A new type of anti icing system – development/application/demonstration

Presentation at Winterwind 2020
by
Jonas Sundström, Kjell Lindskog, Sven-Erik Thor

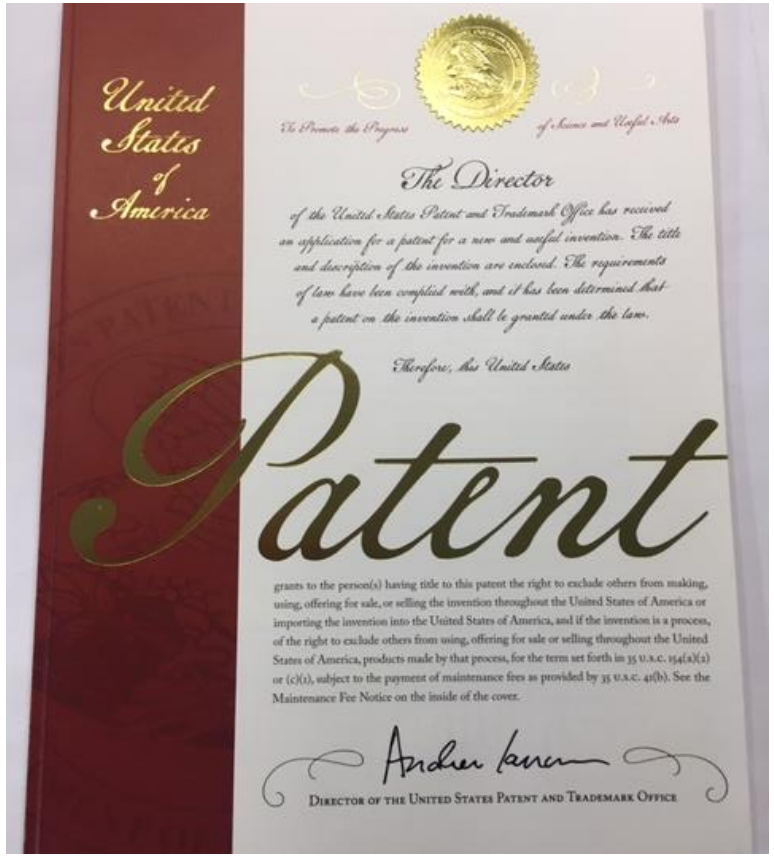
This presentation:

- Background
- System characteristic and layout
- Mounting on wind turbine blades
- Operational experiences
- Next steps

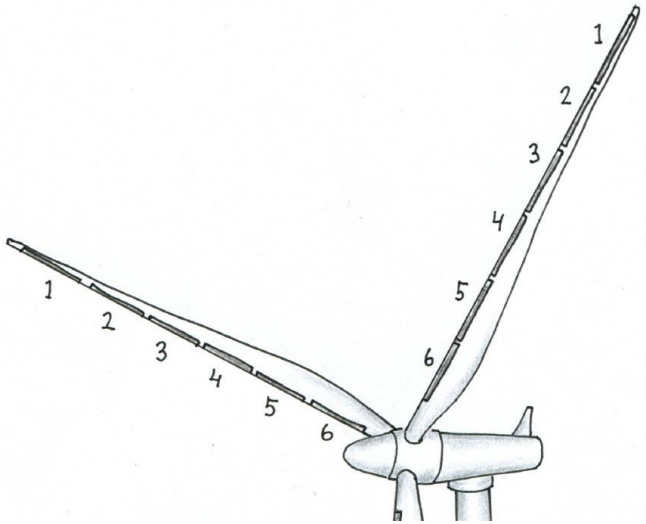
Main characteristics

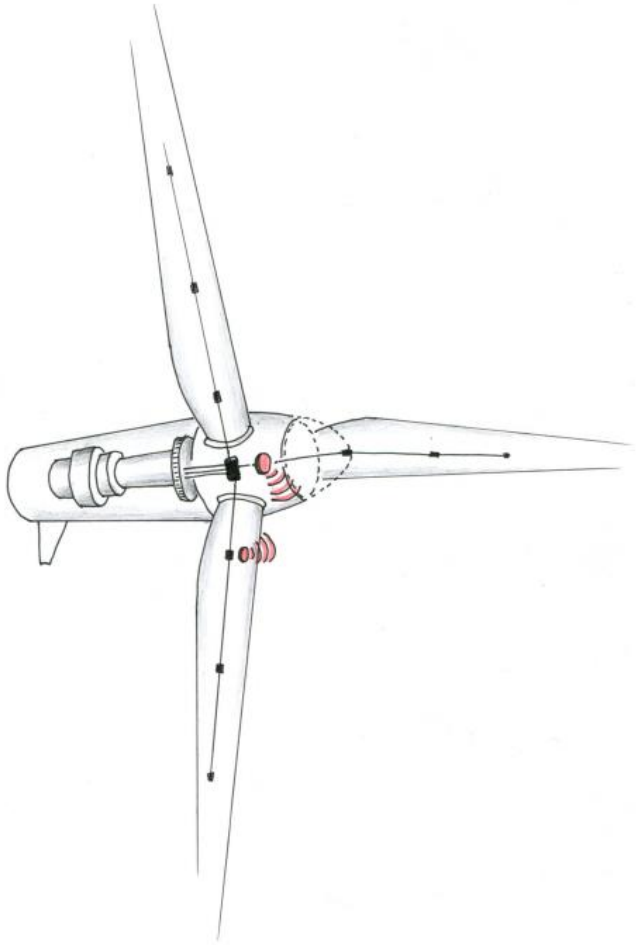
- Autonomous operation
- Copper fabric for heating
- Inherent temperature measurement and control
- Main features are patented

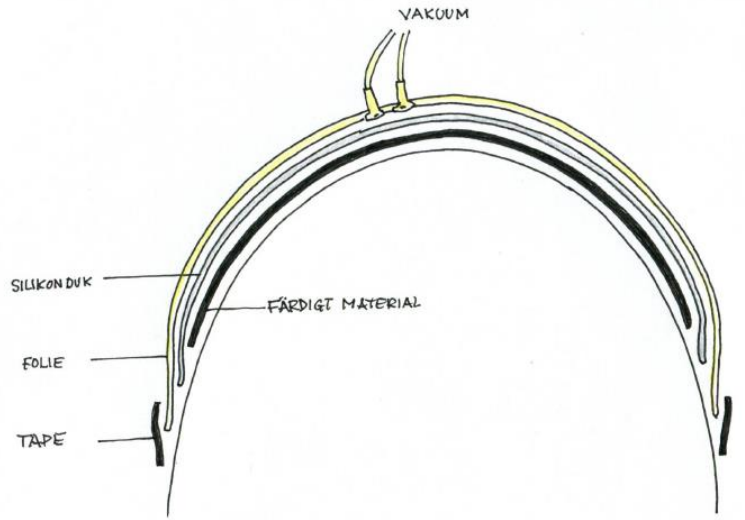
- Technology applied in other areas



Principle layout

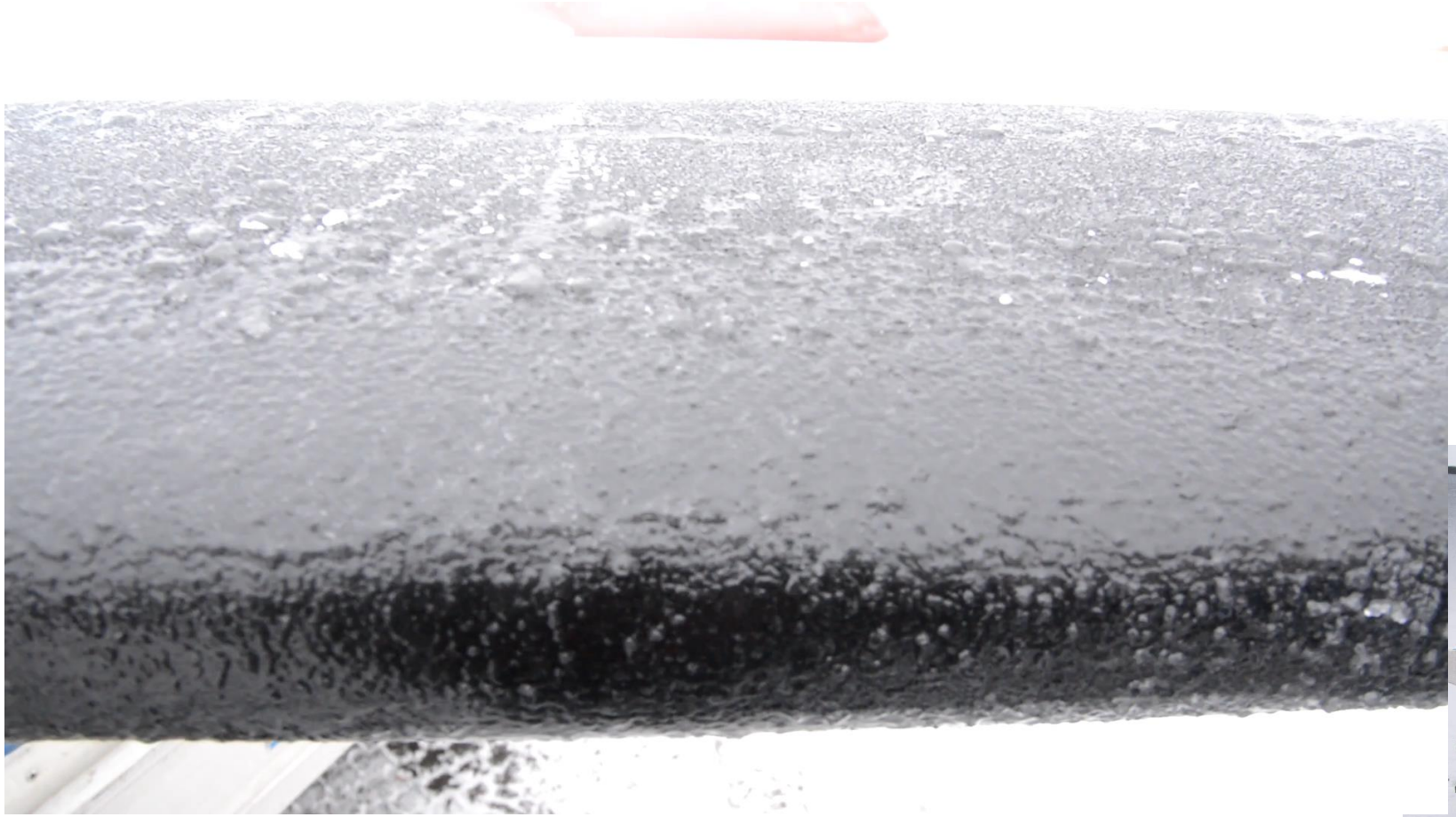


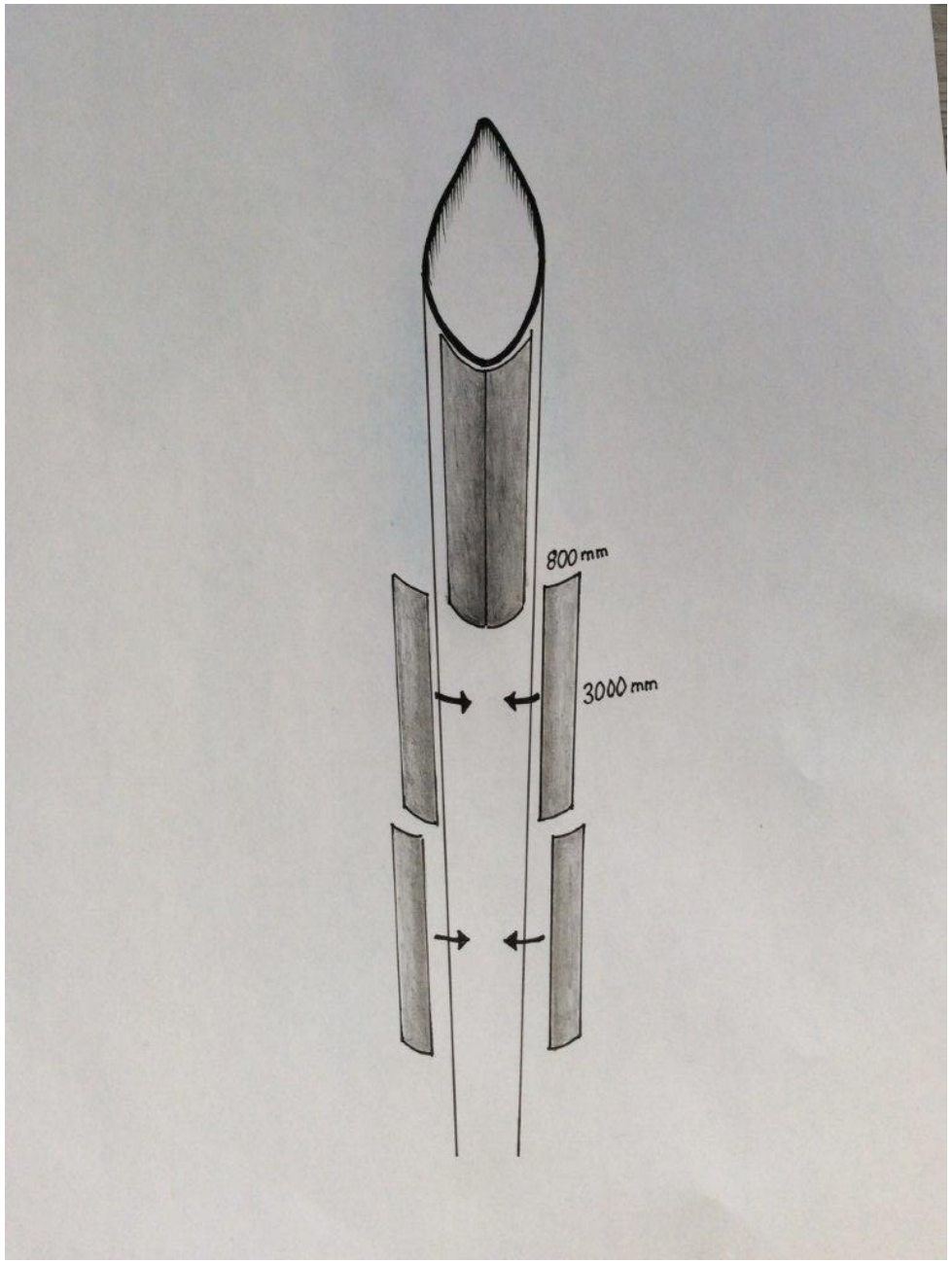




Manufacturing of heating modules

Early experiments



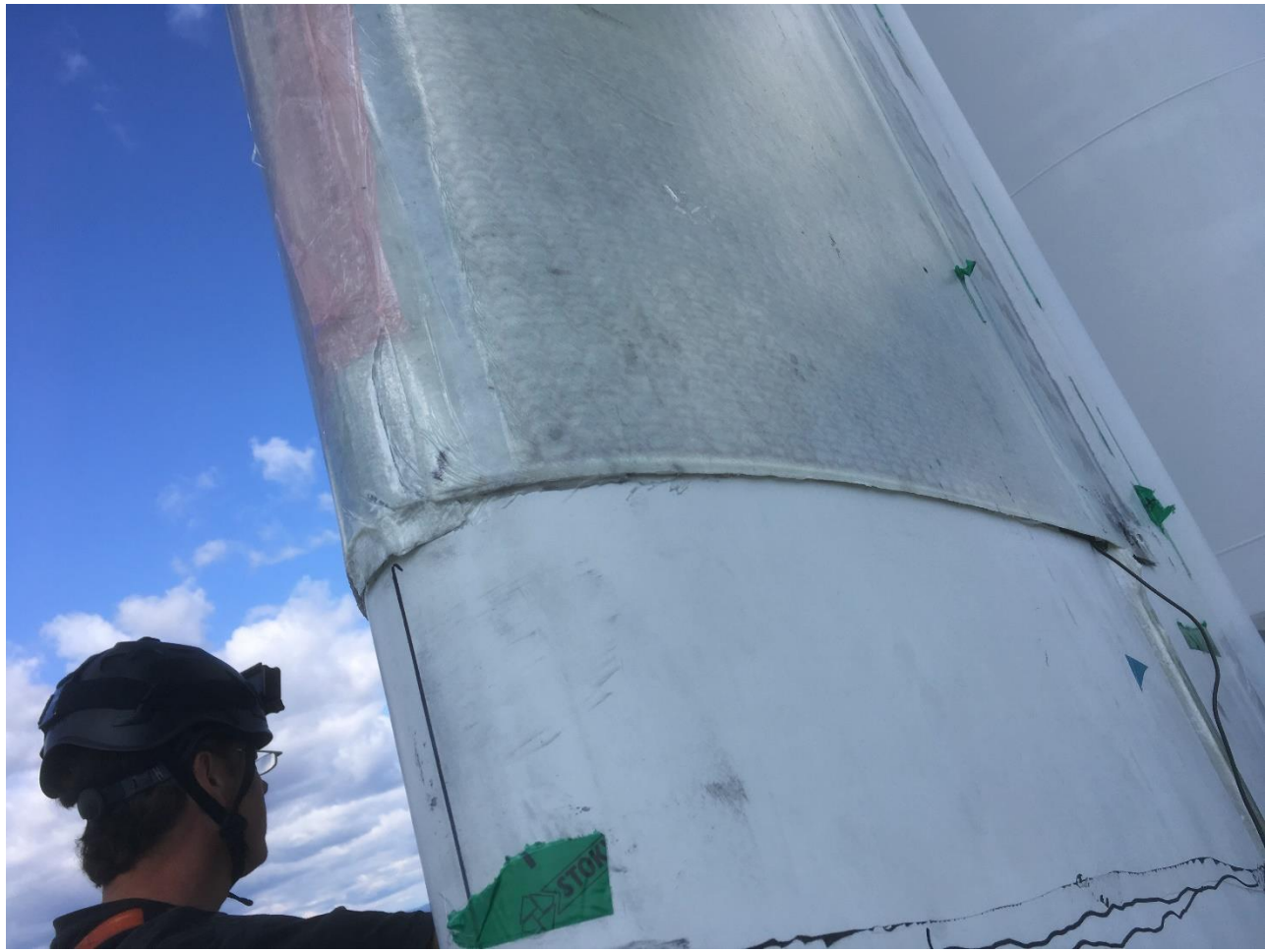


Mounting of heating modules

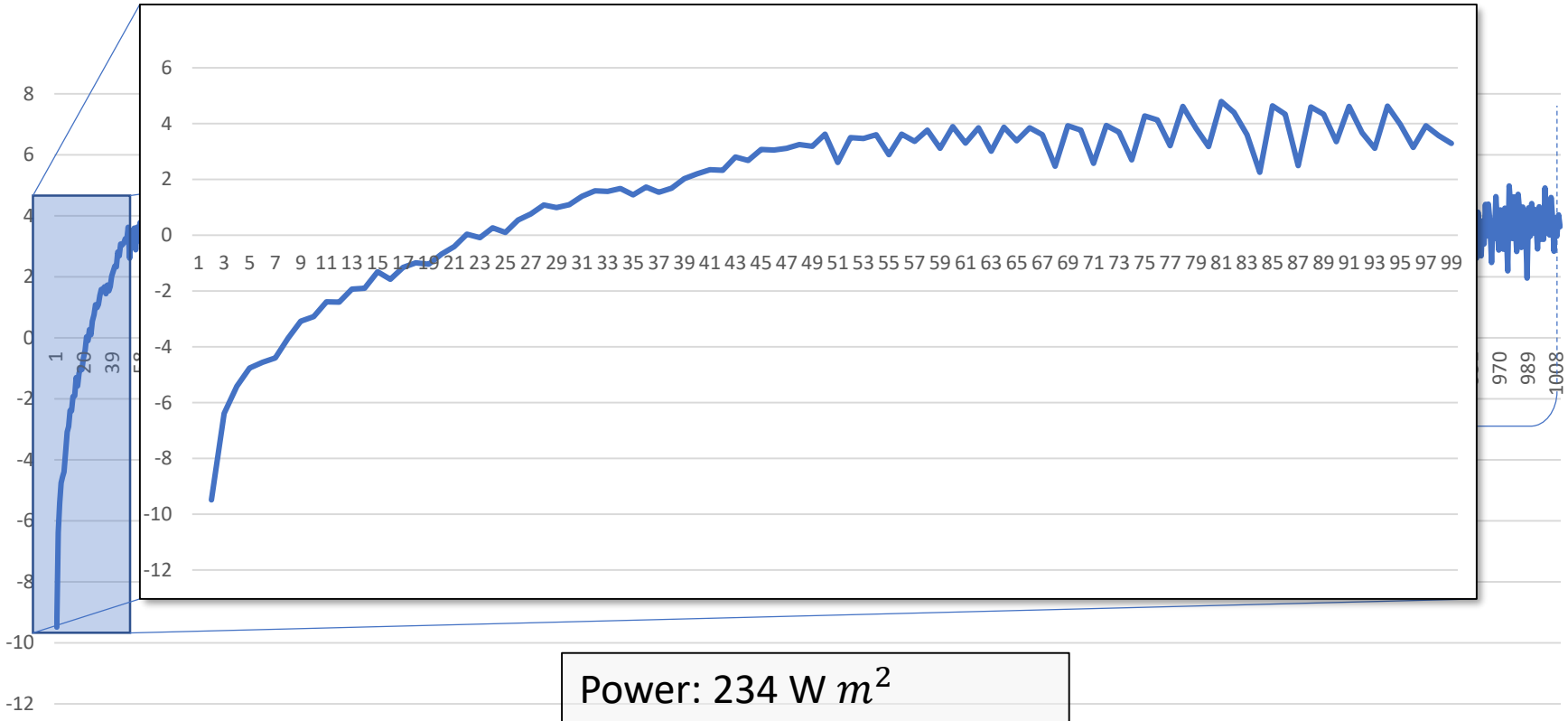
Service platform

Blade work in co-operation with Roofac Wind AB

Heating modules

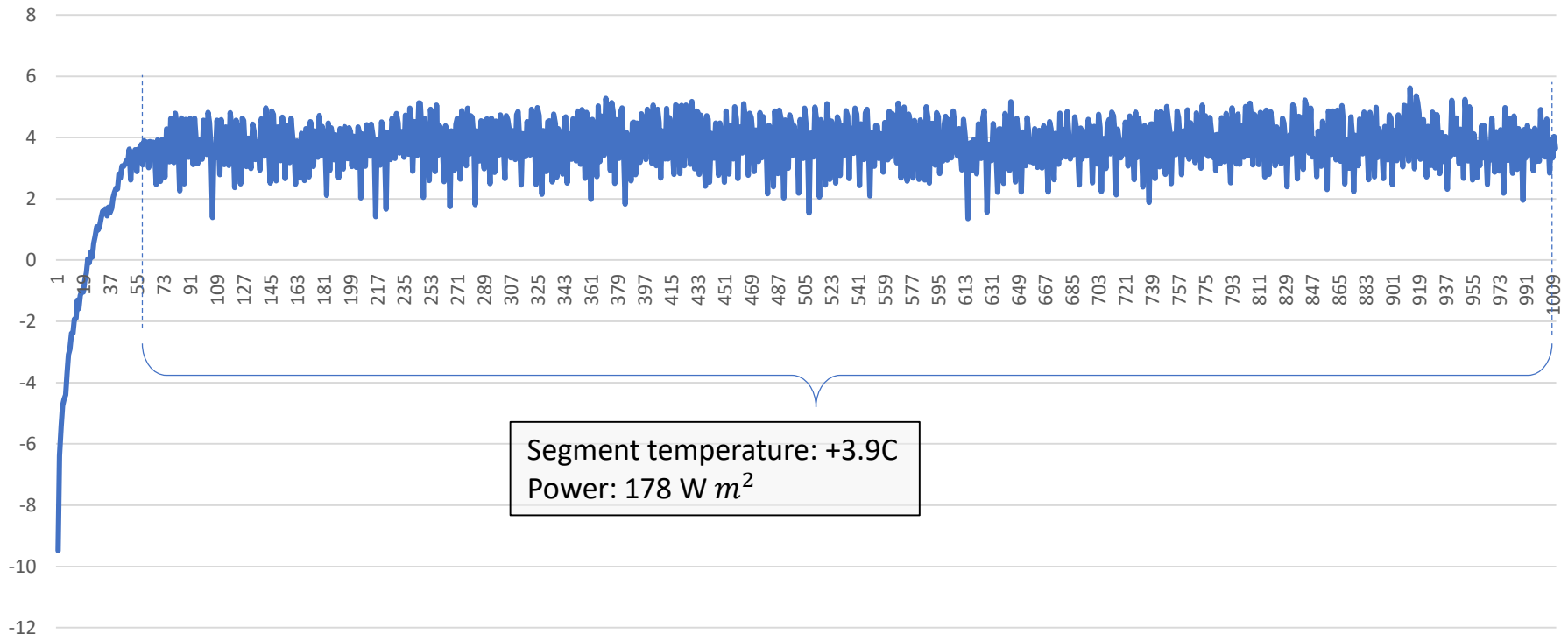


Heating Segment #2, from -9 grader to +4C

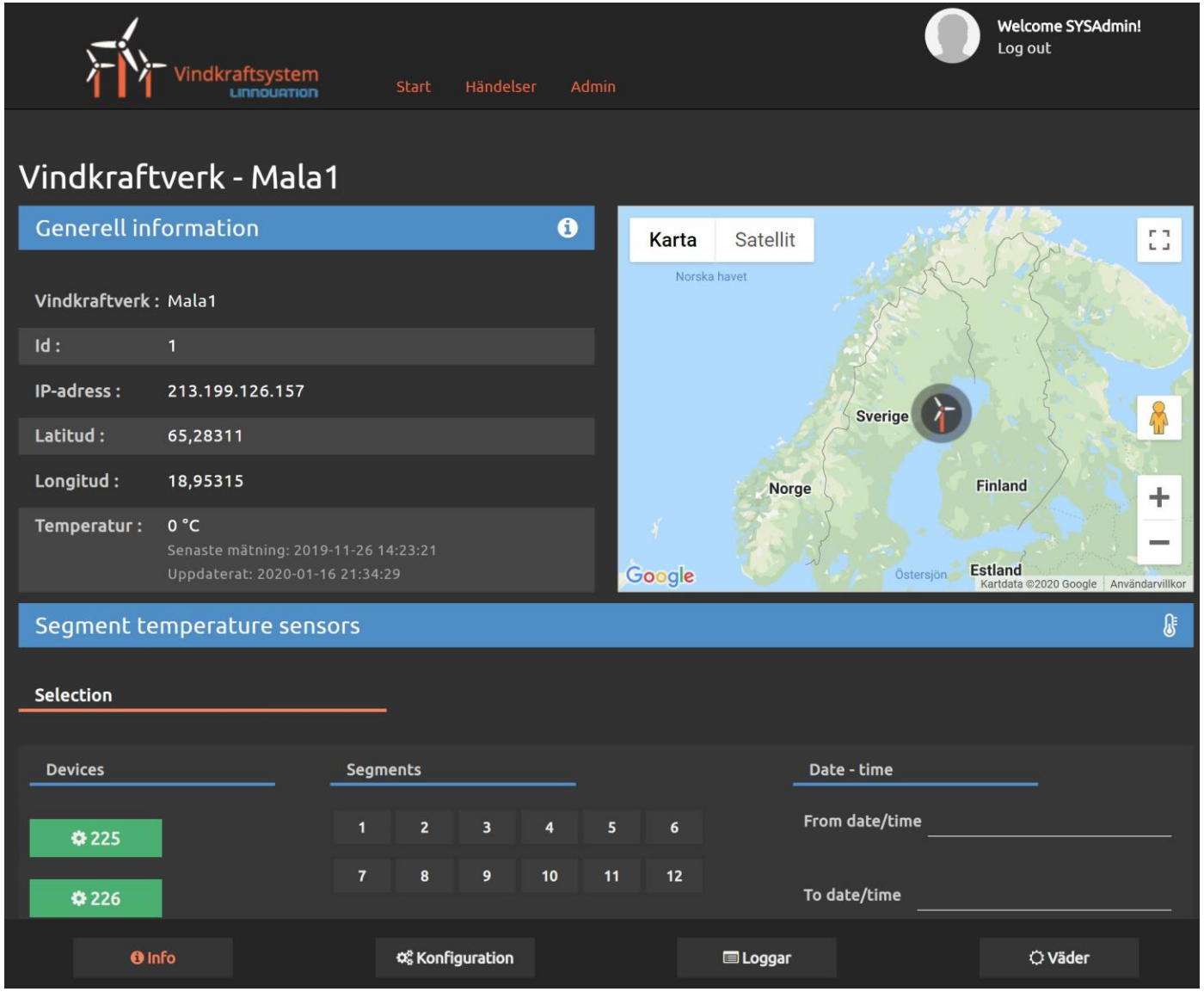


Power: 234 W m^2
Heating time: ~10 minutes

Controlling steady temperature of +4C



Web-applikation

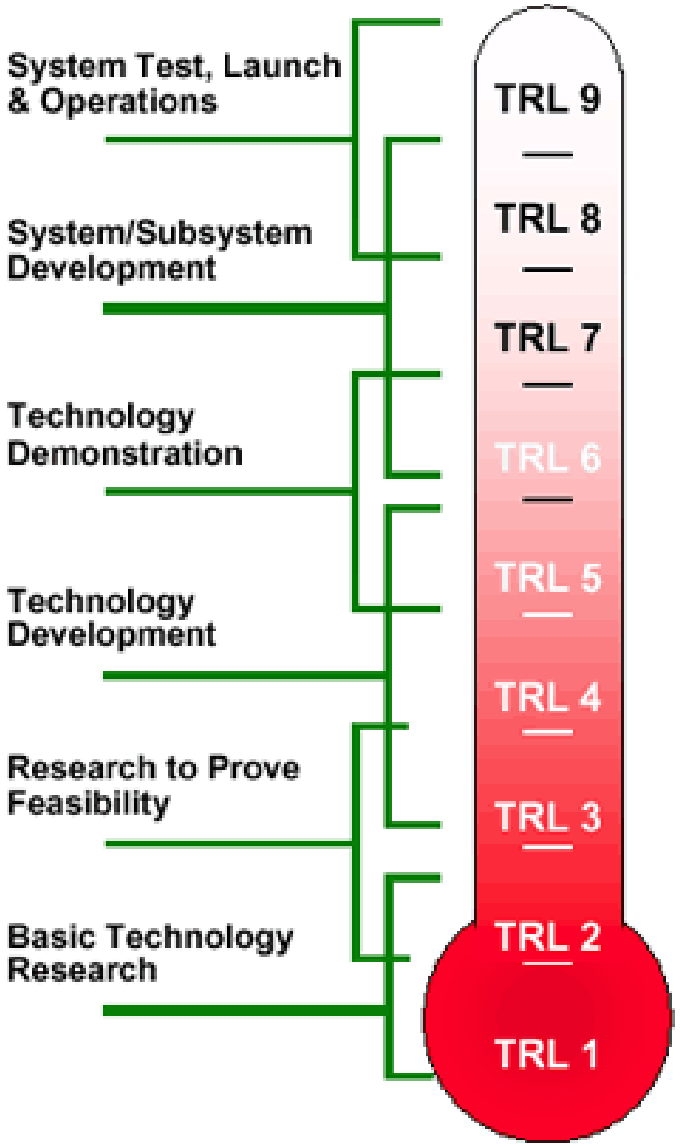


Lightning tests

Summary

- The system works as expected
- The Technology Level has been increased to at least 7
- Next step - introduction to the market

- Miscellaneous
  - Improved service platform is needed, in order to minimize downtime



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Blade work in co-operation with Roofac Wind AB

Contact:

- Lindskog Innovation AB
- Kjell Lindskog, kjell@linnovation.se
- +4670582 28 25

DET KREATIVA SKELLEFTEÅ

Luft under vingarna för stans meste innovatör

From newspaper Norran

Extra pictures – will not be shown

Background

- To deice or not? Yes we need to anti/de-ice in cold climate
- Phase 1 of project developed the basics
- Phase 2 (this project) continued the development
- Increased TRL of the system

Other applications

- Deicing wind turbine nacelle roofs
- Improved service platform
- Heated stretchers
- Heated lorry containers for transportation of iron ore