

# **E-GVAP**

**(EUMETNET GPS Water Vapour Programme)**

## **Workshop**

**November 6, 2008**

**DMI, Copenhagen**



Images courtesy Chalmers

# Programme

- 9:30 - 9:45 Introduction, Henrik Vedel
- 9:45 - 10:30 Processing of ground based GNSS data to produce real time zenith delays. Jan Dousa
- 10:30 - 11:00 Coffee break
- 11:00 - 11:45 E-GVAP data distribution, monitoring, and validation system, Siebren de Haan
- 11:45 - 12:30 E-GVAP products for now-casting and examples of their use, Jonathan Jones
- 12:30 - 13:30 Lunch break
- 13:30 - 14:00 Use of ground based GNSS data in NWP at Meteo France, Patrick Moll
- 14:00 - 14:30 Use of ground based GNSS data in NWP at UKMO, Gemma Bennitt
- 14:30 - 15:00 Coffee break
- 15:00 - 16:00 Use of ground based GNSS data in HIRLAM + Expected future developments (water vapour tomography + slant delays and ztd gradients)+ Wrapup, Henrik. Vedel
- 16:00 End of workshop.

# Common dinner

- Reserved table at restaurant "la Rocca", located near Ibsens Hotel.
- Unfortunately you must pay yourself (experts reimbursed by E-GVAP will in the end be re-imbursed by E-GVAP).
- The reservation for 18:00.

# Location of restaurant



# Location of Ibsens hotel



# E-GVAP overview and history

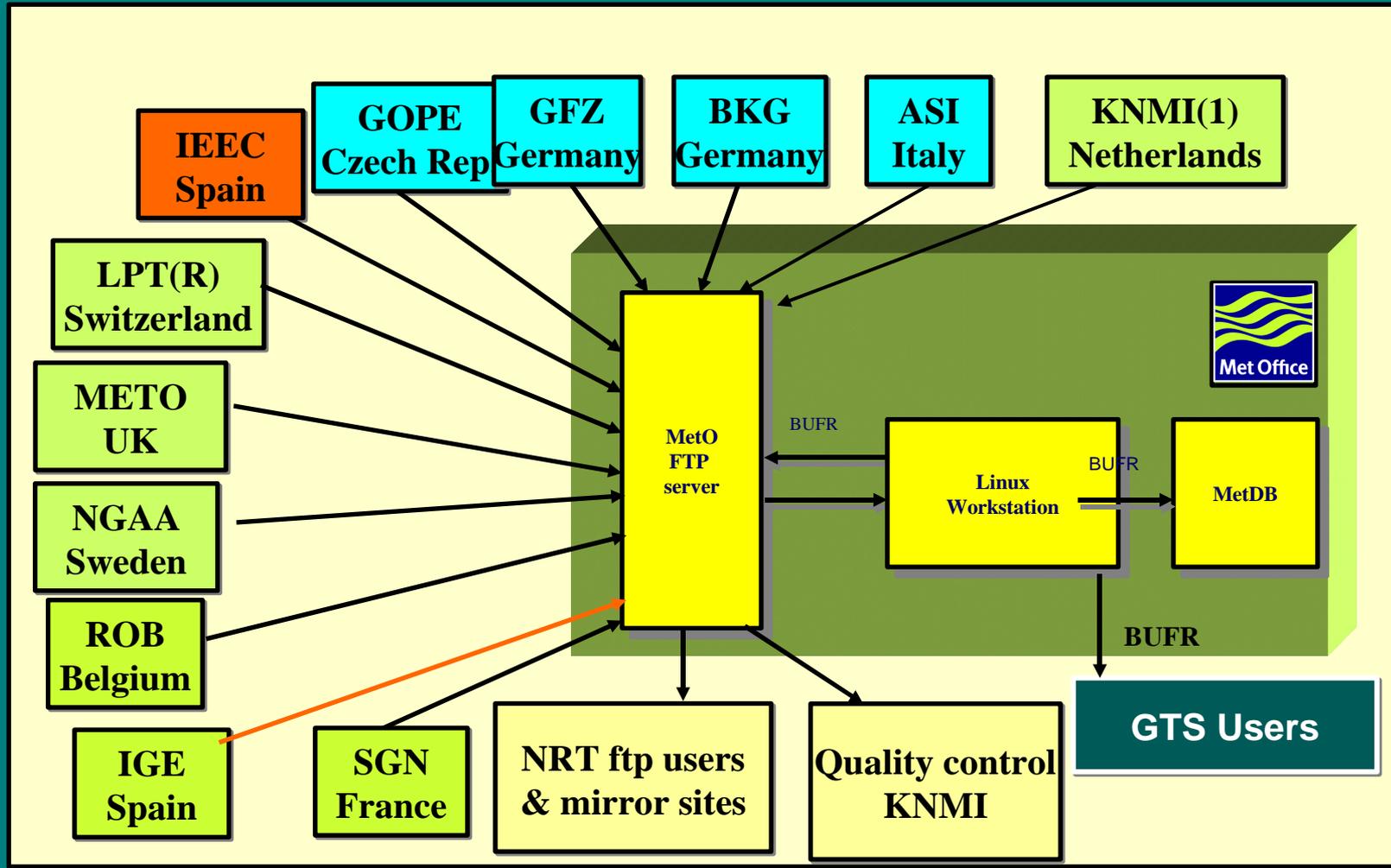
- International scientific projects around the turn of the century (such as COST 716, MAGIC and TOUGH) demonstrated the possibility of using ground based (gb) GPS data to improve weather forecasting. This included:
  - Estimation of the relevant product (delays) from GPS data in near real-time (NRT).
  - Validation of GPS delays against data from radiosondes, water vapour radiometers (WVR), and NWP models.
  - Enabling assimilation of the GPS products into NWP models
  - Making impact studies indicating an increase in NWP forecast skill due to inclusion of gb GPS observations.

- Some large countries started to "redesign" their upper air networks. In part to reduce the use of very costly radiosondes, in part to make available more detailed observations for use in now-casting and higher resolution NWP models. Also here gb GPS data were considered useful.
- Based on this E-GVAP was started in April 2005.
- E-GVAP is a 4 year project, ending March 2009, but a followup project has just been granted by EUMETNET.
- It is optional for the members of EUMETNET (national metoffices) to become members of E-GVAP. Currently there are 13 members (Belgium, Croatia, Denmark, Finland, France, Iceland, Ireland, Netherlands, Norway, Spain, Sweden, Switzerland, and the UK).

- The main purpose of E-GVAP is to provide gb GNSS data in NRT for operational use by the members of E-GVAP.
- Secondly E-GVAP is to further gb GNSS meteorology by helping to improve data quality, extend amount and geographical coverage of data, and help it members in utilising the gb GNSS data in their operations.
- The purpose of the workshop is to
  - Provide attending non-expert meteorologists an overview what are gb GNSS data and how can they be used in meteorology. Where to begin if wanting to start using such data at home.
  - Provide attending geodesists an overview how are the gb GNSS data they help provide utilised in meteorology today.
  - Through collection of the presentations to provide documentation how to use gb GNSS data, which can be used to teach more people about gb GPS meteorology.

- It is important to understand that while the members of E-GVAP are all national meteorological institutes, E-GVAP itself is based on a close collaboration between geodetic institutions and meteorological institutes.
- It is very specific to gb GNSS meteorology that the vast majority of the observing equipment is not owned by meteorological agencies, and that the processing of the GNSS data into properties of meteorological relevance requires geodetic expertise that is in general not present at meteorological agencies.

# NRT GPS Processed Data Flow



Green = nation member of E-GVAP. Blue = nation not member of E-GVAP.  
Orange = no updates to processing.

- From the meteorological side we provide the geodetic side with observations (ground measurements of pressure, temperature and humidity, and radiosonde data) which are useful for validation of GNSS data processing, and which in the future might help improve GNSS data processing.
- Further there is an agreement to exploit the benefits of cost sharing, for example in connection with site sharing.
- Finally there is in E-GVAP funding for travel in connection with liaison and expert team meetings, which helps bringing together experts on both the geodetic and meteorological side, leading to faster improvement through exchange of information and better coordination.

- The workshop is meant to be interactive.
- If you have questions or comments you are encouraged to raise your hand and ask right away.