

Measurement System to Detect Salt Sediments (Corrosion) Inside Offshore Wind Turbines

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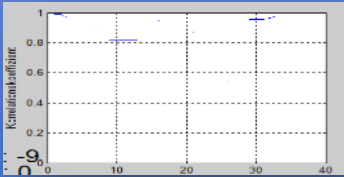
- 2002: 80 offshore wind turbines (OWT) had to be repaired after 2 years due to corrosion and other issues
 - Today's OWTs use air filter systems
- ↳ permanent monitoring reasonable



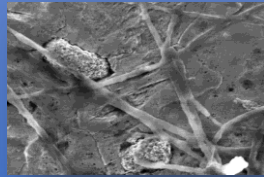
Offshorewindpark Horns Riff 1, Copyright: Mukhz



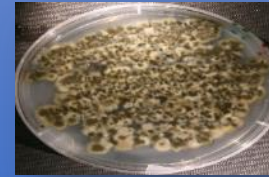
Environmental Influences on Offshore Wind Turbines (Umgebungseinflüsse auf Offshore-Windenergieanlagen)



Acquisition and analysis of
climatological data
(temperature, moisture)

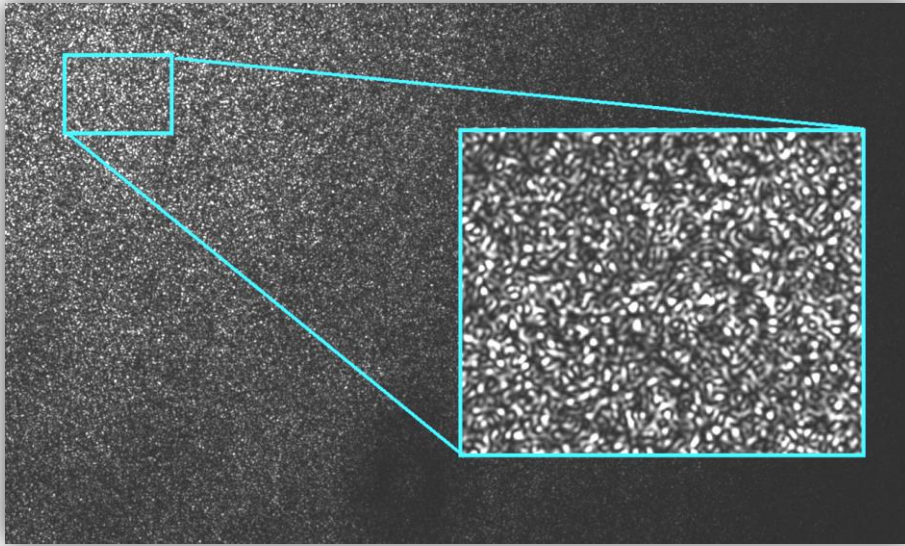


MPA Bremen



Analysis of material and
lubricant sample regarding
microbial induced corrosion and
contamination

Automatic optical
measurement system for
monitoring of surfaces



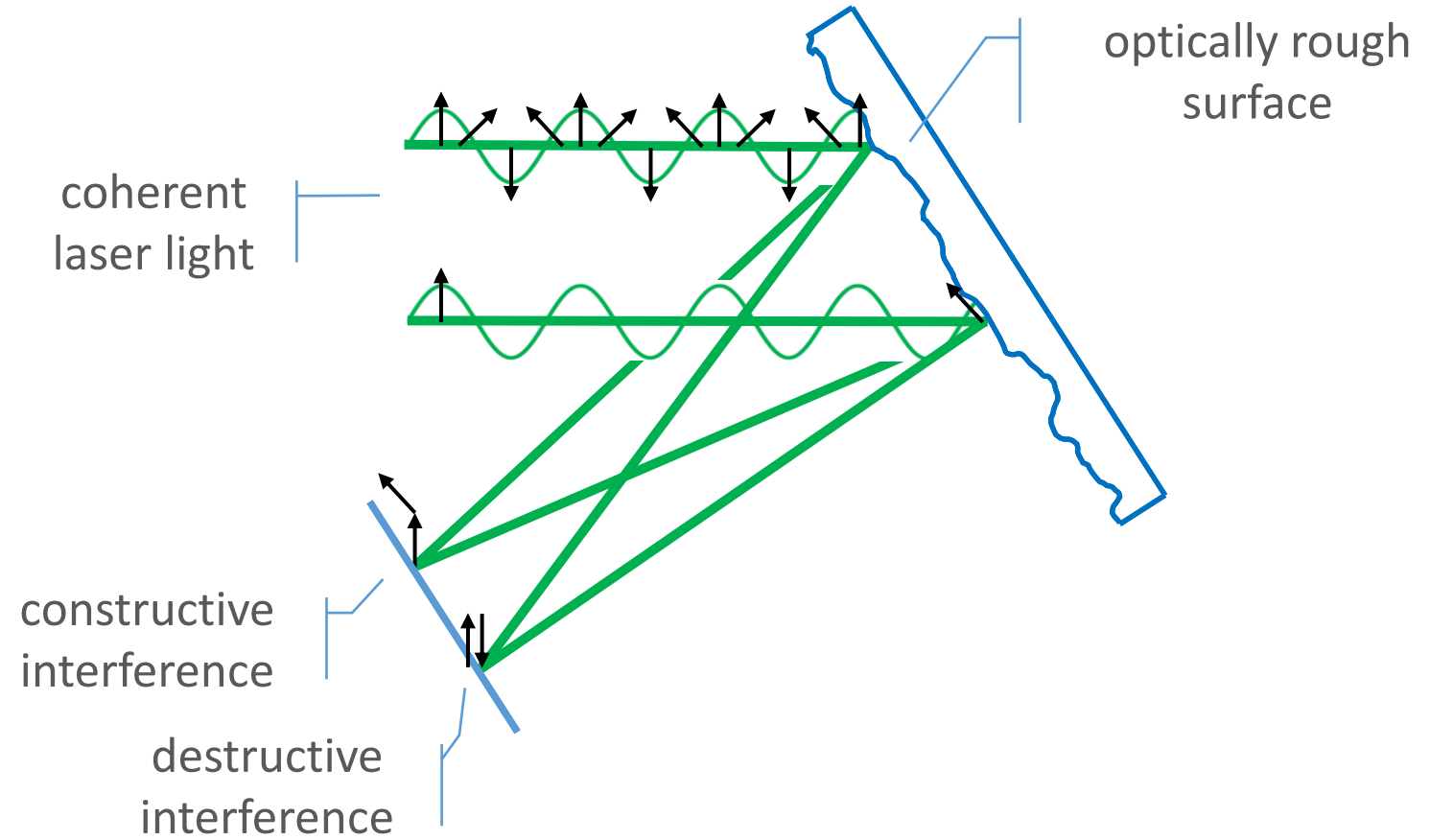
Speckle field

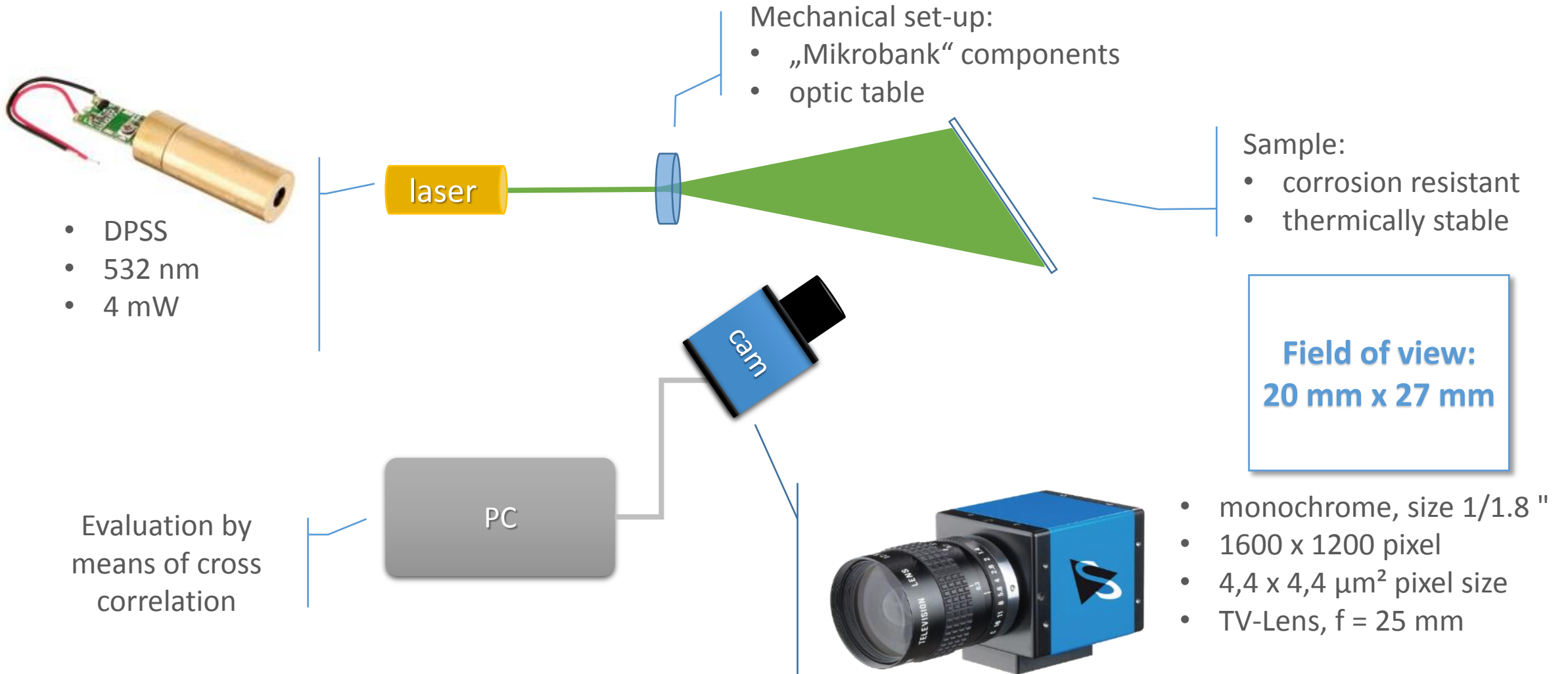
Speckle size:

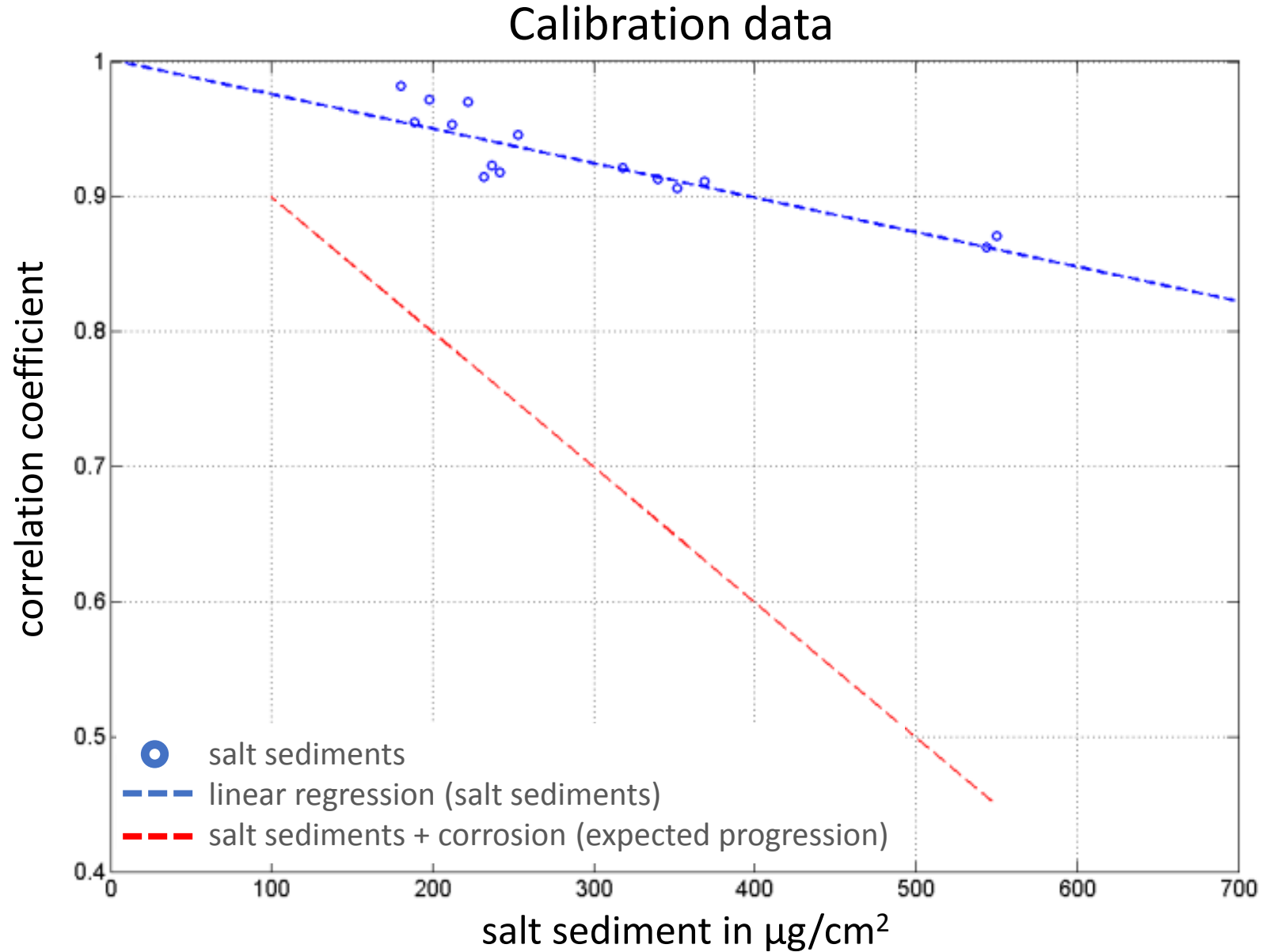
$$S_p = 1,22 \lambda F (1 + M)$$

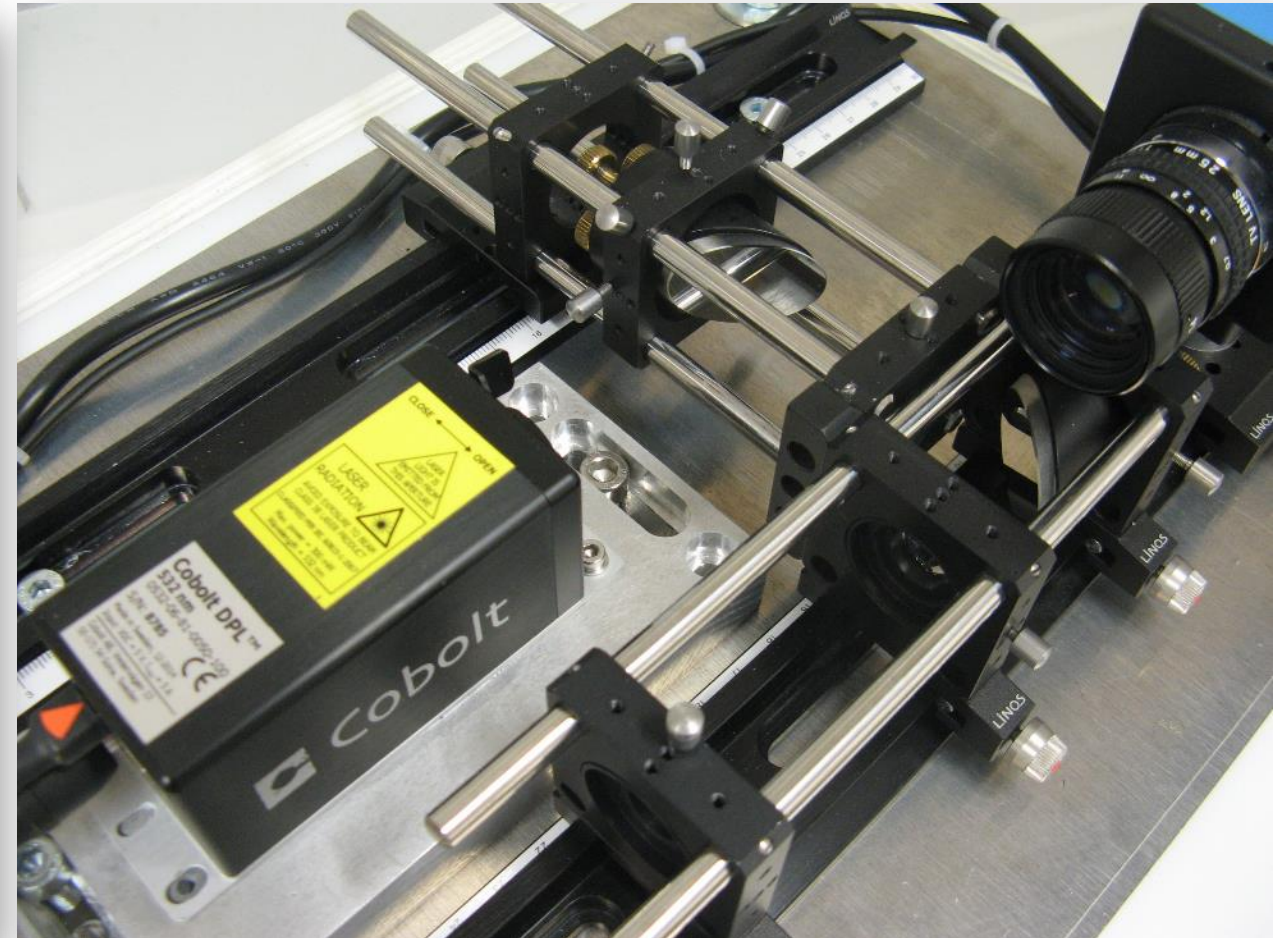
F = f-number

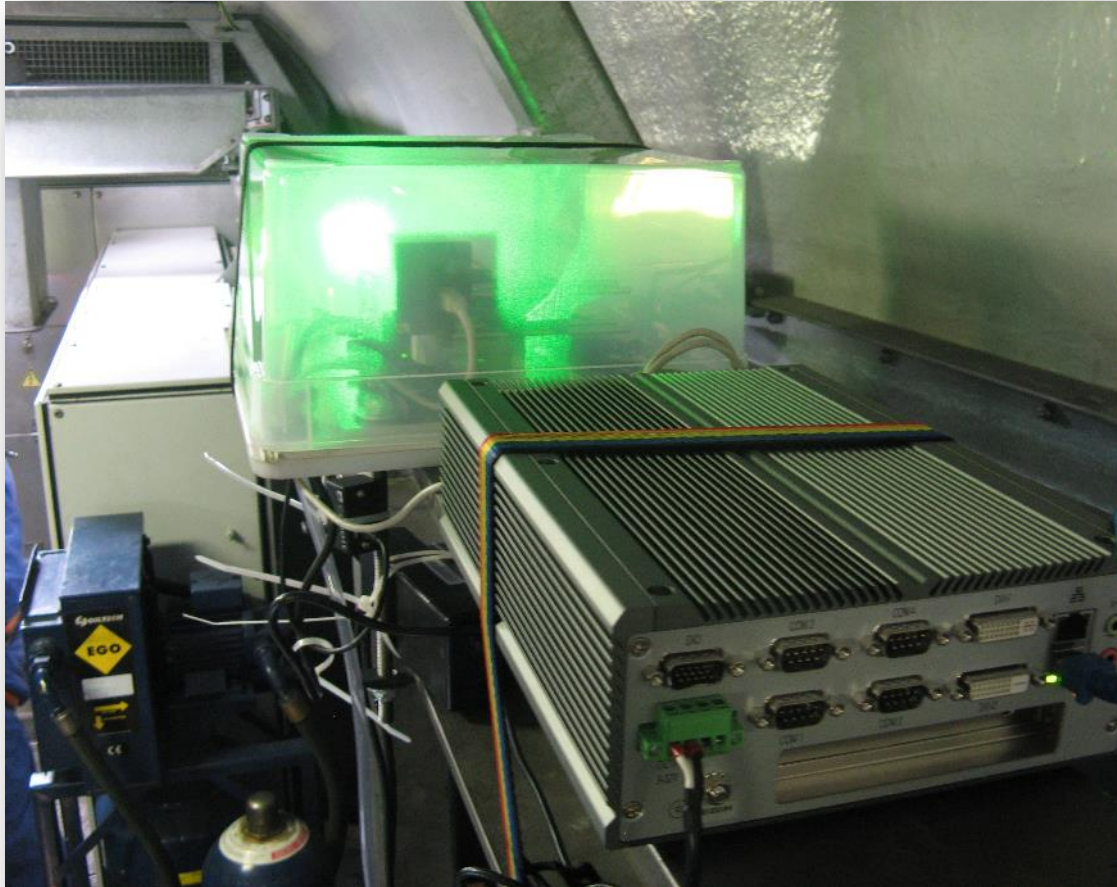
M = reproduction scale



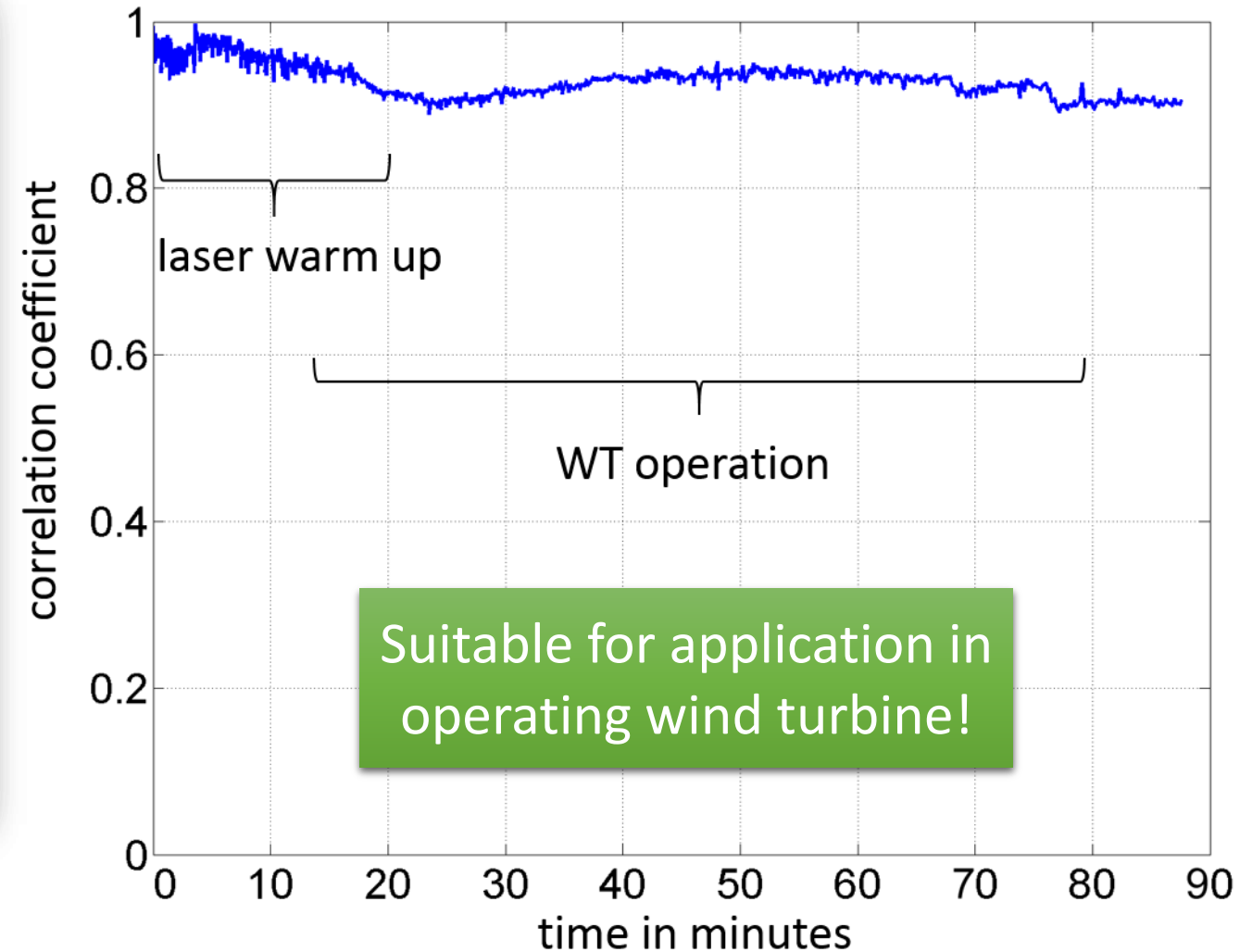








Field test measurement in nacelle



- Speckle correlation is an appropriate method for measuring different salt sediments on surfaces
- Low-cost diode laser is generally suitable
- Suitable for operation in wind turbines
- Important step to concretize layout criteria of offshore wind turbines regarding level of salinity in atmosphere



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Further research is necessary:

- Contamination of measurement system
- Clean air vs. reference sample
- Field tests for a robust system design

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Hochschule Bremerhaven Quelle: lichtographie - Thilo Vogel

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