



## EUREKA E! 3266

<http://www.ess.co.at/WEBAIR>

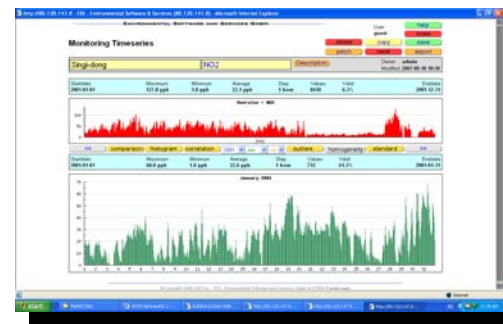
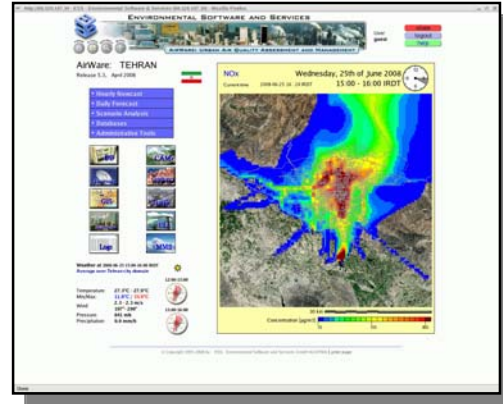


Developed within the EUREKA project E! 3266 WEBAIR with partners from now 19 countries, the **AirWare** system is a modular, cascading multiple model, nested grid, fully interactive, real-time, and web based

### Air Quality Assessment and Management Information System

for national, regional and local, urban and industrial air quality management, aimed at major industries and public institutions in support of 96/62/EC, daughter directives, and similar national regulations. AirWare has an open architecture and can be configured for a wide range of applications including numerous fully integrated components such as:

- Monitoring Data management and analysis including real-time data;
- Emission Inventories and dynamic emission models;
- Prognostic 3D, nested grid meteorological models;
- Simulation and Optimization Models (including 3D photochemical) for scenario analysis, impact assessment, and real-time modeling with regular, automatic nowcast and forecast runs;
- Public Information System (web based) components and reporting on regulatory compliance.



### Implementation

AirWare is implemented as a client-server system under Linux Open Source operating system, using any standard web browser on any PC as client. For on-line examples and operational real-time demos (Republic of Cyprus, South Korea, Tehran) see:

<http://www.ess.co.at/WEBAIR/CYPRUS>

<http://www.ess.co.at/WEBAIR/KOREA>

<http://www.ess.co.at/WEBAIR/TEHRAN>

The WEBAIR project is open for new partners. We are looking for new challenging case studies as well as partners with experience in ambient air quality and emission monitoring.

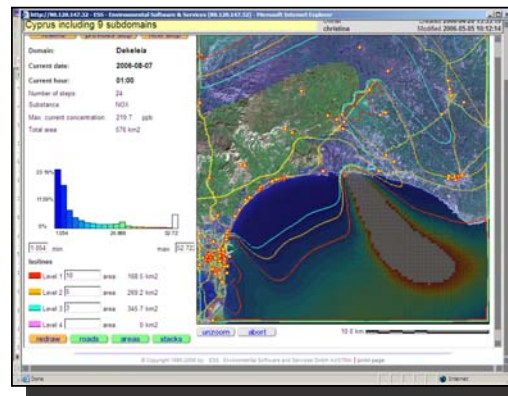
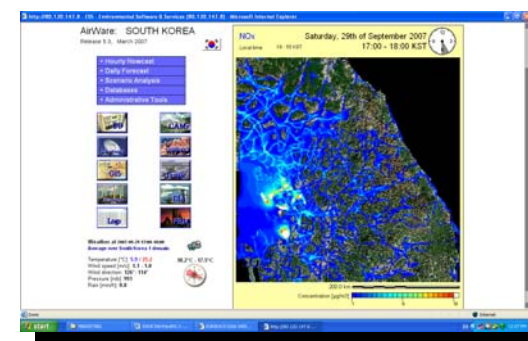
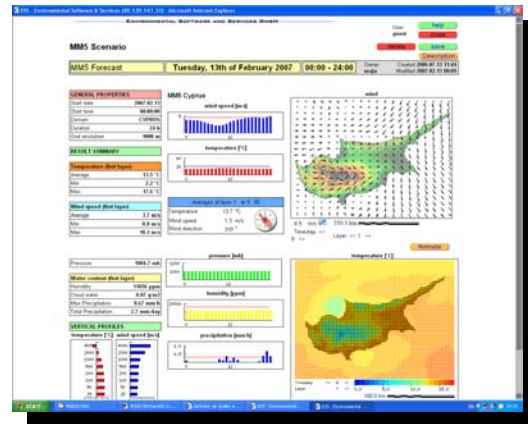
For more information, please visit <http://www.ess.co.at/WEBAIR>  
or contact us by e-Mail: [info@ess.co.at](mailto:info@ess.co.at)



## System components and models

AirWare combines emission data bases, monitoring data management, and several simulation models for interactive analysis:

- **MM5**, the fifth generation Penn State/NCAR mesoscale model. a nonhydrostatic, 3D dynamic nested grid meteorological forecasting model <http://www.mmm.ucar.edu/mm5/documents/mm5-desc-doc.html>
- **CAMx** The **C**omprehensive **A**ir quality **M**odel with **e**xtensions (CAMx) is an Eulerian photochemical dispersion model that allows for an integrated *one-atmosphere* assessment of gaseous and particulate air pollution (ozone, PM-2.5, PM-10, air toxics, mercury) over many scales ranging from sub-urban to continental.
- **AERMOD** represents the latest of USEPA's regulatory dispersion models, derived from the ISC family of models, based on more current planetary boundary layer (PBL) parameterizations.
- Other models: **PBM**, a photochemical box model, **DWM**, a diagnostic wind model, **TRAFFIC**, a high-resolution near-field model, and **PUFF**, a 3D dynamic Gaussian/Lagrangian multi-puff for transient emission or mobile sources.



## Scheduled functions

AirWare includes any number of scheduled, automatically executed tasks and functions, hourly, daily, or event based

- Daily forecast (MM5 CAMx, AERMOD, PBM)
- Hourly now-cast (CAMx, AERMOD)
- Daily data management (several utilities)

## Forecast and Nowcast runs

- Daily data import from global weather forecast models and daily run of MM5/WRF for the entire domain, down to 1 km resolution as air quality model input;
- CAMx for the entire domain and any nested sub-domains; the model is run for NO/NO2, SO2, CO, PMx, and ozone, including
- Probabilistic O3 forecasts

The nowcast runs are executed every hour. They use real-time meteorology if available, or the corresponding hourly data from the forecast runs. For the hourly runs of CAMx, the initial conditions are taken from the previous hourly run. The hourly runs include:

- AERMOD, all subdomains, NOx, SO2.
- CAMx, master domain and all nested domains: NO/NO2, SO2, CO, ozone, PMx.



## Data Bases

AirWare maintains a set of coordinated OBJECT data bases that provide input to the simulation models automatically:

- Industrial stacks and boilers
- Small Stacks
- Area sources
- Line Sources
- Traffic Fleet Composition
- Emission Factors and Patterns
- Model Domains
- Model Scenarios
- Monitoring Stations and time series
- Receptor Points and Areas

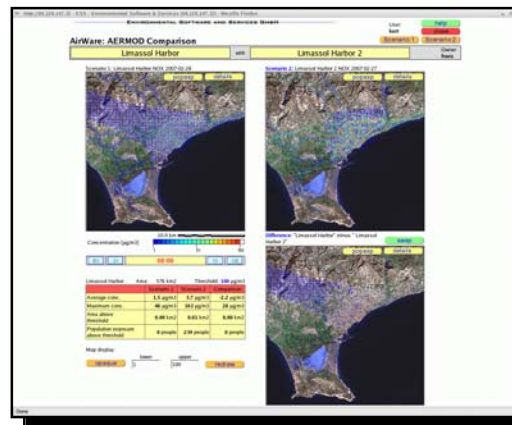
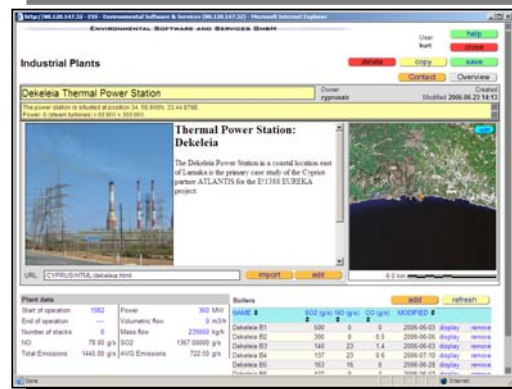
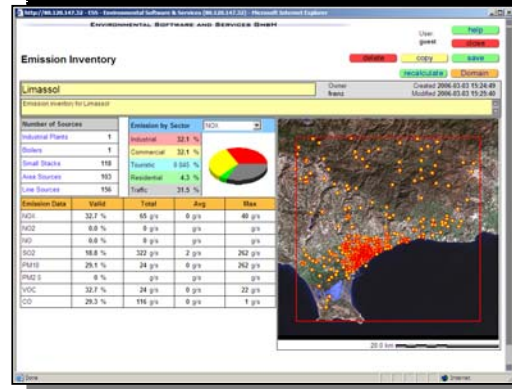
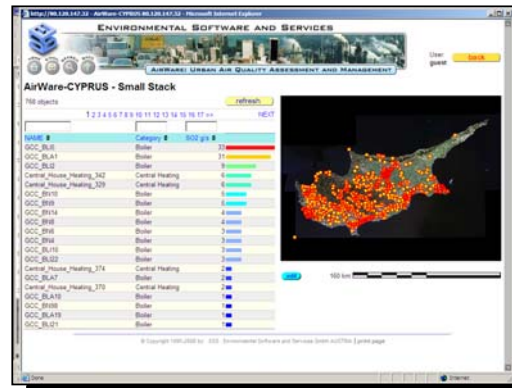
For each data base, a set of auxiliary tools are available e.g., to estimate emissions from fuel consumption and production activities, estimate wind driven dust entrainment, generate emission patterns over time, analyse monitoring data, check compliance with regulations, report errors or missing data, patch missing data, automatic quality assurance for monitoring data etc.

## Support functions

AirWare includes a range of support function and tools including:

- Embedded GIS, MapCatalog, MapComposition and MapServer
- Knowledge Base editor for the embedded rule-based expert system
- User management and access control
- System log data base for all scheduled processes for remote diagnostics
- Data base maintenance
- Integrated hypertext help- and explain pages and user manuals and tutorials
- System configuration and maintenance to
- A problem-reporting system to support remote support and maintenance functions
- Automatic synchronisation with an optional remote mirror installation

Remote support and maintenance include the possibility of complete operational mirrors, backup and disaster recovery, computational services for demanding (cluster implementation) or mission critical applications, regular updates, continuing user training, application support as well as related studies and consultancy.





## Model validation examples

O3/NO2 model validation examples (CAMx/CB4, Cyprus, May 2005)  
 Humidity and temperature (MM5, Korea June 2007)

