



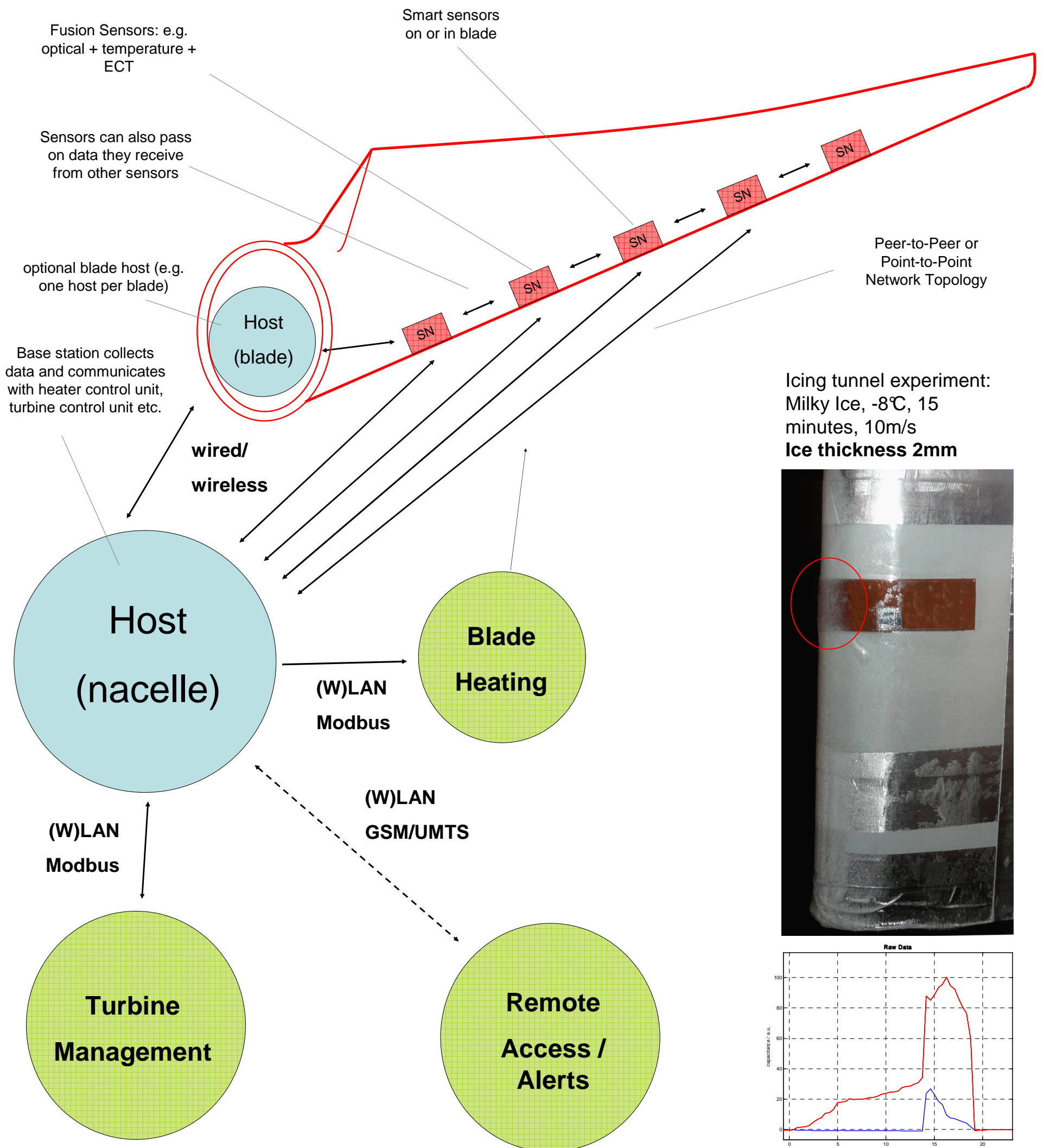
# System Concept of a Smart Icing Sensor Network on Wind Turbine Blades



Michael J. Moser and Hubert Zangl

Institute of Electrical Measurement and Measurement Signal Processing  
Graz University of Technology  
michael.moser@tugraz.at

Abstract: We present a system concept for a network of smart icing sensors for wind turbines. Multiple smart sensors detect icing by means of a sensor fusion approach and are distributed over the surface of the turbine blades (e.g. on leading edges, tower, nacelle etc.). By monitoring the icing status on multiple points, more accurate information can be collected compared to a single or few measurement points especially at early stages of icing. The smart sensors communicate with each other in order to deliver an accurate overall picture of the icing status of the turbine. Smart sensors are a suitable technology as they are light-weight, energy efficient and come with low installation effort. A base station can communicate with the turbine management system in order to stop production only when necessary or to trigger heating when required, thus maximizing production and minimizing both losses due to downtime and energy consumption of anti-icing systems. Smart sensor prototypes suited for harsh environments are presented and experimental results on their performance are reported.



Icing tunnel experiment:  
Milky Ice, -8°C, 15 minutes, 10m/s  
Ice thickness 2mm

