

On the variability of temperature and icing status over the blades of a wind turbine



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Outline



- System Description
- Site #1: Blade Temperature vs. Sensor Location
- Site #2: Temperature and Ice vs. Sensor Location
- Site #3: Monitoring of De-Icing Equipment
- Summary and Outlook

System Description

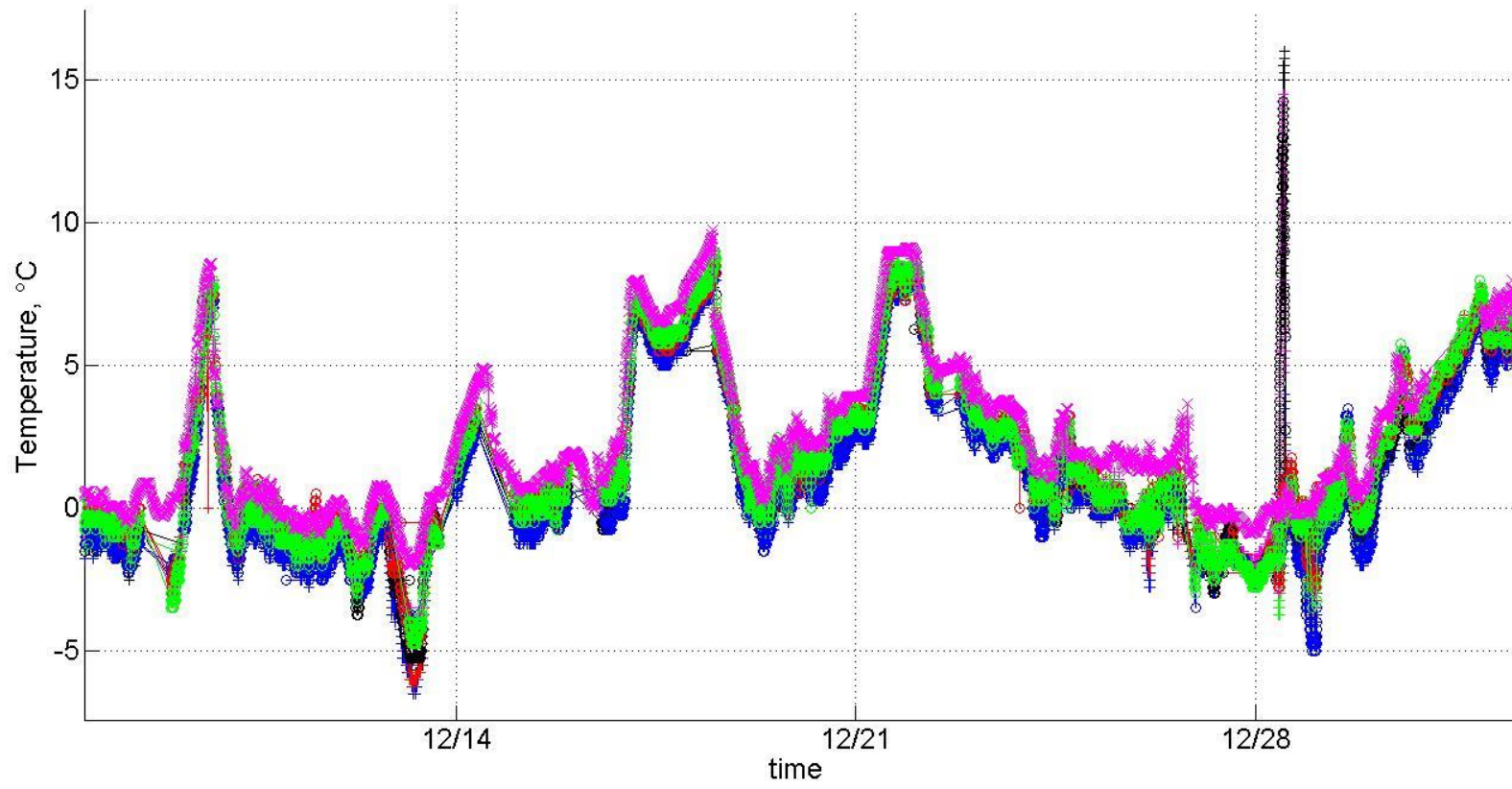


System Description



- Retrofit: mounted with erosion protection tape, wireless
- Anti-/De-Icing: suitable for heated blades
- Receiver locations: ground, nacelle or met mast
- Icing detection also without wind & without rotation
- Current surface status signals:
Free Surface > Activity > Ice1 > Ice2 (to be cont'd)

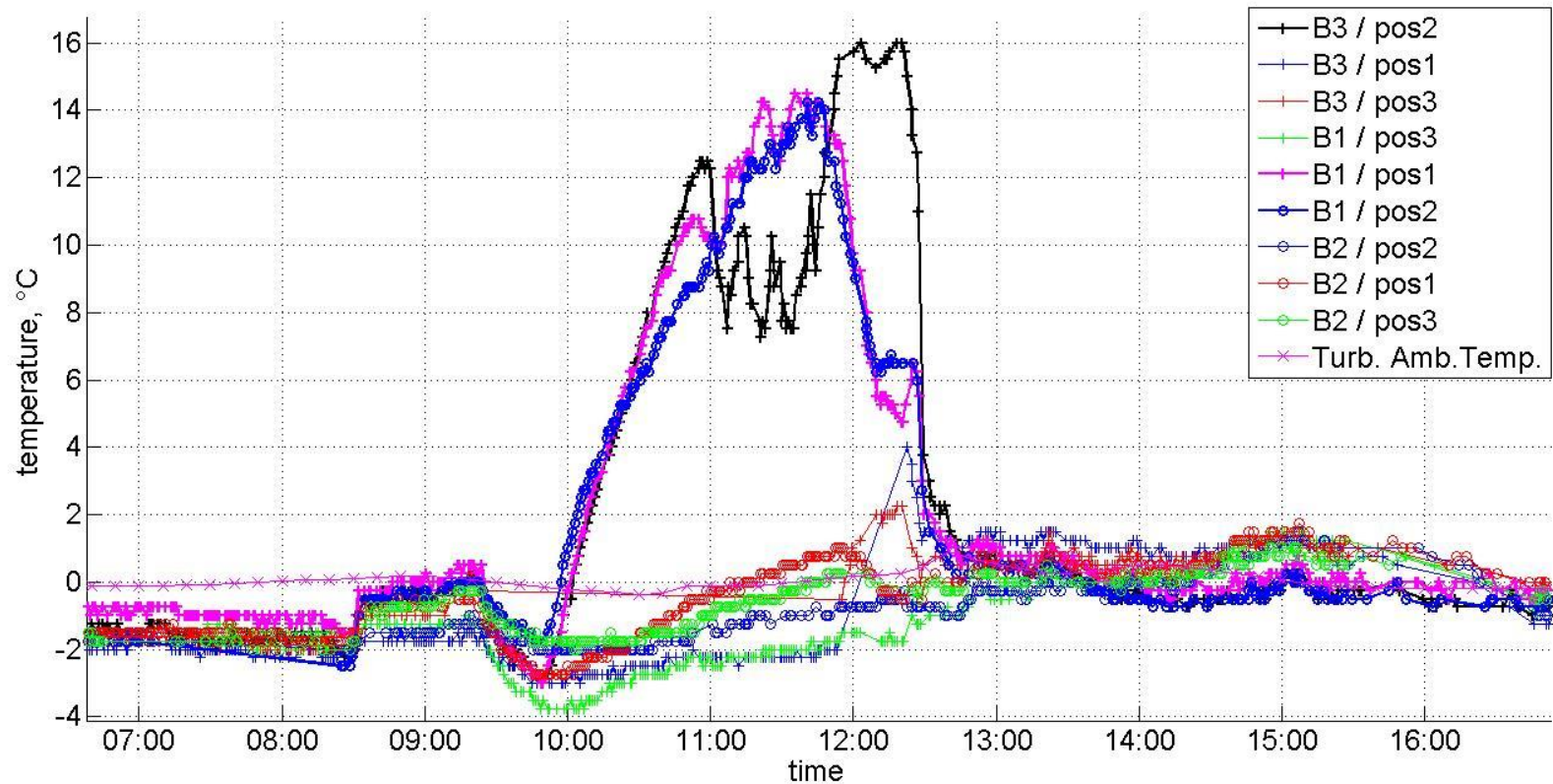
1: Temperature Distribution



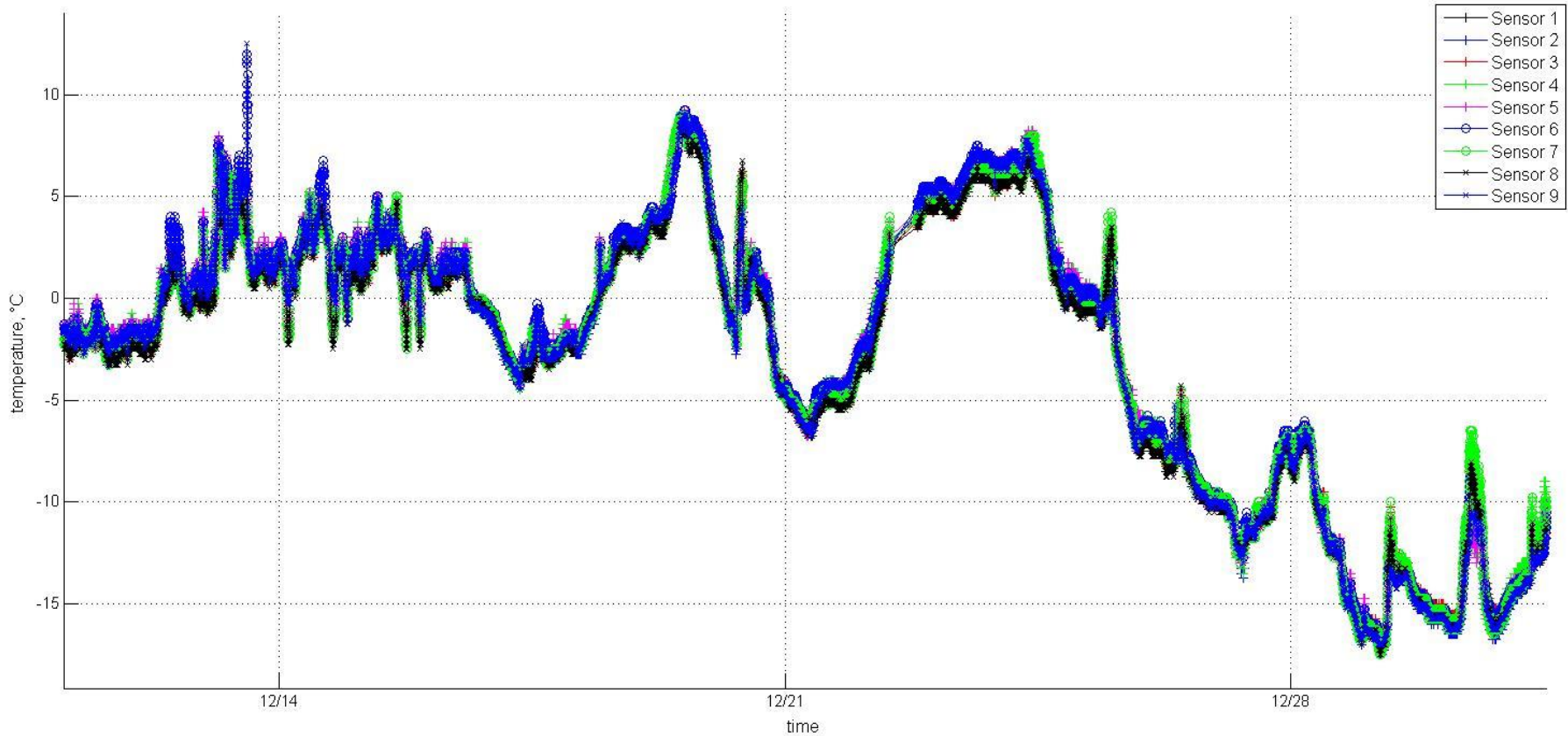
Nordex N60, United Kingdom

data courtesy of **e-on**

1: Temperature Distribution



2: Temperature & Ice



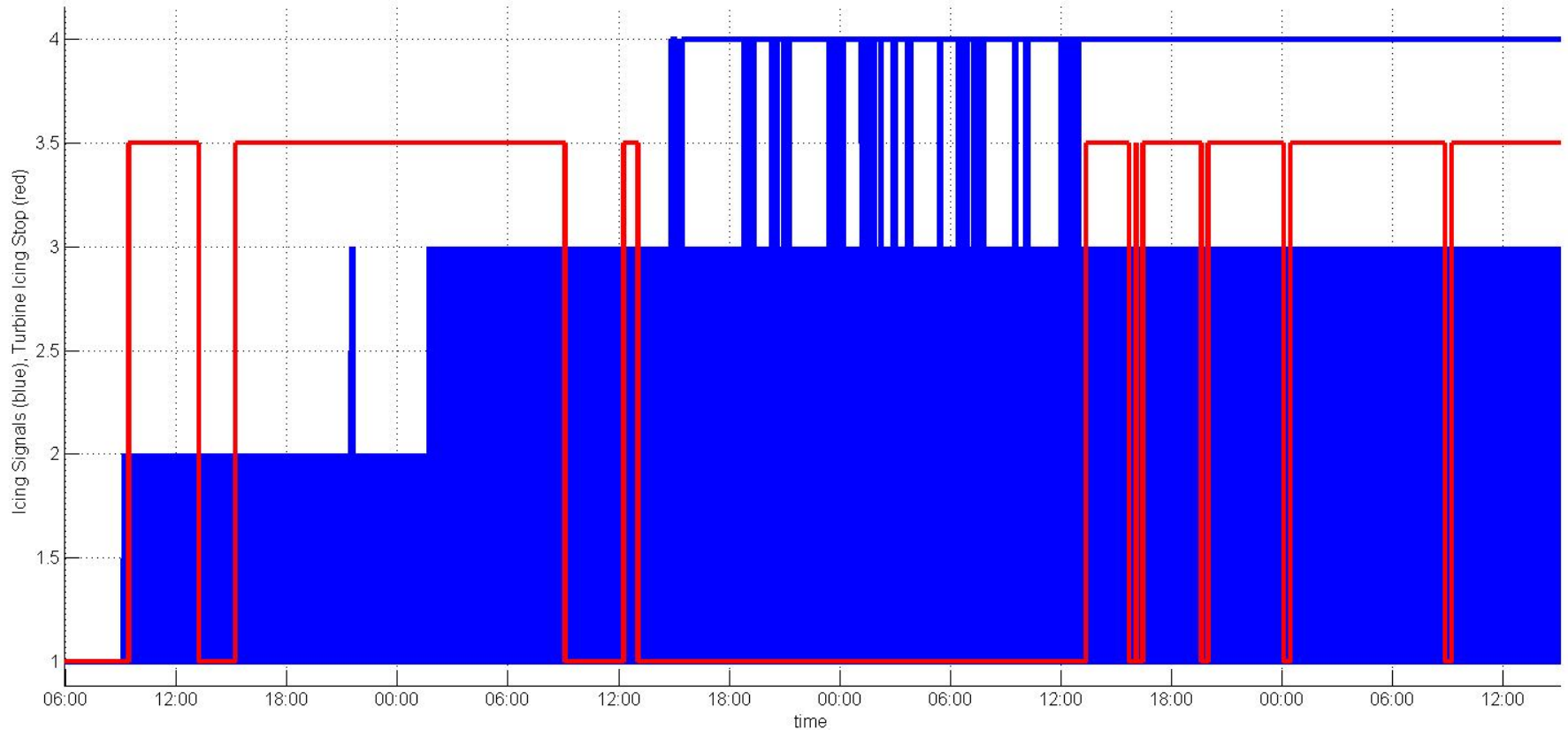
Bonus B52, Austria

data courtesy of



eologix.com

2: Temperature & Ice

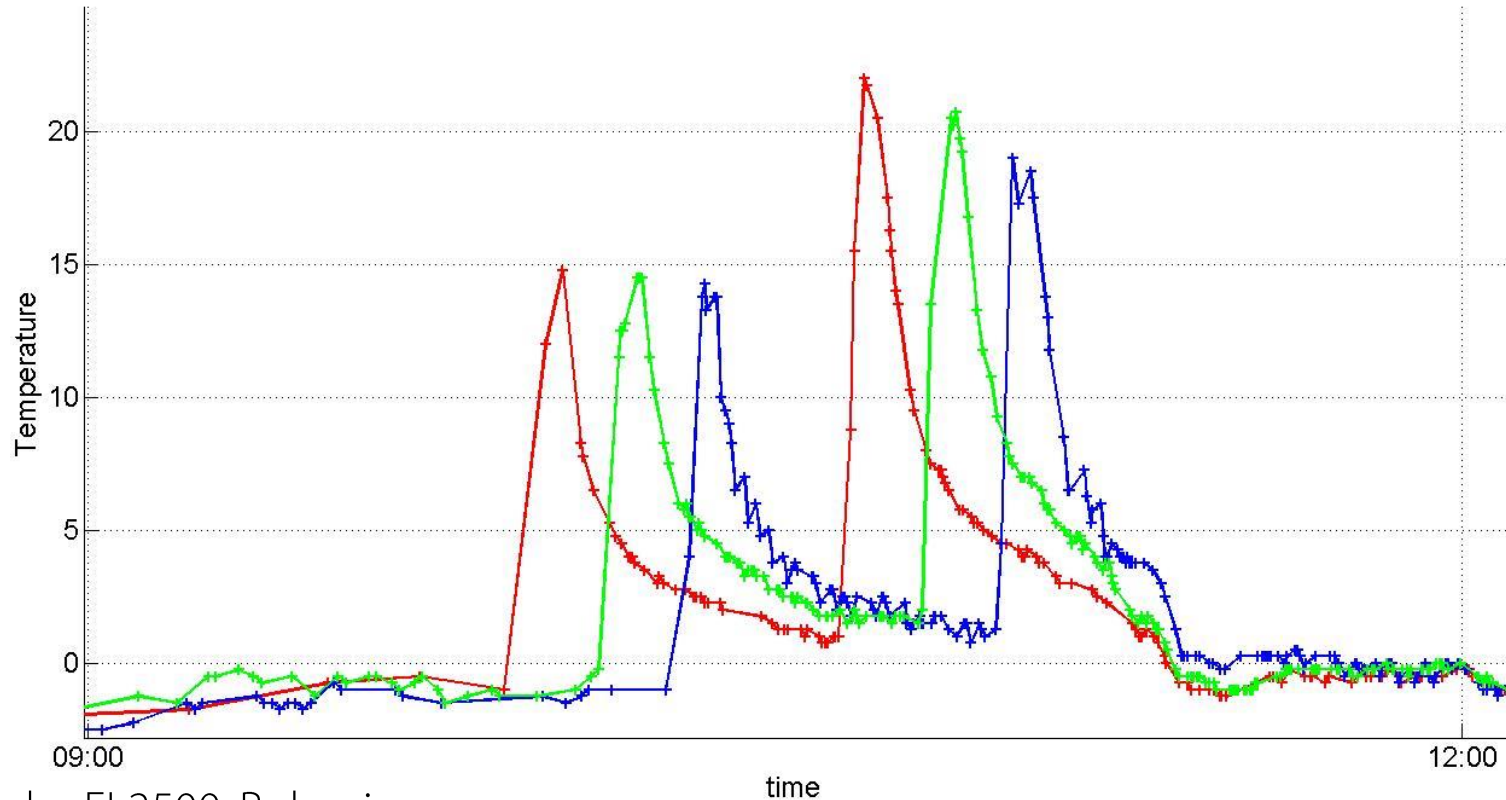


data courtesy of



eologix.com

3: De-Icing Temperature



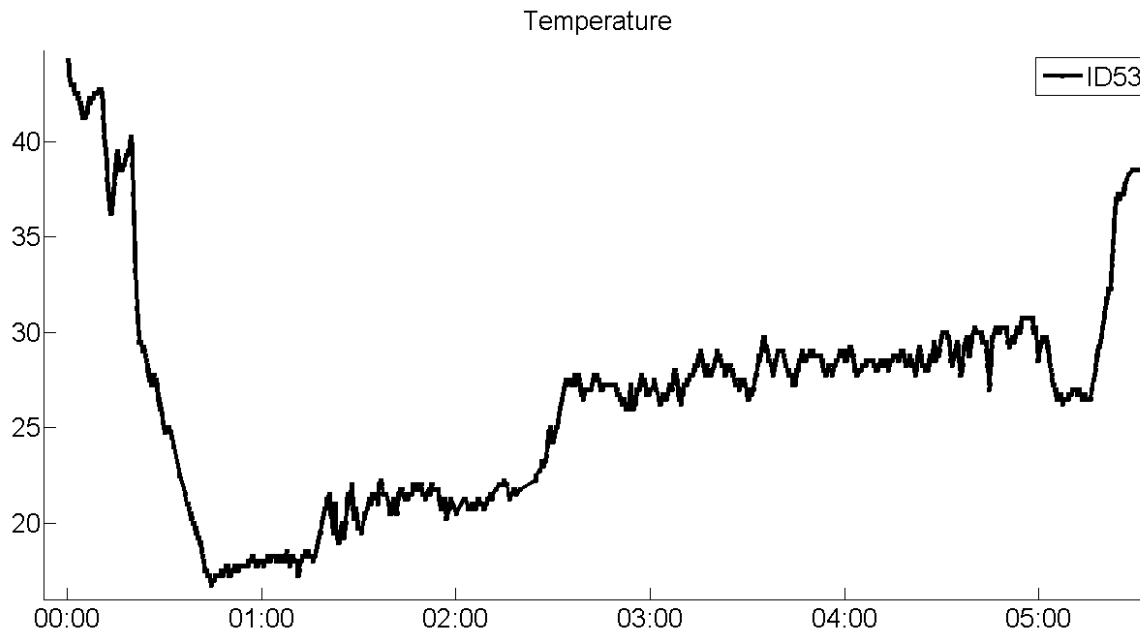
Fuhrländer FL2500, Bulgaria

data courtesy of

ALPIQ

eologix.com

Aircraft Tests



Summary & Outlook



- Blade surface temperature can highly vary even on a single blade (differences $>20^{\circ}\text{C}$ have been measured)
- Icing distribution on blades is not related to nacelle instrumental icing
- Multi-point measurement is useful not only for safety applications but also for effective control of (segmented) anti-/de-icing equipment

Thank you for your attention!



Further questions? Meet us at Stand #31!

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