON channel.
  ⇒ The capacity at least 400 GB useable, raid-protected, with the scalability can be extended to one TB.
  ⇒ Support parallel access volume.
  ⇒ Support multiple allegiances.

  ⇒ ═══════════════════════════════
     ⇒ S/390 integrated Server .
     ⇒ Processor/Memory Card 256 MB .
     ⇒ SSA DASD 72 GB .
     ⇒ 4mm DDS-3 Dat Tape Drive .
     ⇒ CD-ROM .
     ⇒ 3.5'' FDD .
     ⇒ Fixed disks 93 45/B/12 (Disk capacity 8GB) .
     ⇒ Cartridge magnetic tape unit 3490E/C22 .
     ⇒ Magnetic tape unit 2240/A01 .
     ⇒ Line printer 6262 .
     ⇒ 4 HP 750 C++ Graphic color plotter .

⇒ 2 HP 800 PS

⇒ Terminal cluster controller 3174-01L

⇒ 15 Terminals graphic display .

The Climeteological Data Base:-

⇒ 1 SUN server enterprise 450:CLISYS

⇒ 4 SUN Blade workstations:NCDB1 NCDB2 NCDB3
NCDB4 –Solaris 2.8.

⇒ PC Windows 98.

• Windows NT LAN :-

⇒ NT Server IBM 300GL, Pentium III, processor 500MHz.

⇒ 12 IBM PC 300GL, Pentium III, processor 500MHz..

⇒ HP laser printer 2500C.

⇒ HP laser jet printer 4050.

⇒ One laser printer 4029 PS 39.

⇒ Tape cartridge 4/10 - 4mm.

⇒ 4 External Rewritable laser disk.

⇒ One Laser jet colour printer.

The Telecommunication system (AMSS) :-

⇒ AMSS Server (one live & one back-up) model IBM 325.

⇒ Concentrators.

⇒ Automatic change over subsystem (rack - form).

⇒ 3 Supervisory IBM PC 300 GL.

⇒ 3 Graphical PC 300 PL.

⇒ A4 colour Scanner.

⇒ 2 Routers.

⇒ 2 Stackable Hub.

⇒ HP ink jet colour printer.

⇒ HP Laser Jet 6P printer.

⇒ External CD-WRITER.

♣♣S/W Equipment :-

• The IBM Mainframe

⇒ VSE/ESA latest version

⇒ LINUX operating system

⇒ CICS

⇒ COBOL & FORTRAN AND C FULL FUNCTION

⇒ Advanced COMM Function/Network

⇒ Relation Data Base Management (RDBM)

⇒ Web enabled and FTP

The Telecommunication system (AMSS): -

* Operating system Unix Ver. 5.0.4.
* The system is based on the MESSIR automatic message switching system :-
  ♣ MESSIR-COMM: AMSS system equipment composed of server's supervisory PC's communication equipment ,etc,...
  ♣ MESSIR-VISION: The display in alphanumeric from of all observation and forecast reports and bulletins in WMO format.

MESSIR-VISION provides the graphical display of :-

-	WMO observation data	SYNOP,TEMP,METAR,AIREP....reports .
-	WMO processed data	NWP product word &regional Meteorological Centres & T4 code charts.
-	Meteorological image data	Satellite images data.

♣ **MESSIR-AERO:**-There are 6 workstations totally integrated and interfaced with MESSIR-COMM AMSS which provide the functions MESSIR Vision plus services for civil aviation proposed.

The Climateological Data Base:-

- ♣ **Oracle: -**
  - ＊ Version 8.1.7.
  - ＊ Enterprise edition on the CLISYS server (release 8.1.7.2.0).
  - ＊ Oracle client on each workstation (8.1.7).

- ♣ **Oracle environment: -**
  - ＊ Database on the CLISYS server 2 databases are running:-
    - – ORACLE_SID = CLIM operational database.
    - – ORACLE_SID = DBUSER development database (for users development).
  - ＊ Each client is configured to access to the DBUSER database (by a TWO-TASK environment variable under Unix clients)
  - ＊ Under the DBUSER database, 5 Oracle users have been created, with a default table space of 10MB each: train1/train1 train2/train2 .. up to train5/train5.

- ♣ **Unix environment: -**
  - ＊ Under each workstation is existing a Unix user: login= ncdb password= $ncdb.

B. _Graphics system_ :-
   We have a locally developed S/W for plotting and analysis of upper - air charts.

C. _Met. databank_ :-
   Daily, monthly and annual averages of different meteorological elements on computer readable media

D. _Quality control system for observation_ :-
   We have a locally developed S/W for quality control on the local observations only.

3. _Data and products from GTS in use_ :-

   ＊ The following types of observations, extracted from GTS are presently used at the centre according to the typical 24-hours amount :-

   SYNOP *4000*
   TEMP *440*
   SHIP *100*

   ＊ The following types of observations, extracted from GTS are presently used at the centre twice a day.
   ＊ TEMP 00 , 1200 GMT .
   ＊ GRID, GRIB.

* The AMSS system has a connections with SADIS, MDD and RETIM systems. It retransmit the output of these products to MESSIR - Vision and MESSIR-AERO at the forecasting centre and Airports.

4. Data input system :-

* Fully automated system for incoming bulletins and reports from the remote sites .
* Some human intervention available to correct bulletin . reports and to put our local observation .

5. Quality control system :-

1. Quality control of incoming data: the format of all coded reports are checked and if necessary corrected if possible.
2. All received messages are checked for internal consistency before storing and exchange.
3. Space consistency check.
4. Time series consistency check.

6. Monitoring of the observing system :-

* Surface and upper - air observations are monitored on the national level.
* From MESSIR COM we involves the collection of data for annual global for all type and send it to another client PC to make some operations to obtain the results reports to be carried out once a year in October {(1-5) and (1-15)} and send the monitoring results to the WMO FTP server via Internet.
* From MESSIR COM we involves the collection of raw data for all type and send it to another client PC to make A PRE-ANALYSIS by using DP4 software and send the monitoring results to the WMO FTP server via Internet periodically four times per year (February-April - July - October).

7- The forecasting system: -

(a) Mesoscale Model
The prediction model in use is the regional ETA coordinate Model with terrain representation basic equations & primitive equations.

Independent: Longitude, Latitude, ETA, time

Prognostic variables: Temperature, wind components, Specific humidity, Turbulent kinetic Energy, soil moisture, snow depth, Surface potential temperature.

Diagnostic variable: precipitation, vertical velocity, Turbulent exchange coefficients.

Topographic data set: mean orography, land sea mask.

Operational: forecast initial dates 00,12 UTC

Application: integration up to 120 hours Assimilation cycle 00m06,12,18UTC,

(b) Numerical weather predication products:
The geopotential height at the standard level and mean sea level pressure.
- Horizontal wind components (U.V).
- Temperature (T).
- Specific Humidity (q).
- Surface pressure (Ps).

- Soil temperature.
- Soil moisture content.
- Surface temperature.
- Connective precipitation.
- Layer cloud amount.
- Vertical velocity.
- Thunderstorm and sandstorm

A new non - hydrostatic forecasting system of at least 36 level sigma
Coordinates Forecast for 48 h.
- Basic equations: primitive equations system.
- Independent variables.
- Dependent variables: T, U, V, q, p.s.
- Integration domain 25E to 37E 22N to 35 N
- Horizontal resolution.
-Forecast for 48h
-Vertical resolution; 36 level.

(c)   Meso-scale Model (MM5)- Non-hydrostatic
The prediction model in use is the MMSv3, with; -

1)   Additional equations for prognostic 3D vertical velocity and
perturbation pressure.

2)   No equations for prognostic surface pressure diagnostic
pressure and diagnostic omega integrations.

3)   24 category for vegetation and physical properties.

4)   Projections (dx=dy) (Paler-Lambert and Macerator).

5)   Data Required to run:

•   Topography and land use
Cribbed analyses (Regional), wind Heights temp.
Snow cover, SST, and RH for 18 levels with top at 100hPa.

6)   Nesting (one and two ways).

7)   Vertical interpolation from pressure levels to sigma coordinate system.

8)   Resolution three nested 63,21,7 km.

(d)   System under test (Reg-CM/CTP).

(e) Dispersion models

1-   CAMX
2-   ISC3T
3-   CALPUFF

Using the forecasting model output at different resolution, to monitoring the emission of dust factory
and mongering the Rice burning control

8 - verification of prognostic products: -

The center producing statistical verification, correlation coefficient, mean square error ..., on the
geopotential-height, temperature and wind components products of the forecast models.

Also, the center going to verificat the products of the models at the meteorological stations over
Egypt, by calculate the difference between the measured and interpolated value from the model products
at these stations

9. Plans for the future: -

•   The AMSS systems will be upgrade.
•   On the AMSS systems: upgrading the circuits (Cairo-Moscow, Cairo-
NewDelhi, Cairo-Jeddah) to be TCP/IP (FTP or Socket) instead have X-25
and telegraphic protocols with a suitable speed.
•   EMA will be establishing an intranet.
•   Improvement the convection scheme used in ETA Model.
•   Improvement the dust scheme to become model-scheme interactive.
•   Improvement the objective analysis method and data assimilation.