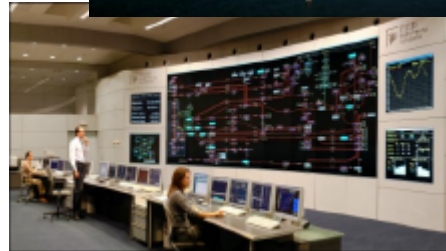# The ANEMOS Forecasting Platform

Techniques and Experiences

Igor Waldl, Felix Dierich,
Overspeed GmbH & Co. KG, Germany

Georges Kariniotakis, Alexis Bocquet,
ARMINES, France

ELSAM AS

The Anemos Forecasting Platform · EWEC 2006, Athens · March 2006

overspeed
GmbH & Co. KG

ECOLE DES MINES DE PARIS

Ideas

- Set-up costs and efforts of prediction systems are high
- Bound to the system once bought
- High importance of prediction: improvement of predictions is crucial

- Increase development and operational costs
- Have better predictions
- Anemos: Building a common flexible platform
- State of the art IT techniques for basic features:
  data handling, data transport, GUI, evaluation, security
- Big variety of specialised prediction models as plug-ins

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Overview

- Goals

- The Platform

- Prediction modules

- Operational experiences

- Conclusions

Goals

- Common platform with prediction models as plug-in modules
- Include state-of-the-art prediction models
- High QM standard
- High security standards
- High availability
- Well-defined and documented interfaces
- OS-Platform independent
- On-line uncertainty evaluation and prediction risk.

- Goals
- The Platform
- Prediction modules
- Operational experiences
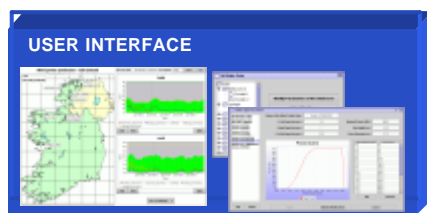- Conclusions

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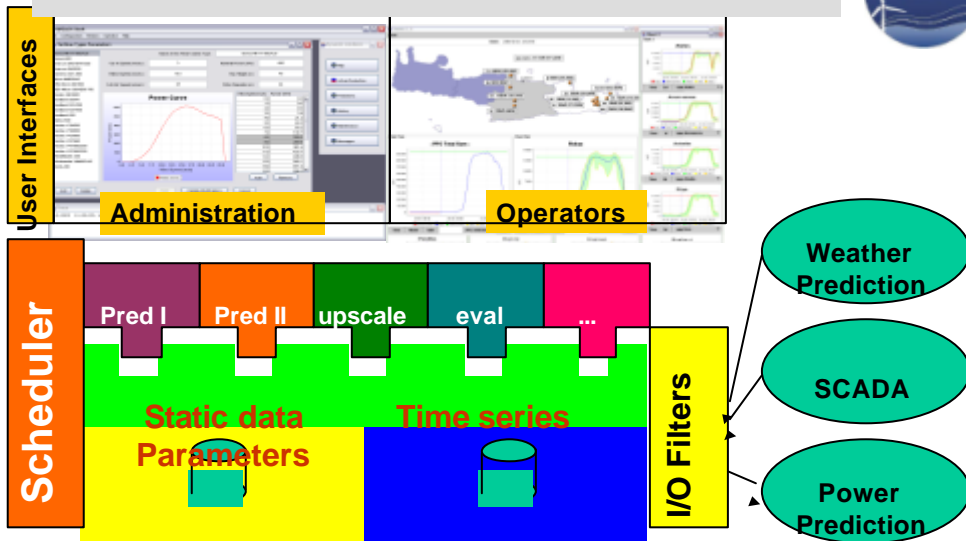
The Platform: Features

- Common handling of static data and parameters (wind farms, power curves, terrain, ...)
- Common, standardised handling of time series data
- Interfaces: SOAP web services
- Distributed servers, mirroring
- Common scheduler
- Running on Win, Linux, mysql, Oracle, …
- Specialised GUIs

The Platform: User Interface Features

Anemos SETUP

Anemos LIVE

Anemos ANALYSIS

Anemos VALUE

Anemos FRAME

USER INTERFACE

OPERATOR

Graphical user interfaces

Anemos SETUP:
administration

Anemos LIVE

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Prediction modules port folio

- PC model, AWPPS   Armines   physical/statistical
- Aria Wind   Aria   physical
- IBV   RAL   statistical
- LocalPred   cener   physical/statistical
- Prediktor   Risoe   physical
- Previento   emsys   physical
- Sipreolico   UC3M   statistical
- WPPT   DTU   statistical
- NTUA   NTUA   statistical
- (...)

Added-value modules

- online uncertainty assessment   Armines
- prediction risk   Armines
- upscaling   Uni OL / emsys
- automatic combination of models   UC3M
- benefit and performance monitoring   UC3M
- security checks   Overspeed
- scheduled maintenance   Armines

Overview

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Current test cases and customers
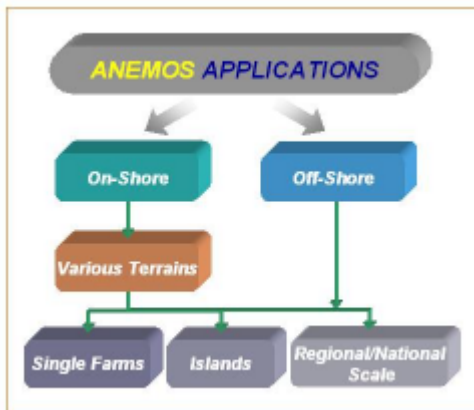
ANEMOS APPLICATIONS

On-Shore — Off-Shore

Various Terrains

Single Farms — Islands — Regional/National Scale

| **Denmark** | Elsam |
France	eDF
Spain	EHN IDAE
Greece	ΔEH
Ireland	ESB
UK/North. Ireland	SoNi
Germany	EWE

Operational Experience

- > 1 year

- Availability 100 % (recent 18 month)

- Running for three utilities remote

- Running for four utilities in-house

- Fast ad-hoc implementation of new features requested

- Special requests can be handled by an experienced consortium

Example: Island system
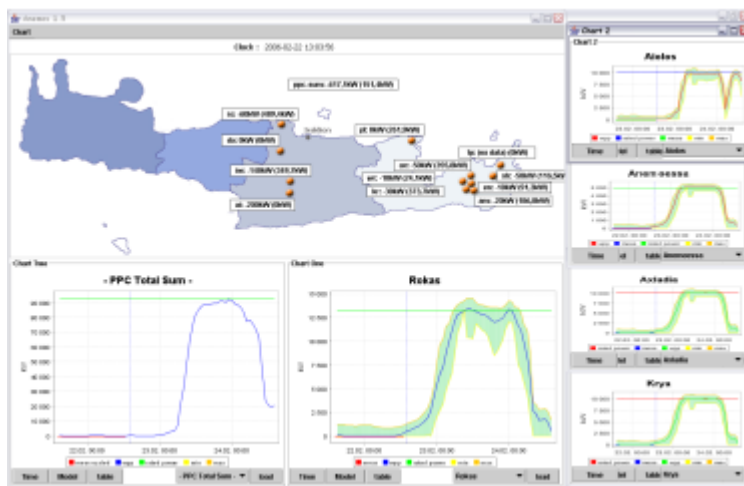
Example: Northern Ireland
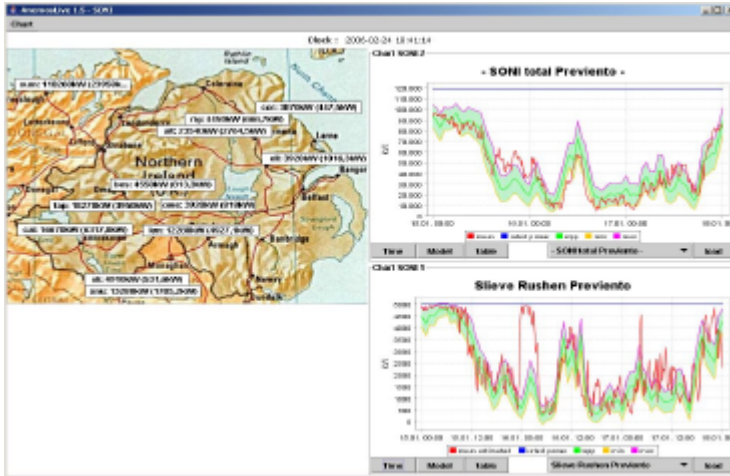
First prediction system for France
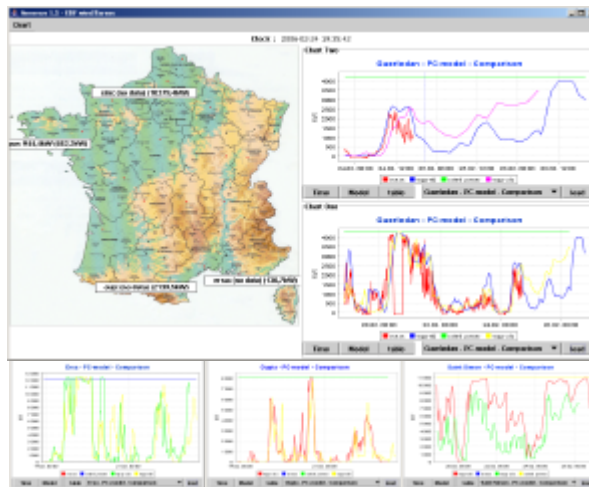
Conclusions and outlook

- Successful implementation of a common, highly standardised wind power prediction platform

- 8 prediction and 5 service modules from leading European wind power prediction developers

- Testing under commercial conditions at 7 customers

- High experience with IT, QM and security related issues

- Anemos to-go: …

Anemos to-go

- Predictions for single farms or pools of wind-farms
- Goal: minimising set-up and operational costs of predictions
- Application: markets with obligation to provide predictions from wind farm operators