Teconer

A Compact Road Weather Station and a Mobile Road Condition Monitor

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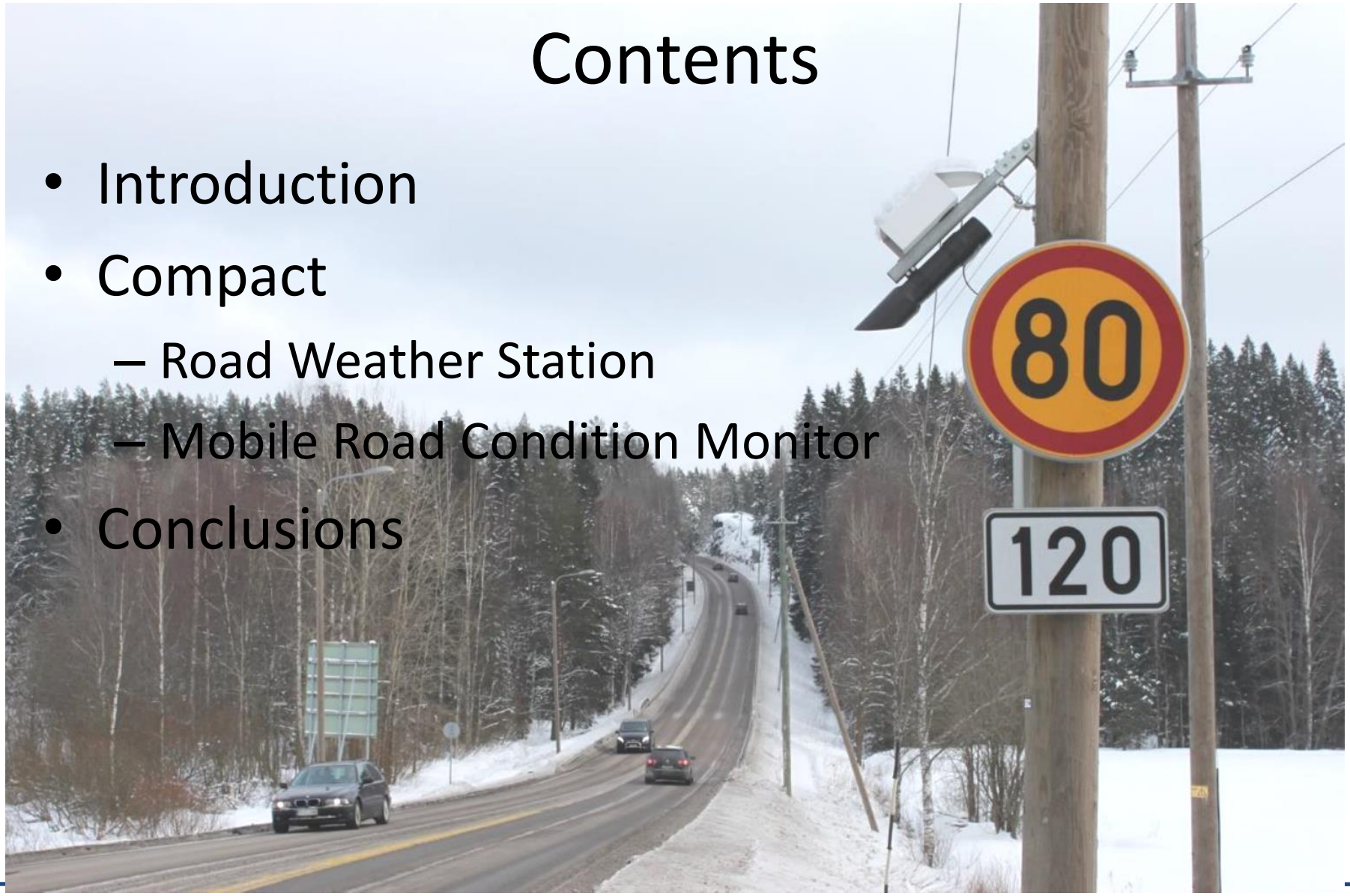


Introduction (RWS)

- Road Weather Stations (RWS)
  - expansion started in 1990's
  - non-invasive optical road condition monitoring
    - direct measurement of slippery conditions
  - long list of measurands -> high cost!
    - surface condition, water and ice layer thickness, road surface temperature, air temperature, dew point temperature, estimated coefficient of friction, road temperature at a depth, wind speed and direction, precipitation, visibility, present weather, short and long wave radiation, concentration and amount of de-icer chemical, depression of freezing point …

Introduction (RWS)

Cost of a typical RWS is 30 – 60 k€

- sensors, data logger, communication, power, …
- initial installation, maintenance and service
- scarce network

What are the minimal requirements for a compact RWS?

1. minimal amount of sensors and hardware
2. easy installation
3. low maintenance

A Compact RWS

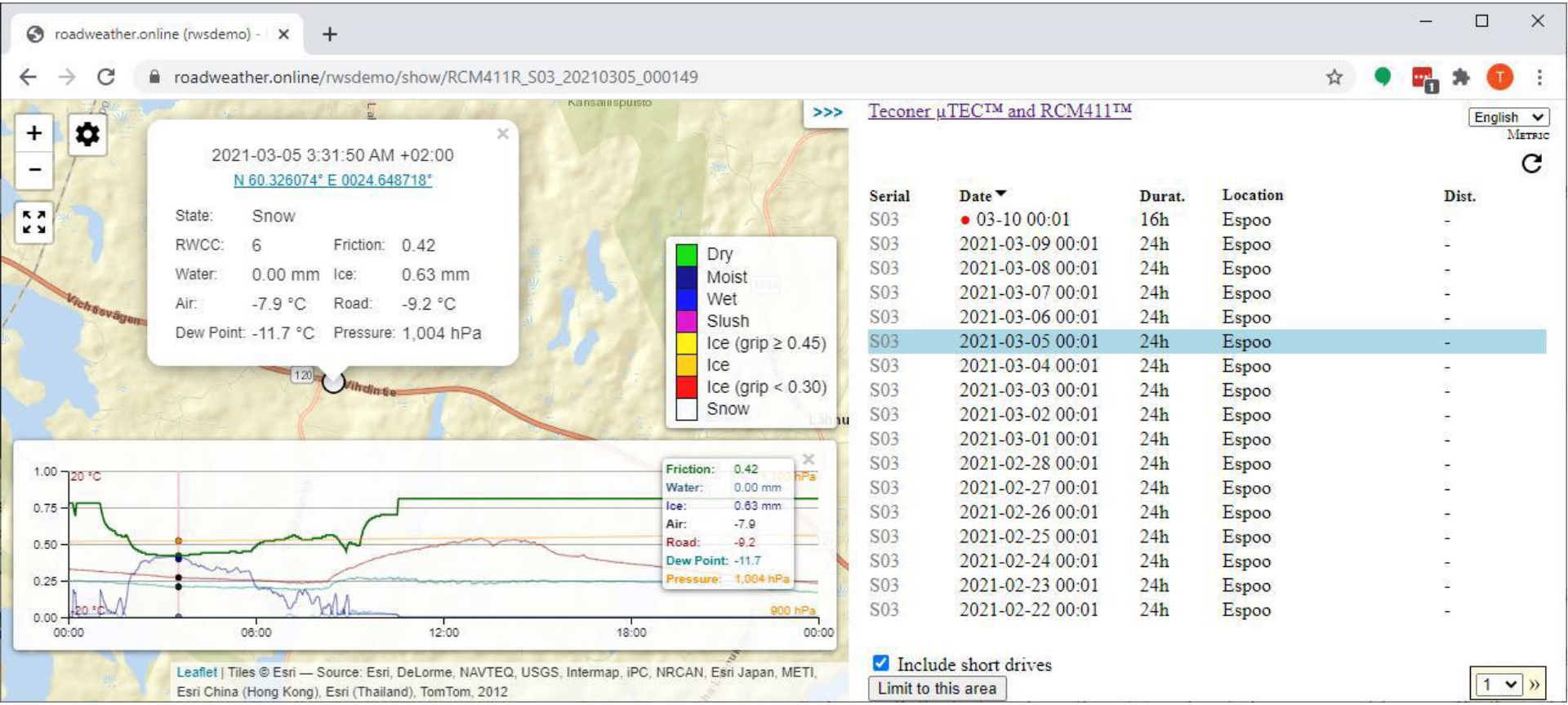
Our approach:

1. Minimal amount of sensors and hardware
   - optical road condition monitor
   - surface and dew point temperature
   - comms unit
   - power from street lights
2. Easy installation
   - use existing infrastructure, poles and masts
   - simple fixing parts or a tiltable mast
3. Minor maintenance needs
   - long service interval
   - remote updates and calibration

Sensors

- Remote Road Condition Monitor RCM411R
  - surface state, friction, water and frozen layer thickness
- Dew Point and Surface Temperature Sensor RTD411SA
  - temperatures Tsurf, Tdew and Tair
  - atmospheric pressure, wind speed, Tground

Field Testing



Field Testing of RWS10

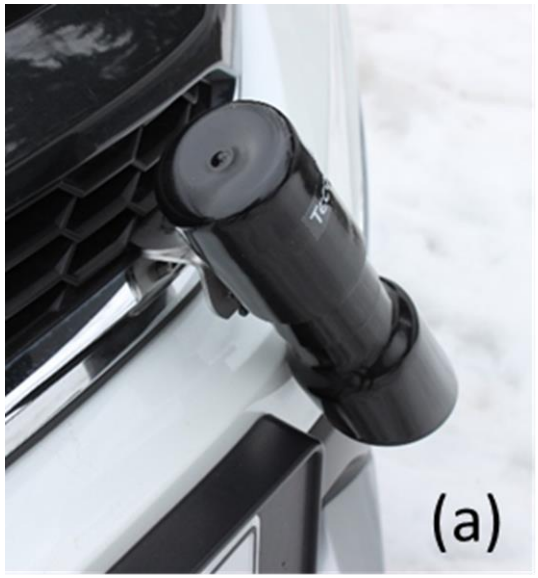
- roadweather.online/rwsdemo
  - running two years without on the spot service
- Fintraffic test station in Arkala and RWS10
  - follow Teconer blog about performance of RWS10
    - Surface Condition
    - Surface Temperature
    - Air temperature and Moisture
    - Ground Temperature
    - Wind Speed

RWS10 in Arkala Test Station

A Compact Mobile Road Condition Monitor

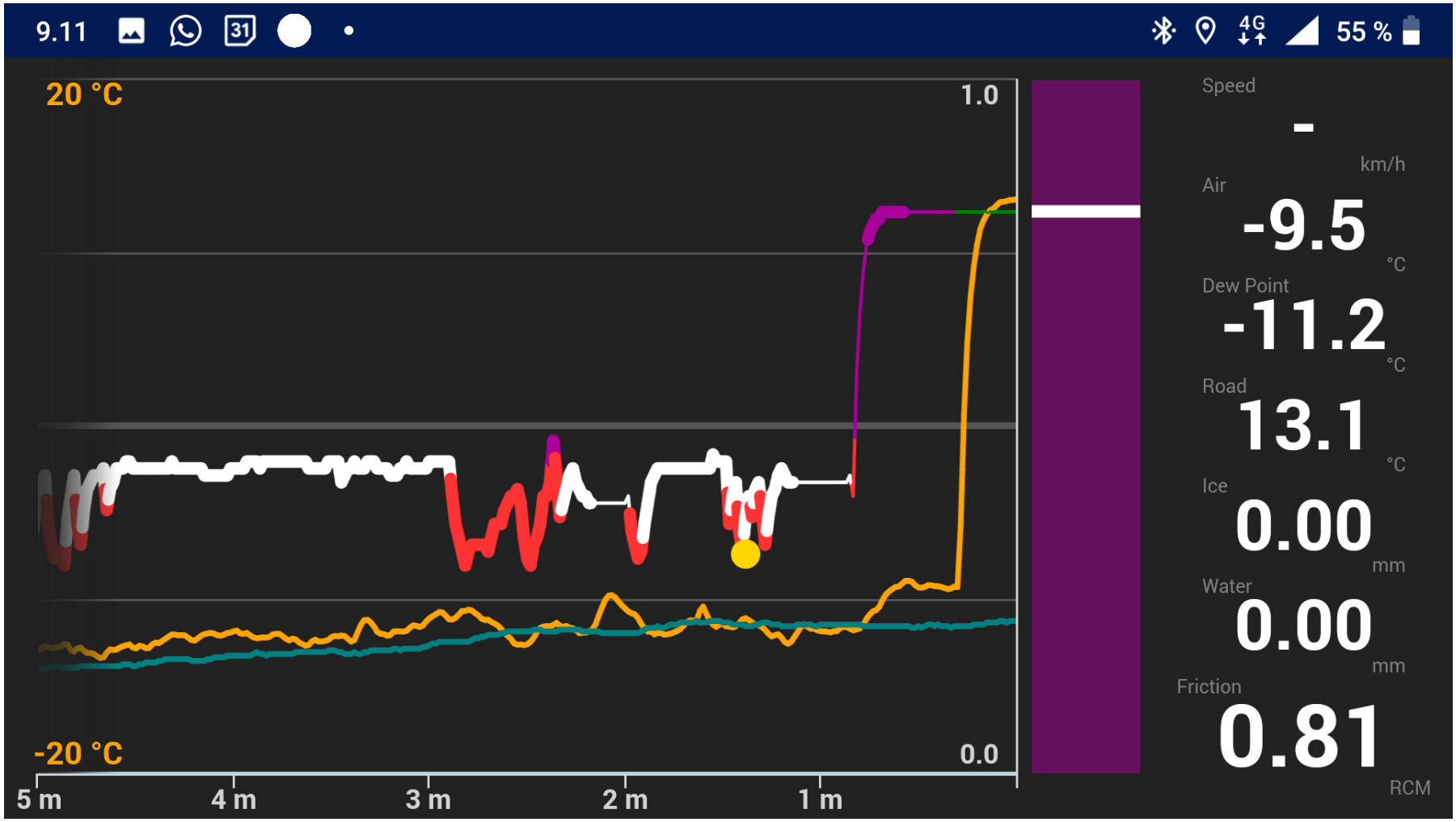
- pioneering work since 2011
- need to reduce the size
  - easier installation
  - magnetic fixing

Fixing Options



Need to do something?

In Vehicle User Interface

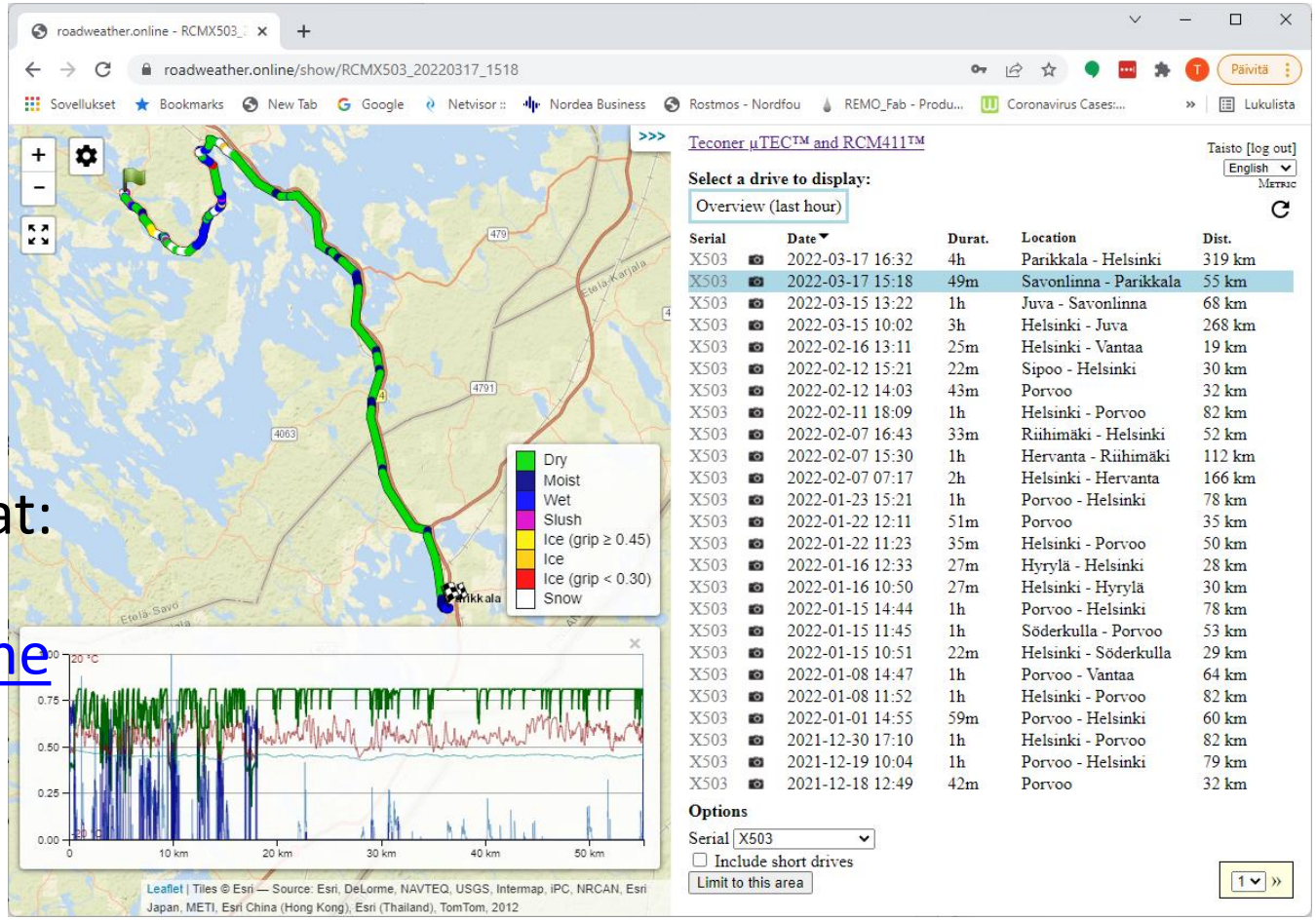


Map Based UI for the Data

Performance testing

- piloting
  - test driving 11000 km
- data available at:

roadweather.online



Serial	Date	Durat.	Location	Dist.
X503	2022-03-17 16:32	4h	Parikkala - Helsinki	319 km
X503	2022-03-17 15:18	49m	Savonlinna - Parikkala	55 km
X503	2022-03-15 13:22	1h	Juva - Savonlinna	68 km
X503	2022-03-15 10:02	3h	Helsinki - Juva	268 km
X503	2022-02-16 13:11	25m	Helsinki - Vantaa	19 km
X503	2022-02-12 15:21	22m	Sipoo - Helsinki	30 km
X503	2022-02-12 14:03	43m	Porvoo	32 km
X503	2022-02-11 18:09	1h	Helsinki - Porvoo	82 km
X503	2022-02-07 16:43	33m	Riihimäki - Helsinki	52 km
X503	2022-02-07 15:30	1h	Hervanta - Riihimäki	112 km
X503	2022-02-07 07:17	2h	Helsinki - Hervanta	166 km
X503	2022-01-23 15:21	1h	Porvoo - Helsinki	78 km
X503	2022-01-22 12:11	51m	Porvoo	35 km
X503	2022-01-22 11:23	35m	Helsinki - Porvoo	50 km
X503	2022-01-16 12:33	27m	Hyrylä - Helsinki	28 km
X503	2022-01-16 10:50	27m	Helsinki - Hyrylä	30 km
X503	2022-01-15 14:44	1h	Porvoo - Helsinki	78 km
X503	2022-01-15 11:45	1h	Söderkulla - Porvoo	53 km
X503	2022-01-15 10:51	22m	Helsinki - Söderkulla	29 km
X503	2022-01-08 14:47	1h	Porvoo - Vantaa	64 km
X503	2022-01-08 11:52	1h	Helsinki - Porvoo	82 km
X503	2022-01-01 14:55	59m	Porvoo - Helsinki	60 km
X503	2021-12-30 17:10	1h	Helsinki - Porvoo	82 km
X503	2021-12-19 10:04	1h	Porvoo - Helsinki	79 km
X503	2021-12-18 12:49	42m	Porvoo	32 km

Conclusion

A compact Road Weather Station RWS10:

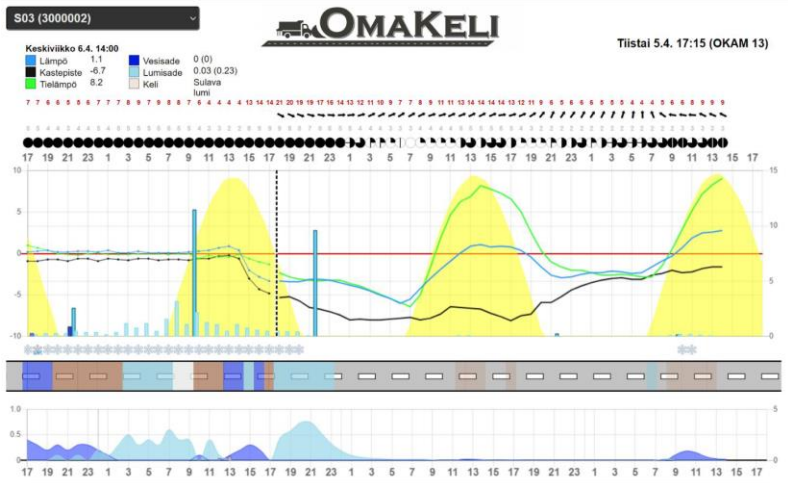
- low cost, easy installation, low maintenance

A compact mobile Road Condition Monitor:

- magnetic fixing, fast and enhanced response

1. RWS for trends
2. Mobile RCM for spatial data
3. Forecasts
4. Maintenance recommendations

MDSS



Thank You!