



ILMATIETEEN LAITOS  
METEOROLOGISKA INSTITUTET  
FINNISH METEOROLOGICAL INSTITUTE

# The AurorasNow Nowcasting Service for Hotels in Finnish Lapland

A. Mälkki, K. Kauristie, V. Tulkki  
Finnish Meteorological Institute  
M. Anttila  
Space Systems Finland



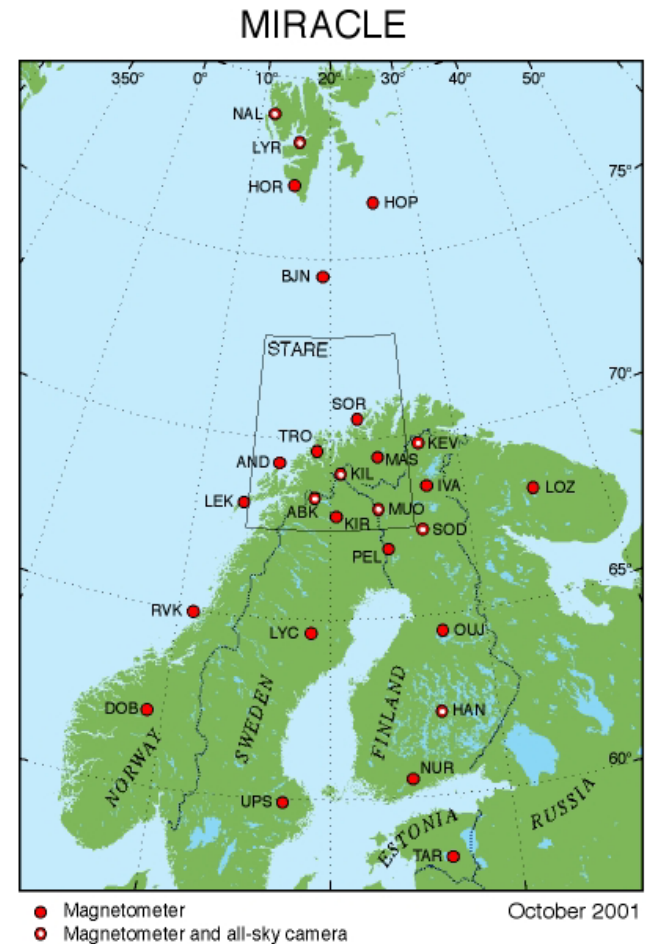
# Outline

- Data
- Model
- The Service System
- The Service Contents:
  - Hotel Service
  - Public WWW pages (in progress)
  - SMS warning service (in progress)
- Customers
- The Future



# The Data

- MIRACLE stations:
  - magnetometers
    - SOD & NUR
  - ASC
    - SOD
  - (Near) Real-time access to data over internet
- Cloudiness predictions:  
FMI regional service for Northern Finland





# Model for Auroral Warning

- Activity prediction: time derivative of magnetic field variation at SOD.
- Threshold value derived and validated by comparison with ASC images.
- Successfully tested in Southern Finland (success rate above 70 %), now implemented for Lapland.



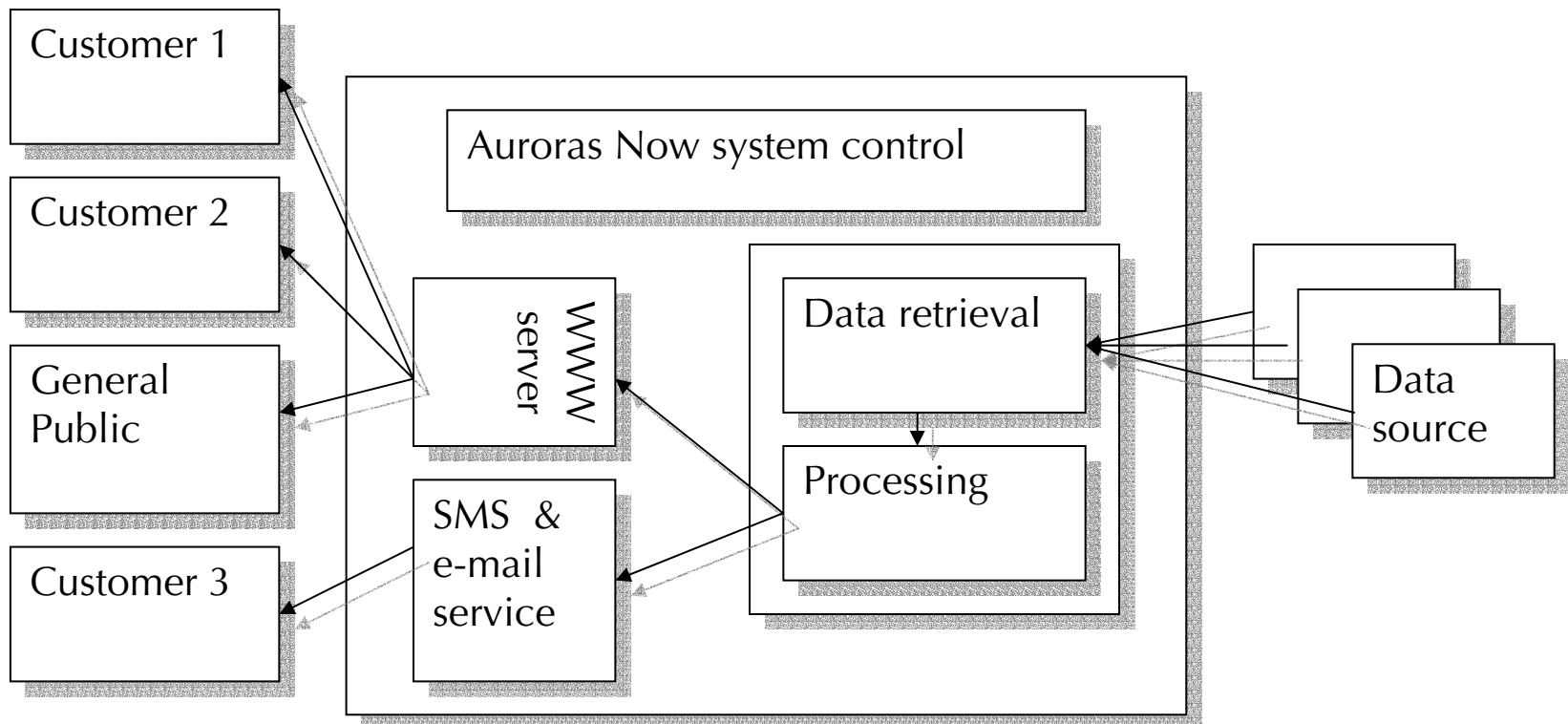


# The Service System

- WWW server at FMI
  - access controlled
- Implementation
  - script-based (cron tables etc.)
  - automatic update of pages
- All events monitored and logged
- Autonomous recovery from "normal" problem situations



# The Service System





# The Hotel Service

- Three-level WWW-based service:
  - General information ([link](#))
    - Displays general information about aurora and the service
    - predicted auroral activity for the coming 12 hours
  - Warm-up pages ([link](#))
    - activated around noon
    - predicted auroral activity for the coming 12 hours
    - tailored cloudiness prediction from FMI local services
  - On-line pages ([link](#))
    - on-line All-sky-camera (ASC) image
    - ASC image projected on map, with hotel location indicated
    - cloudiness prediction
- Compatible with internal TV system of hotels



# Public WWW pages

- General information about Space Weather, Aurora, and the AurorasNow! SDA
- Weekly summaries of space weather activity, etc.
- Customer groups
  - Members of URSA astronomical association
  - Science Center Arktikum in Rovaniemi
  - Hotel Revontuli
- Status: Being written at the moment



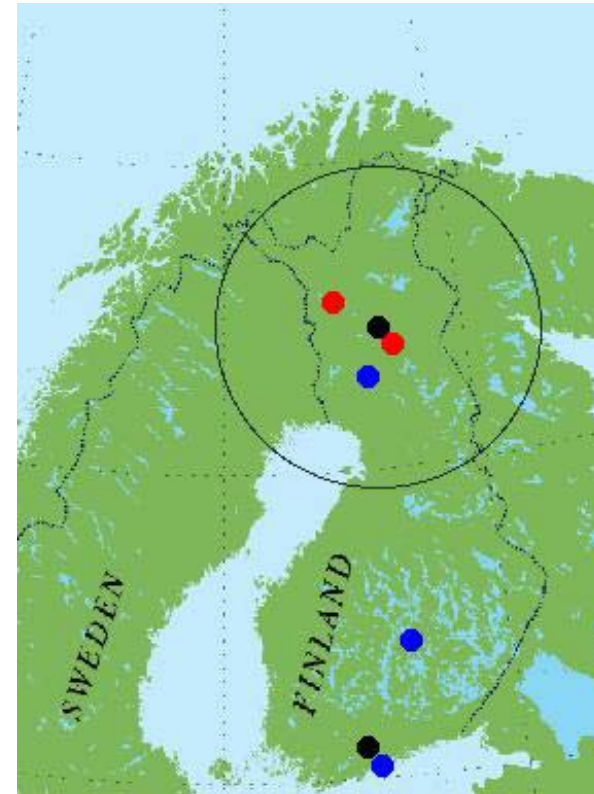
# SMS service

- Not yet operational
  - goal: during this winter
- Auroral warnings
  - based on the activity monitor
- SMS messages sent to customers who have subscribed to the service (commercial operator)
  - Customers may select level of warning (all, only high activity,...) and region (South, North, All)



# Customers

- Two hotels in Lapland
  - Hotel Hullu Poro
  - Hotel Luostotunturi
- One hotel in Central Finland
  - Hotel Revontuli
  - Public pages
  - Tailored slide show
- Science Center Arktikum
  - Public Pages
- URSA Astronomical Association
  - SMS Service
  - Public WWW pages



- Hotel Service customers
- Other customers
- Observatories



# Future

- Operations during winter auroral / tourist season
- Collection of feedback during winter
- Improvements / reporting next autumn
- Future: depends on cost-benefit analysis
  - maintenance costs to be calculated based on experience during operational phase

## AURORAS

now!

### About this service

The AurorasNow! service aims to encourage the hotel customers to observe auroras. The service consists of an alarm operating all the day, a real-time monitor operating during dark hours and cloudiness predictions for the coming night, given around the noon. The alarm is based on measurements of variations in the geomagnetic field. The more disturbed the field is (i.e., more variations), the higher is the probability to see auroras. The monitor shows real-time pictures from an all-sky camera imaging the night sky.

### About auroras

Auroras can be observed in Lapland and Northern Finland during at least one out of three of nights without cloud cover. The hours from 9 pm to 12 pm are the best time for watching auroras. Predicting auroral displays one by one is a difficult task but their statistical behavior and the conditions favouring them are known so well that reasonably reliable alarms can often be given early enough for interested people.

### Magnetic activity level



QUIET ▷ ENHANCED ACTIVITY ▷ STRONG AURORAS

Starting time of the all-sky camera: 17:45



FINNISH METEOROLOGICAL INSTITUTE



# AURORAS

## now!

### About this service

The AurorasNow! service aims to encourage the hotel customers to observe auroras. The service consists of an alarm operating all the day, a real-time monitor operating during dark hours and cloudiness predictions for the coming night, given around the noon. The alarm is based on measurements of variations in the geomagnetic field. The more disturbed the field is (i.e., more variations), the higher is the probability to see auroras. The monitor shows real-time pictures from an all-sky camera imaging the night sky.

### Previous activity:



### Magnetic activity level



### Cloudiness

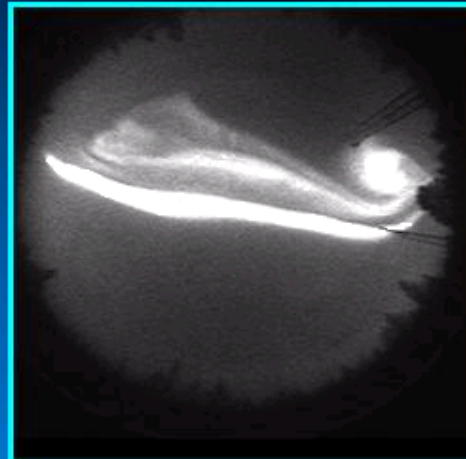


Starting time of the all-sky camera: 17:34



# AURORAS now!

The latest  
all-sky camera  
image



2003.10.26 22:36:00



2003-10-26  
22:36:00

Avaruus 2003

Magnetic  
activity level



QUIET ▷ ENHANCED ACTIVITY ▷ STRONG AURORAS

Cloudiness

Pre-midnight:



Post-midnight:



Stopping time of the all-sky camera: 06:35



FINNISH METEOROLOGICAL INSTITUTE



This service helps you to observe  
auroras. More information  
coming within 10 min.