Experiences of Mobile Road Condition Monitoring

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ID 14

Road Condition Monitor RCM411

- measurements
  - road **surface condition**
    - dry,
    - moist,
    - wet,
    - icy,
    - snowy,
    - slushy
  - water/ice layer **thickness**
  - modeled **friction**
  - add-on measurements
    - surface temperature
    - …

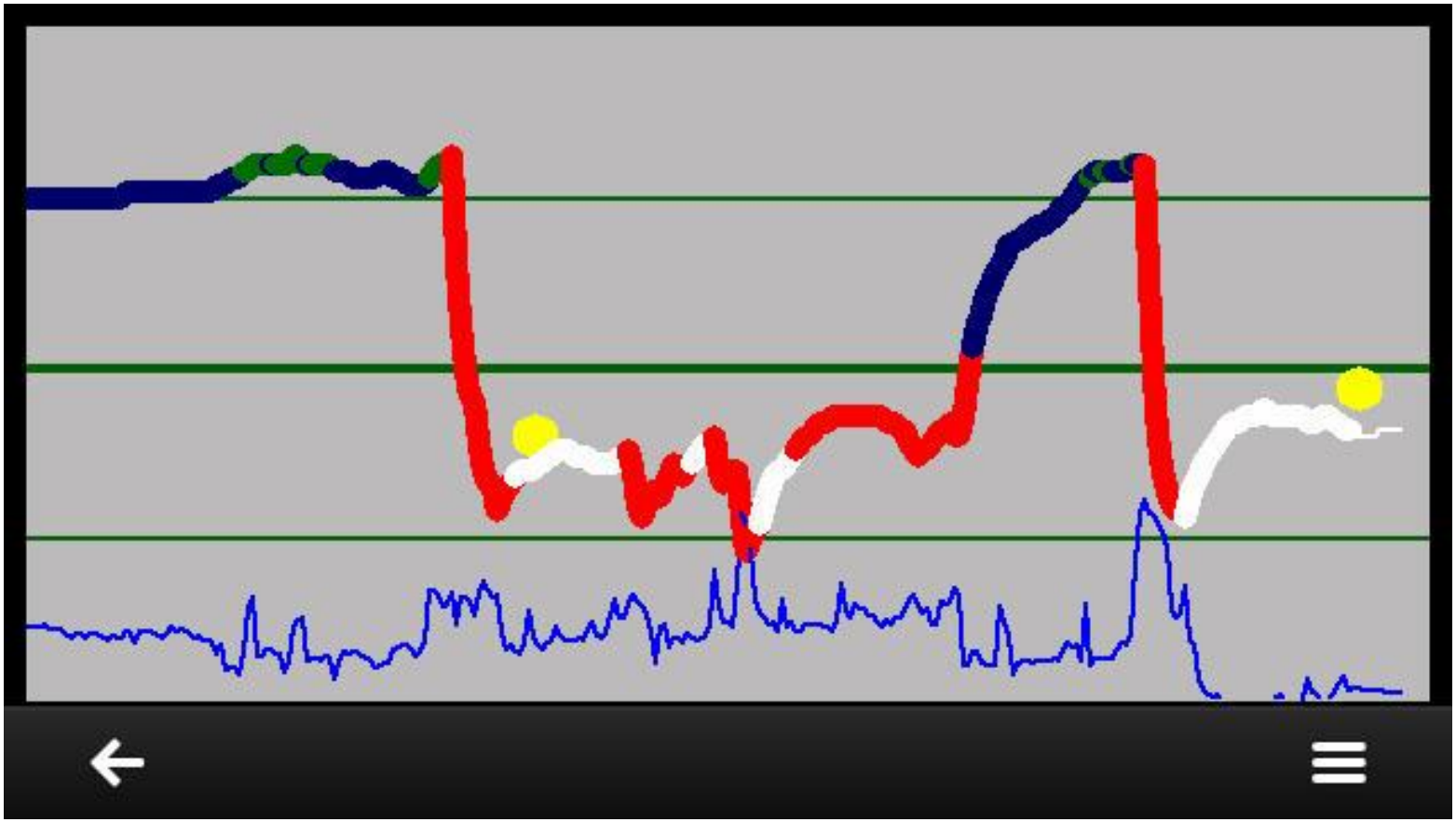
Road Condition Monitor RCM411

- installed on a vehicle
  - user interface on cell phones
    - BlueTooth link to cell phone
    - power from the trailer connector
  - data communicated to selected servers
  - results on a map interface as color coded lines

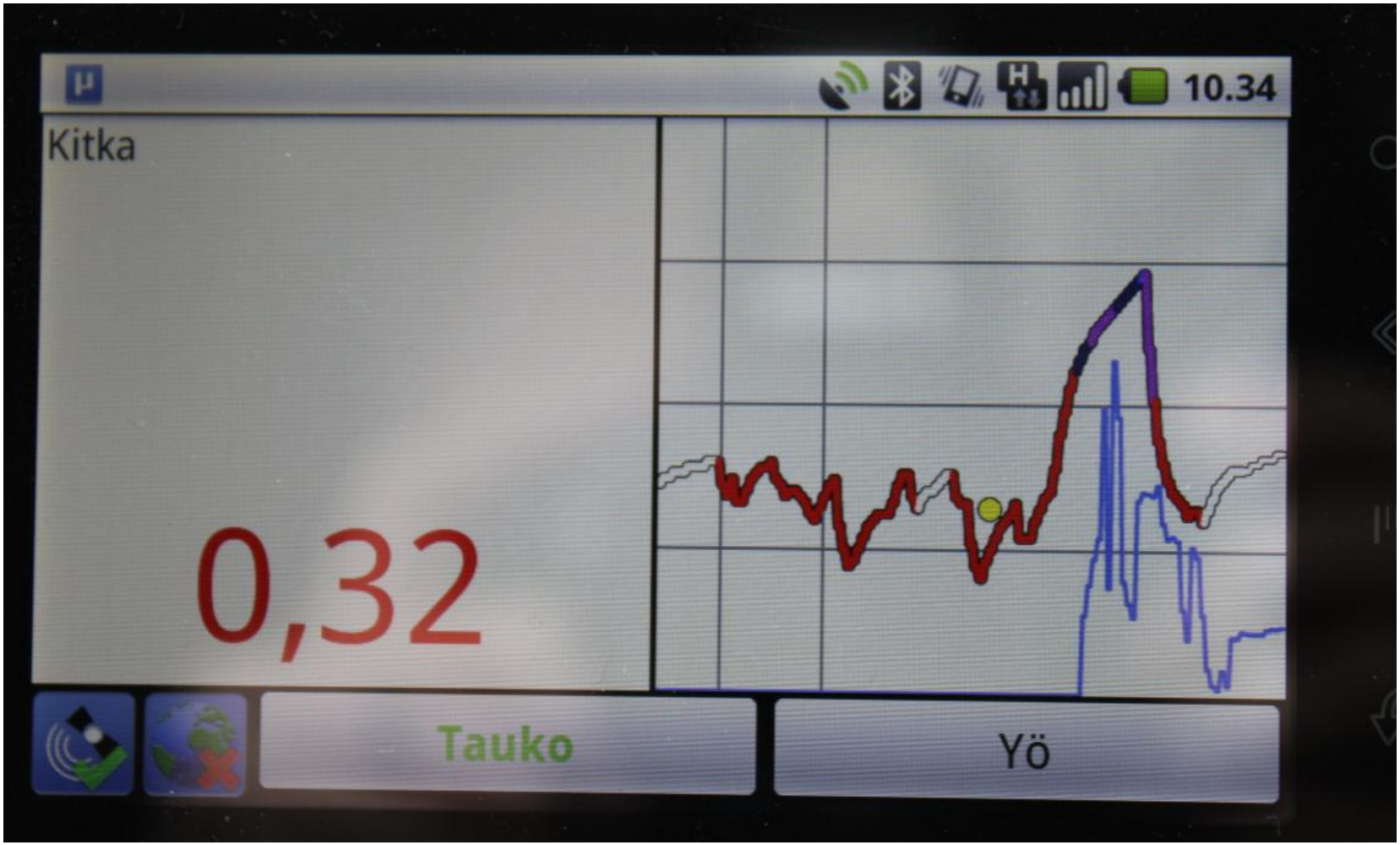
µTEC Friction Meter

- µTEC
  - cell phone application
  - accelerometer based absolute friction meter
- used for friction reference
  - development of RCM411 friction model
- µTEC and RCM data shown on the MµMS Service at http://liukasta.info

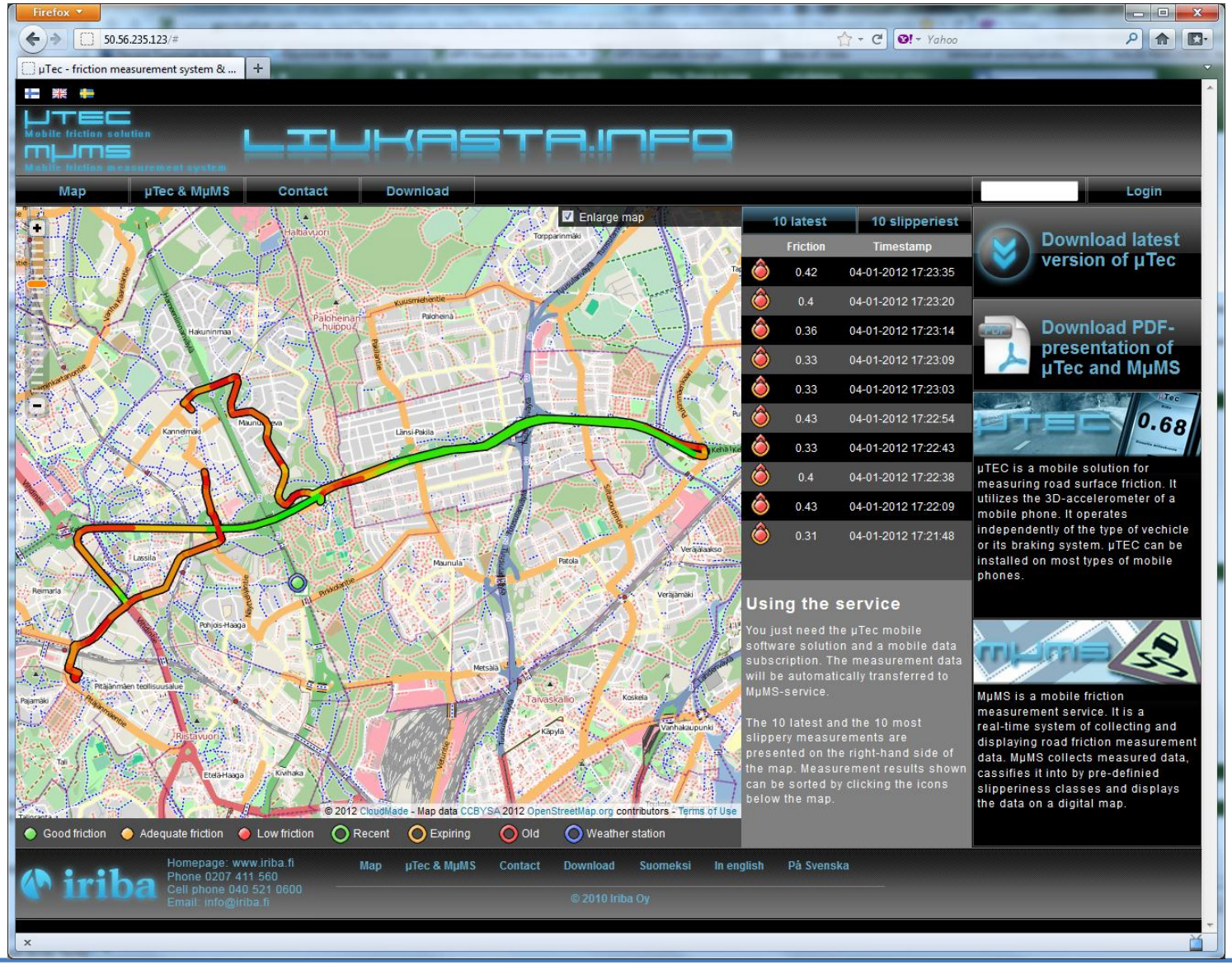
Screenshot of a Symbian User Interface



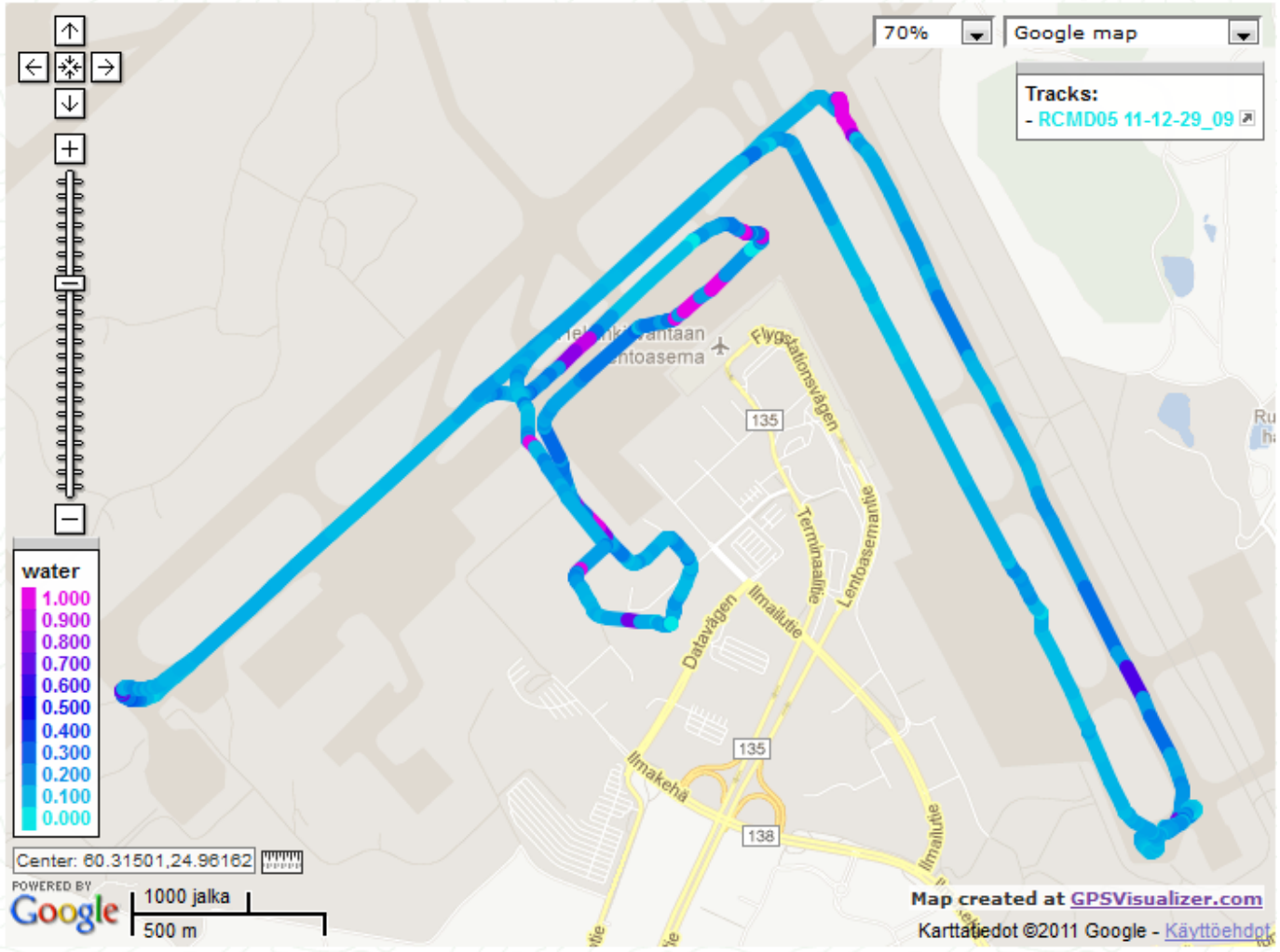
An Android User Interface



Friction Test Run 6.12.2011 on MµMS service at http://liukasta.info

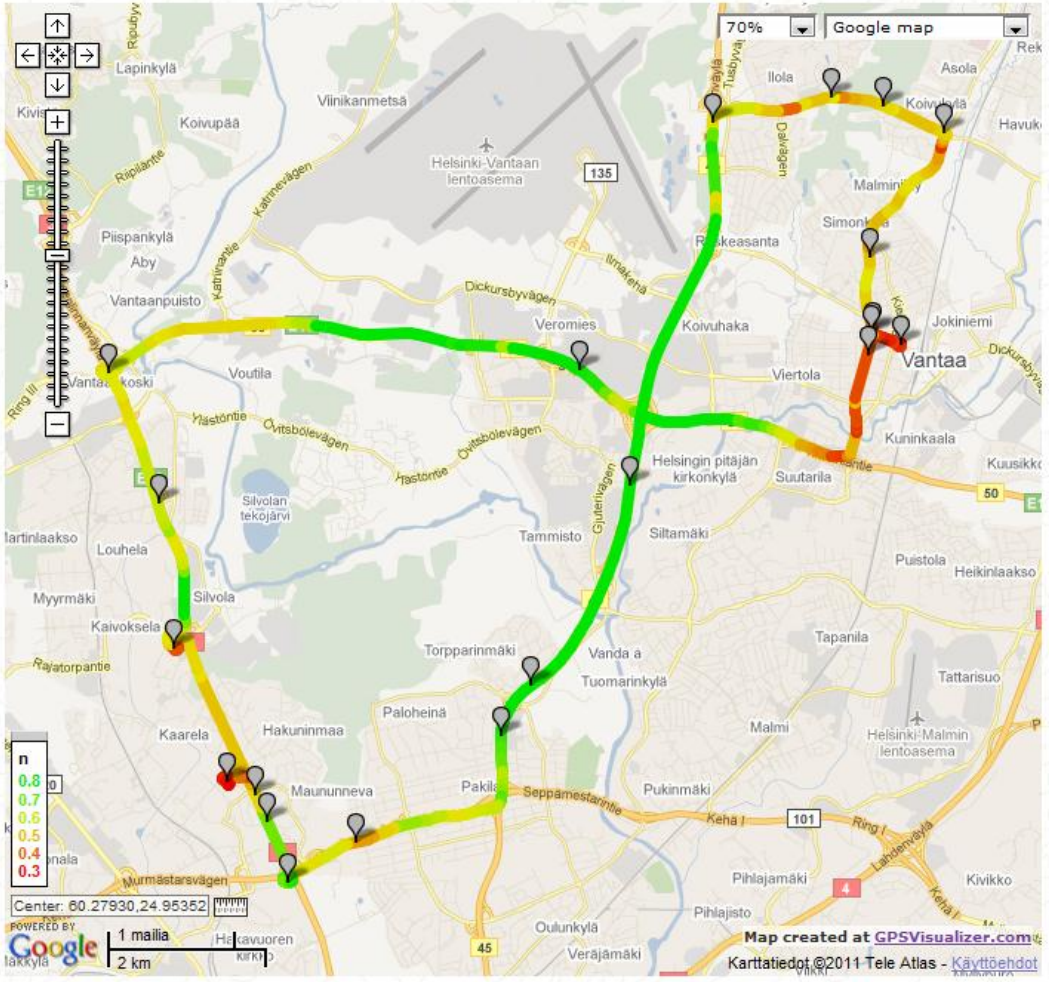


Water layer, Hki-Vantaa Airport 29.12.2011

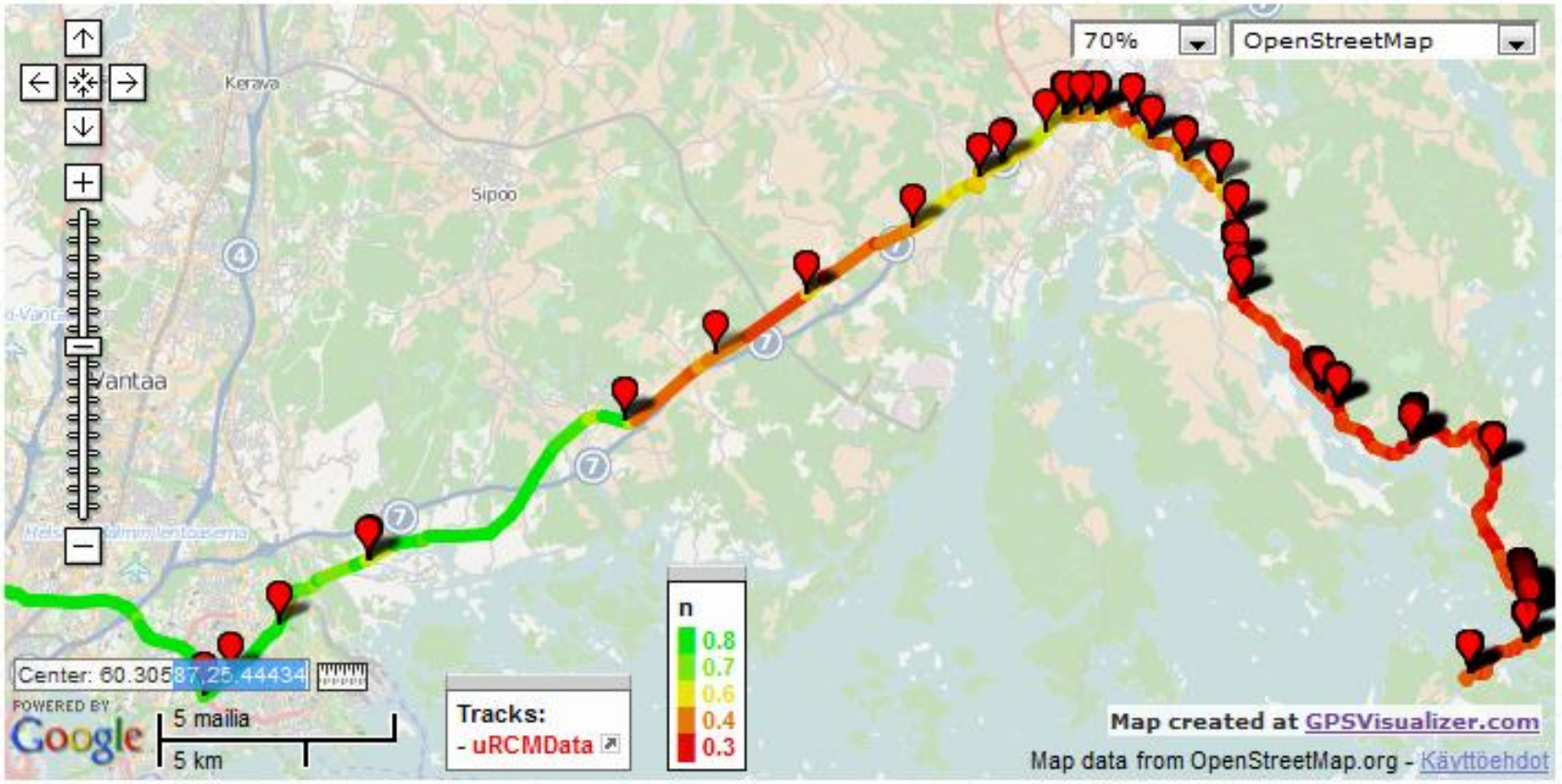


Friction Test Run 27.01.2011

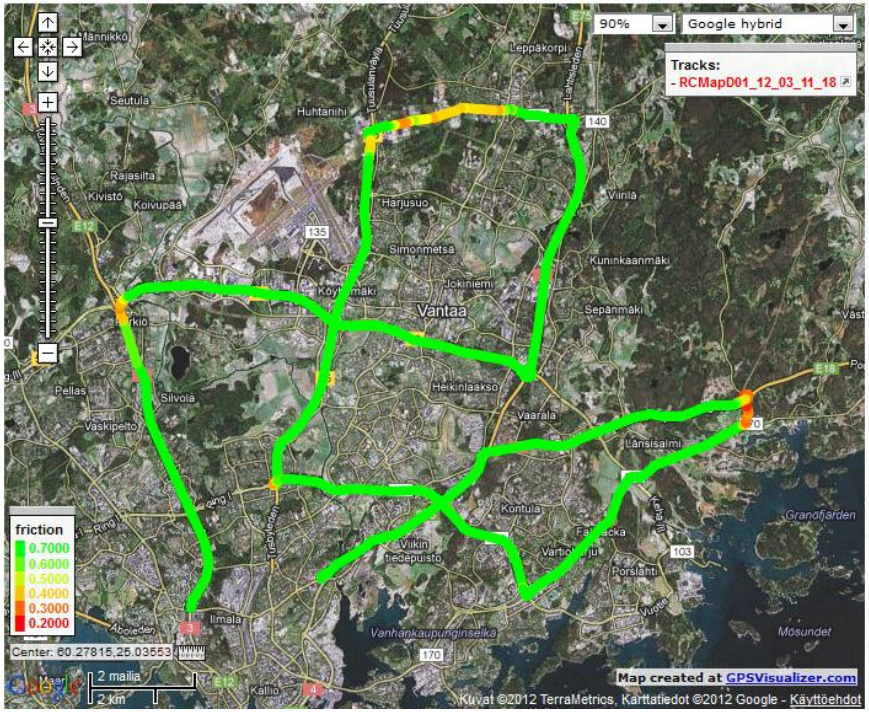
- Conditions:
  - air temperature -7 °C
  - surface icy, dry or snowy
- RCM411 results:
  - friction values as color codes in the table ”n”
  - µTEC comparison friction at locations of droplets
- standard deviation
  - 0.10 as difference of µTEC and RCM friction values

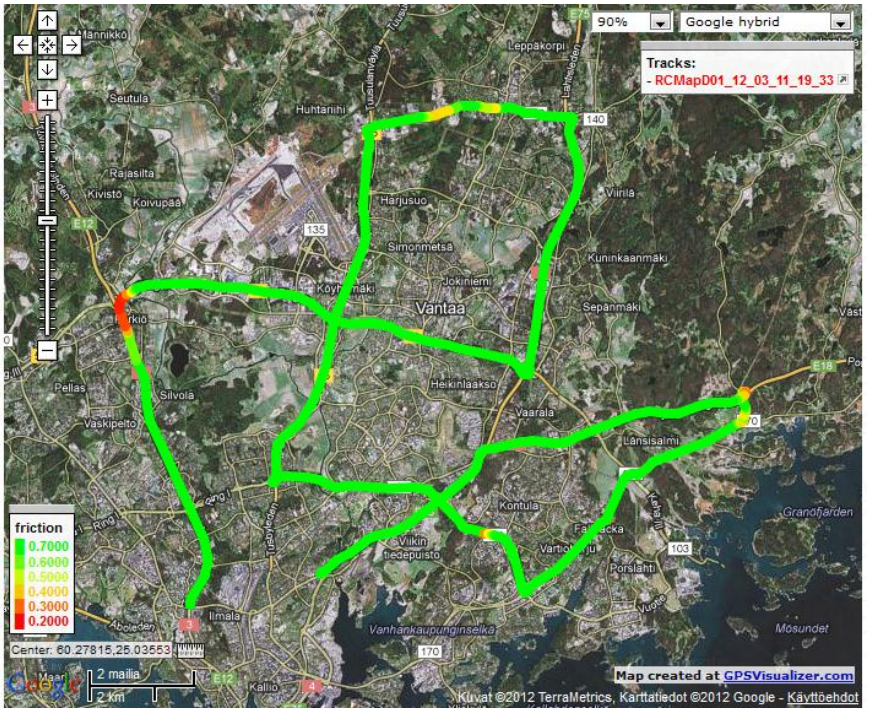


Friction Test Run 30.01.2011

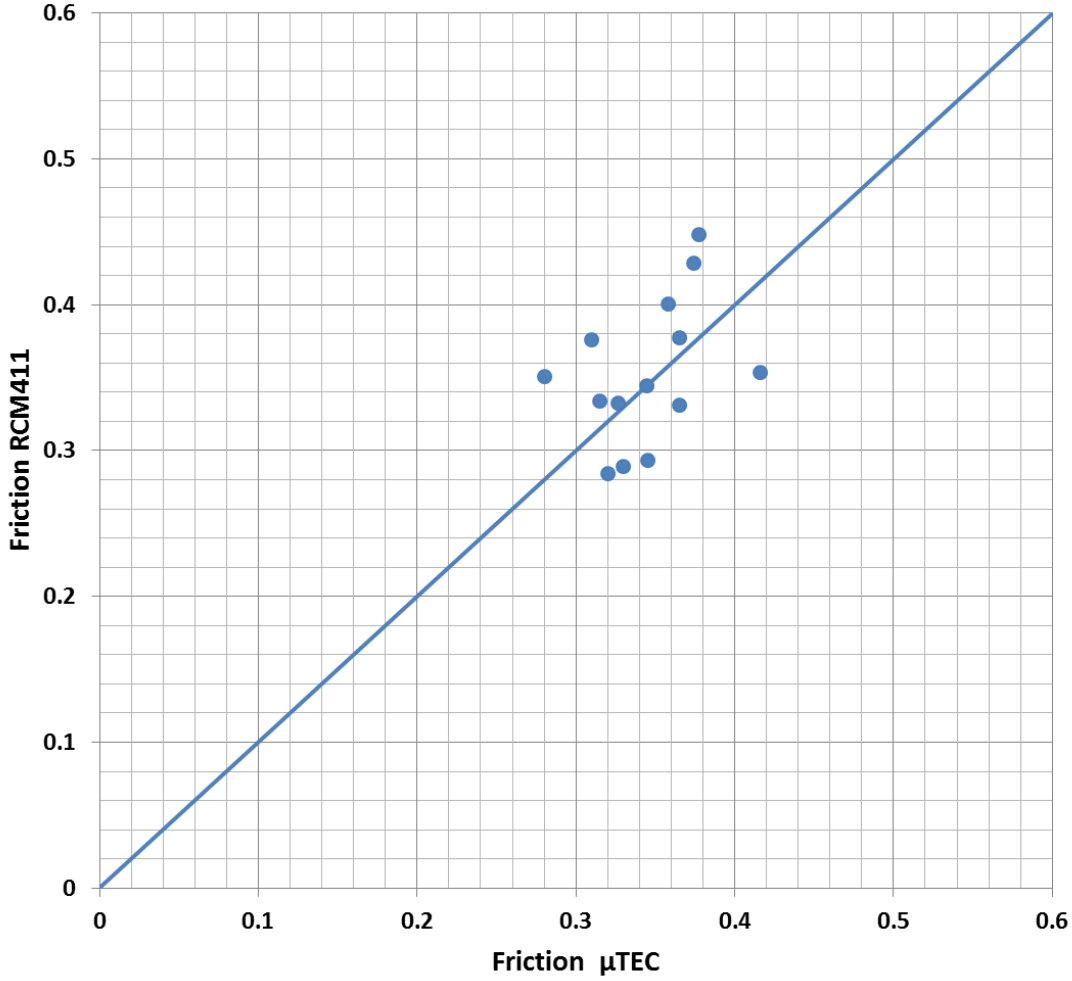


Friction Test Run 11.3.2012
Road Laboratory of Aalto University





Aalto University Friction Test



Conclusion

- Mobile Road Condition Monitor RCM411
  - surface state, amount and friction
    - standard deviation is on the order of 0.10
  - various user interfaces available
    - cell phone, tablet or PC
    - real time map interface in the internet
  - add on sensors
    - surface temperature

Conclusion

- RCM applications
  - a tool for winter maintenance
  - a tool for quality control
  - active spreading of deicers
  - friction mapping
  - thermal mapping
  - information to drivers
  - warning for aquaplaning, …
- look at the demo video!