Egypt
The Egyptian Meteorological Authority
(EMA)
Cairo

WWW Technical Progress Report for 2002

1. **Summary of highlights: -**
   - **August 2001:** Operational Data Base putting into operation.

2. **Computing facilities: -**

A. The IBM Mainframe: -

*** Fully operation in May 1999 ; -**

= S / 390 in targeted Server.
= Processor/Memory Card 236 MB.
= SSA DASD 72 GB.
= 4-MM DDS-3Dat Tape Drive.
= CD Rom.
= 3.5" FDD.
= Fixed disks 93 45/13/2 (disk capacity 8MB).
= Cartridge magnetic tape unit 3990E/C22.
= Magnetic tape unit 2240/Ao1.
= Line printer 6262.
= 4 HP 750 C Graphic colour plotter.
= 12 IBM PC 300 GL, Pentium III, Processor 500MHz.
= Telecommunication controller model 3745/170.
= Terminal cluster controller 3174-01L.
= 15 Terminals graphic display.

Windows NT LAN: -

= NT Server IBM 300 GL, Pentium 111, Processor 500 MHz.
= 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): -

{} H/W Equipment.

= AMSS Server (one live & one back-up) model IBM 325.
= Concentrators.
= Automatic change over subsystem (rack-form).
= 3 supervisory PC 300 GL.
= 3 Graphical PC 300 PL.
= A 4 colour Scanner.
= 2 Routers.
= HP ink jet colour printer.
= Laser printer.
= External CD-WRITER.

- The Climeteologicl Data Base: -

= I sun server enterprise 450: CLISYS
= 4 SUN Blade Workstations: NCDB1 NCDB2 NCDB3 NCDB4- Solaris 2.8.
= PC windows 98.

{} S/W: -

* 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. Supervisory PC's communication equipment, Etc, …

* **MESSIR-VISION:** The display in Alphanumeric from of all observation and Forecast reports and bulletins in WMO

* **MESSIR-VISION:-** provides the graphical Display of: -

* **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.

{} 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 accs 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 tables pace of 10MB each: train1/ train1 train2/train2.. Up to train 5/ Train 5.

{} 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 al the center according to The typical 24-hours amount: -

SYNOP 4000
TEMP 400
SHIP 100

* The following types of observations, extracted from GTS are presently used at the center twice a day.
* TEMP 00, 1200 GMT.
* GRID, GRIB.
* The AMSS system has a connections with SADIS, MDD and RETIM systems. It retransmits the output Of these products to MESSIR - VISION and AERO at the forecasting center 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 cheeked and if necessary corrected if possible .
2. All received messages are cheeked 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.
* Non real time monitoring of observing system is carried out in October automatically.
  Out 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 variables	perception, vertical velocity, Turbulent exchange coefficients.
Integration domain	Eta coordinate with step-like Terrain representation, 32 levels, Top at 100 hPa.
Grids	Arakawa E-grid on transformed Latitude/longitude coordinate. System centered at 25°E, 31°N.
Resolution	35 Km
Time integration	split explicit adjustment, Euler Backward advection adjustment, Time step 120s.
Orography	silhouette mountains
Boundary values	time-dependent lateral boundary Conditions from an NMC global Forecast, based on 00ut& 12 ut And sampled at 6-hourly intervals.
Physical Parameterization	Mellor-Yamada level 2.5 turbulence closure model for Planetary layer, level 12 for surface Layer fourth order non- linear lateral Diffusion. Modified Betts Miller scheme for deep and Shallow convection. GFDL Radiation Scheme ground surface Processes and surface hydrology Large-scale precipitation.

b) Regional model (EGYPETA model):

The system has the following properties:

Basic equations	primitive equations

Independent variables	N,n=A+B Ps,t
Dependent variables	temperature, horizontal wind Components, specific humidity.
Diagnostic variables	precipitaion, vertical velocity, Turbulent exchange coefficients
Integration domain	40°W to 70°E 00° to 70° N
Vertical	ETA coordinate with 32 level, Top at 100 Hpa Arakawa E-grid 35 km Split explicit scheme Semi-lagrange advection scheme Time-dependent lateral Boundary Conditions from an NMC global forecast, based on T-12h and sampled at 60hourly intervals.
Physical Parameterization	a) large-scale condensation. b) modified Arakawa-schubart Convection scheme. c) Betts-miller shallow Convection scheme. d) Explicit precipitation scheme including cloud microhysics. e) Mellor-Yamada level 2.5 turbulence closure model for planetary layer, level 2 for surface layer f) Radiation scheme g) Four-layer soil model
Topographic data set	mean orography, land sea mask.
Operational	forecast initial dates 00,12 UTC
Application	integration up to 120 hours Assimilation cycle: 00,06,12,18 UTC; Integration up to 6 hours.

c) Numerical weather prediction 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
- Convective precipitation
- Layer cloud amount.
- Vertical velocity.
- Thunderstorm and sandstorm.

d) System under test:

A new non-hydrostatic forecasting system of at least 36 level sigma Coordinates:

- Basic equations: primitive equations system.
- Independent variables:
- Dependent variables: T,u,v,q, Ps
- Integration domain: 20°to 40°E & 20°to 40° N.
- Horizontal resolution: = 0.09° =0.09°.
- Vertical resolution: 36level.

8 - Plans for the future: -

- On the AMSS systems: upgrading the circuits (Cairo-Moscow and Cairo-New Delhi) to be TCP/IP (ETP or Socket instead of X-25 and telegraphic protocols with a suitable speed.
- The AMSS system will be upgrade.
- EMA will be establishing an Climatological Data Base, it will be putting into operation on march 2002.
- Issuing seasonal forecast of Nile discharge Aswan Dam.