



**UBIMET**

Department for infrastructure & transportation

# About UBIMET

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## + 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

## + INNOVATION

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

## + GLOBAL & LOCAL

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

## + 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)



# EURNEX

## RAIL RESEARCH NETWORK (EUROPE & CENTRAL ASIA)



# Natural Hazards in Railway Operation

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**Winter operation &  
Snow removal**

**Energy consumption**

**Switch points**

**Landslides &  
Flash Floods**

**Overhead Contact  
lines**

**Bridges &  
Flooding Alerts**

**Electrical Systems  
& Lightning**

**Fire Risk**

**Wind Speed  
Alerts**

In 2005 the Austrian Federal Railways asked UBIMET to implement a nationwide meteorological monitoring system



# ÖBB infra:wetter

## GOALS OF THE RAIL WEATHER INFORMATION & WARNING 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



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**INCREASE OF SAFETY**

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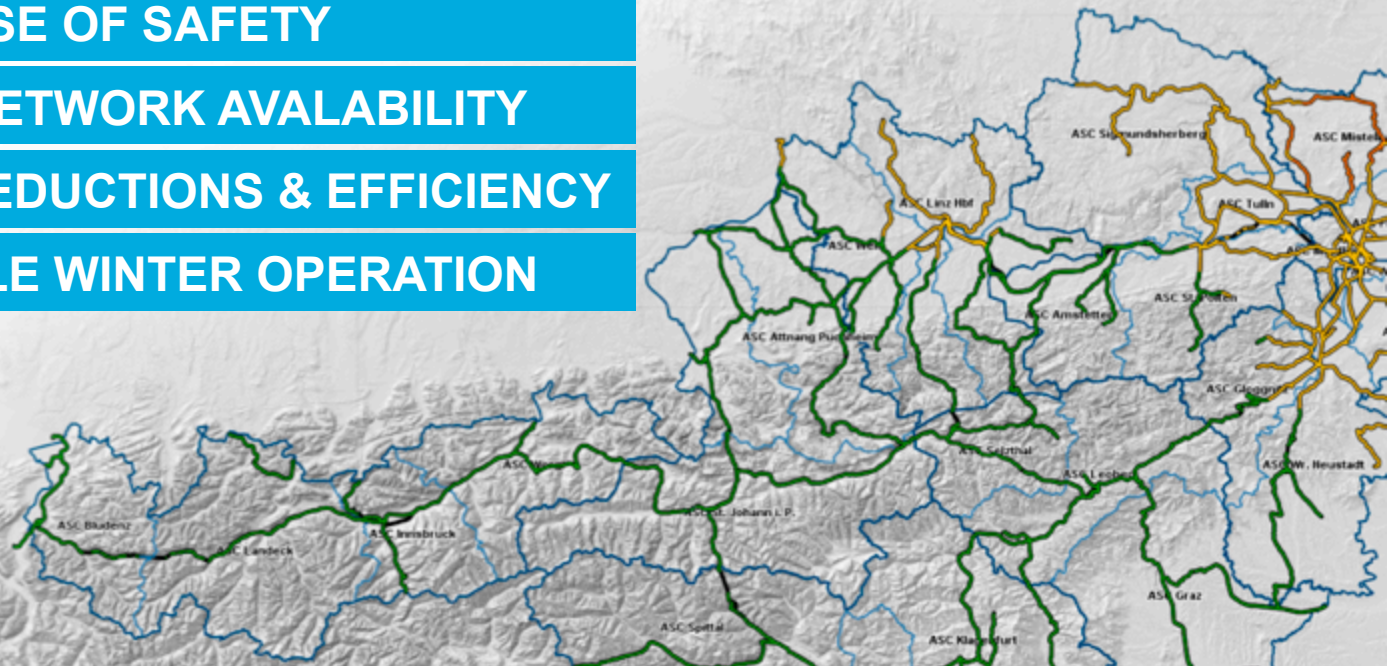
**MORE NETWORK AVAILABILITY**

+

**COST REDUCTIONS & EFFICIENCY**

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**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

Direktauswahl

Warnungen

- Verstärkung des Gewitters: Starkregen und lokale Sturmböen
- Gewitterverstärkung: Gefahr von Starkregen und lokalen Überflutu...**
- Gewitter aus N, Gefahr von Starkregen, lokale Überflutungen
- Gewitter aus NO, Gefahr von Starkregen, lokale Überflutungen
- Gewitter mit viel Regen in kurzer Zeit möglich, örtlich Überflutungen

**Gewitterverstärkung: Gefahr von Starkregen und lokalen Überflutungen**  
Das Gewitter hat sich verstärkt. Im Gewitterbereich besteht die Gefahr von Starkregen mit lokalen Überflutungen.

Zeitraum

Erstellungszeit	Beginn	Ende
Freitag, 11. Juli 2014 15:08	Freitag, 11. Juli 2014 14:23	Freitag, 11. Juli 2014 16:43

Betroffene Punkte

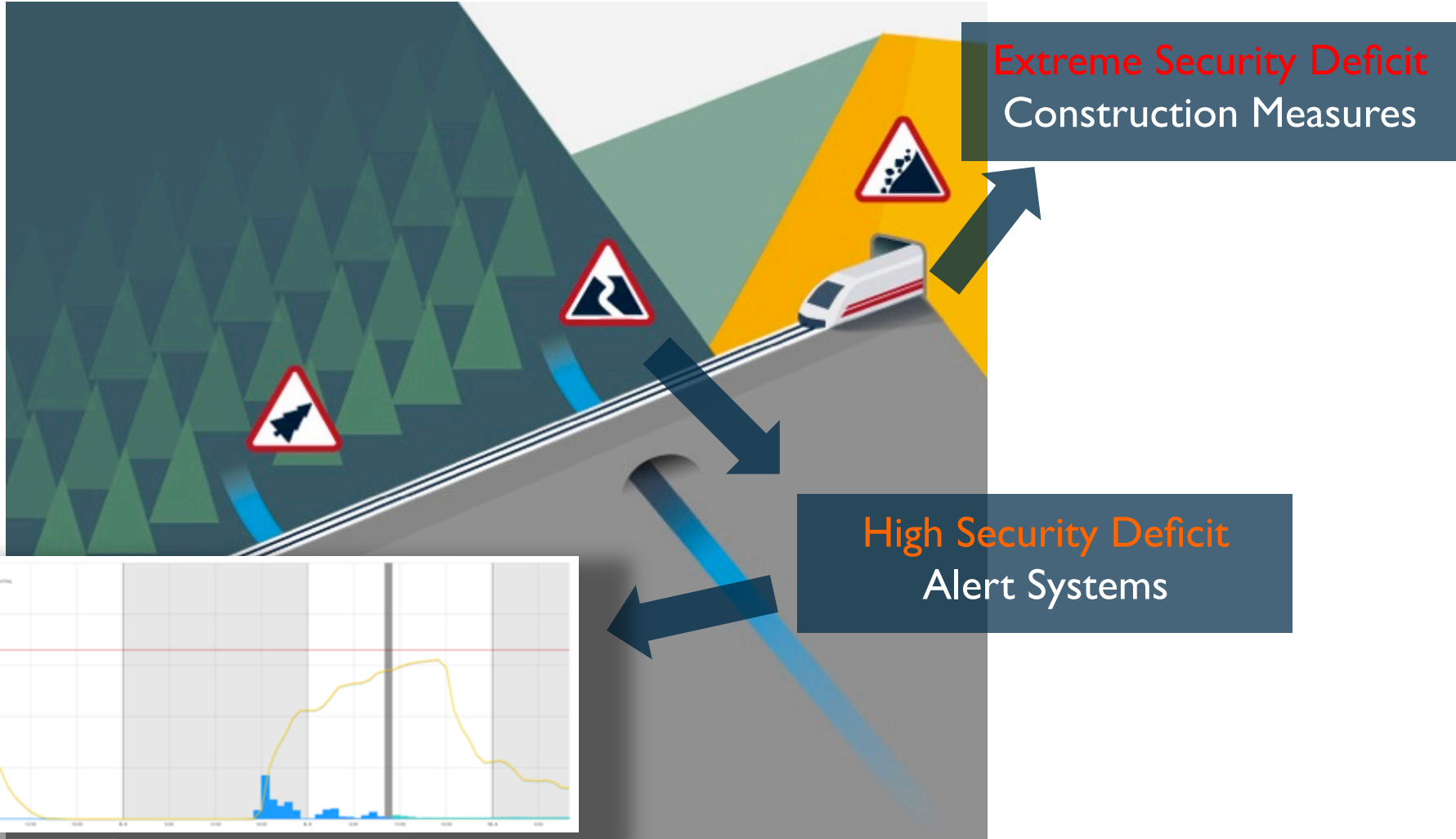
Laa/Thaya Stockerau

nundsherberg ASC Mistelbach



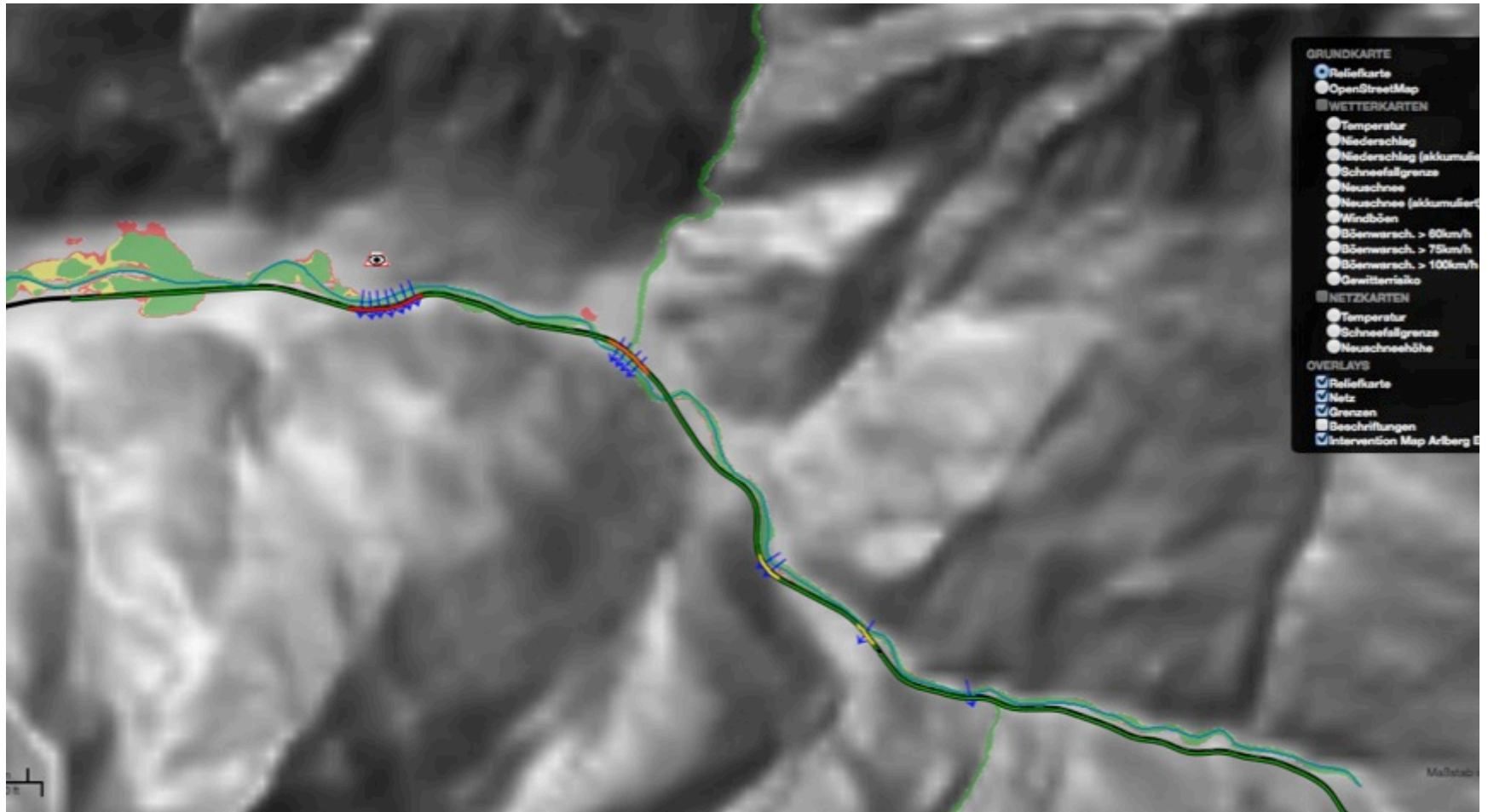
# The new natural hazards management

NETWORK WIDE EVALUATION OF RISKS AND SECURITY DEFICITS



# Risk mapping of the network

BASE FOR THE NEW NATURAL MANAGEMENT PLAN



# International approach

## TRANS NATIONAL WEATHER ALERT SYSTEM FOR RAIL OPERATION

- 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 costumers with risk forecasts, e.g. when large meteorological inducted delays are expected (flooding, snowstorm, freezing rain,...)
- Some weather related problems have their roots outside of the own network



### GOALS

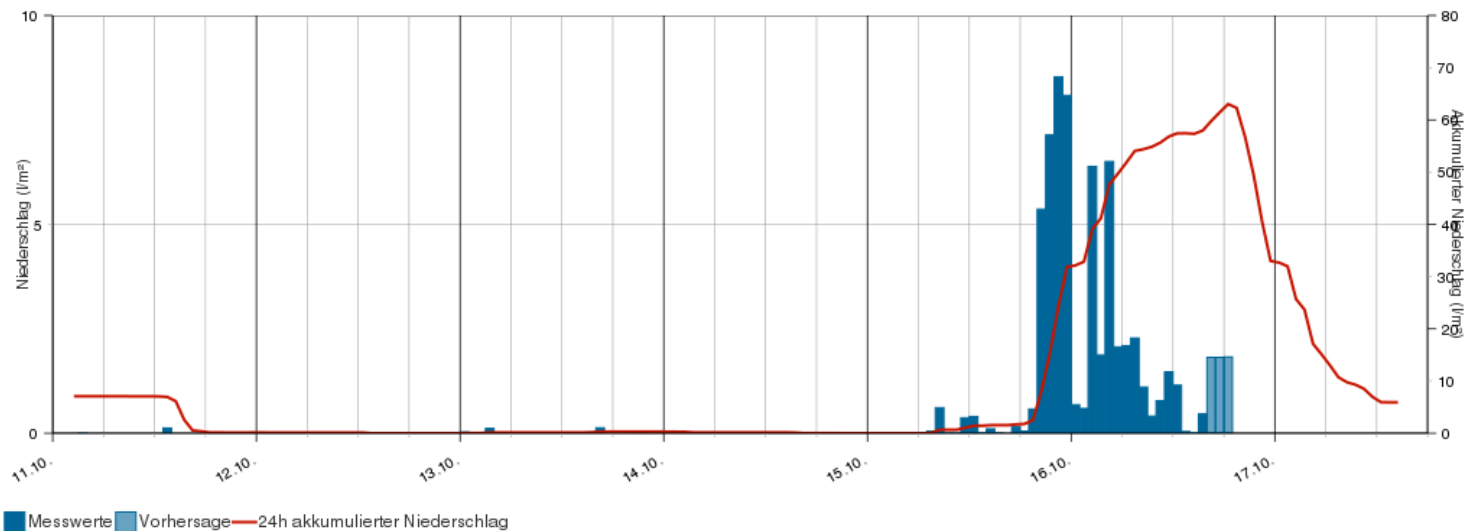
Extension of existing national weather systems for international data

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

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- 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 an 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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