About UBIMET

**EXPERTISE**
- Professional experience in various sectors
- Exceptional data quality in real time
- International team of meteorologists, physicists, mathematicians, biologists, geoscientists, IT experts
- One-stop-shop for our customers

**GLOBAL & LOCAL**
- Tailored and locally adapted customer solutions
- Stable shareholder structure: two private trusts and Red Bull
- Worldwide access to weather station data

**INNOVATION**
- Market leader in severe weather warnings
- Development of cutting-edge technologies
- On-going development of future-focused services
- Customer solutions for increased efficiency and cost reduction

**QUALITY MANAGEMENT**
- In house R&D department
- Continual enhancement of weather models, products and forecasting techniques
- Extensive cooperation with the Fraunhofer Institute
- ISO 9001 certification
UBIMET

INSTITUTE FOR UBIQUITOUS METEOROLOGY

- International Meteorological Institute
- Founded in 2004 by a meteorologist and a chemist
- Global scope / Headquarters in Vienna, main branches in Melbourne, New York & Munich
- Focus on research activities in the railway sector
- Cooperation with ÖBB, DB, international organizations, Universities,…
- Supplier of meteorological alarm and forecast systems for railways (ÖBB, DB)

[Logos of DB, ÖBB, EURNEX, UIC]
EURNEX

RAIL RESEARCH NETWORK (EUROPE & CENTRAL ASIA)
Natural Hazards in Railway Operation

- Winter operation & Snow removal
- Energy consumption
- Switch points
- Landslides & Flash Floods
- Overhead Contact lines
- Bridges & Flooding Alerts
- Wind Speed Alerts
- Electrical Systems & Lightning
- Fire Risk
In 2005 the Austrian Federal Railways asked UBIMET to implement a nationwide meteorological monitoring system.
Highly precise weather forecasts along the railway lines
- Severe Weather Warnings for the safety of railway operation
- Exact snow forecasts for the planning of winter services

**GOALS OF THE RAIL WEATHER INFORMATION & WARNING SYSTEM**

- **INCREASE OF SAFETY**
- **MORE NETWORK AVAILABILITY**
- **COST REDUCTIONS & EFFICIENCY**
- **RELIABLE WINTER OPERATION**
Natural hazards - status quo

WEATHER WARNING SECTIONS

- The ÖBB rail weather system is not only used for operational planning, but also for safety issues (natural hazards).
- At the moment very critical track sections are declared as **WEATHER WARNING SECTIONS**.
- If a certain severe weather warning is issued or e.g. some heavy rain expected, there is an individual special operation checklist in effect for every track section!
- An more automatic approach is planned – Complete natural hazards mapping.
The new natural hazards management

NETWORK WIDE EVALUATION OF RISKS AND SECURITY DEFICIENCIES

- Extreme Security Deficit
- Construction Measures
- High Security Deficit
- Alert Systems
Risk mapping of the network

BASE FOR THE NEW NATURAL MANAGEMENT PLAN
In cooperation with international organizations, we would like to prepare an more trans-national approach for natural hazards management, rail weather forecasts and alert systems.

It is a huge advantage for corridor managers to provide customers with risk forecasts, e.g. when large meteorological induced delays are expected (flooding, snowstorm, freezing rain, ...)

Some weather related problems have their roots outside of the own network.

**GOALS**

- Extension of existing national weather systems for international data
- Monitoring and forecasts for international trains (ice problems, delays)
- Exchange of information and standardized communication between national railway operators
Flash flood warnings

- Traditional radar based systems
- Calculation of liquid precipitation rates and soil saturation
- Warning levels based on experience and case studies
- Problems:
  - Adaptation of thresholds may be necessary
  - No hydrological model (would be too expensive)
  - Remote areas without radar coverage
Conclusions

- Huge developments in rail weather models during the last years
- Problems in implementing weather warnings and forecasts into the daily operational business
- Lack of trans-border information systems
- Searching for test regions for a trans-national information system
- Still a lot of research to be done – there is much room for improvements
- Combination of climate models and local risk models for long-term risk predictions!

BE PREPARED FOR CLIMATE CHANGE IMPACTS
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