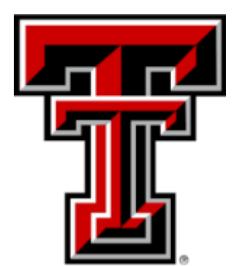


High Wind Speed Performance of AeroMINE at Pilot-Scale

Brent C. Houchens, David V. Marian, Suhas Pol and Carsten H. Westergaard



Motivation

Distributed, point-of-use rooftop wind energy has not been successful, unlike rooftop solar.

Past solutions have suffered from:

- poor power performance
- poor resiliency

There are untapped markets for renewable rooftop and remote, harsh climate wind energy

Novel AeroMINE Concept



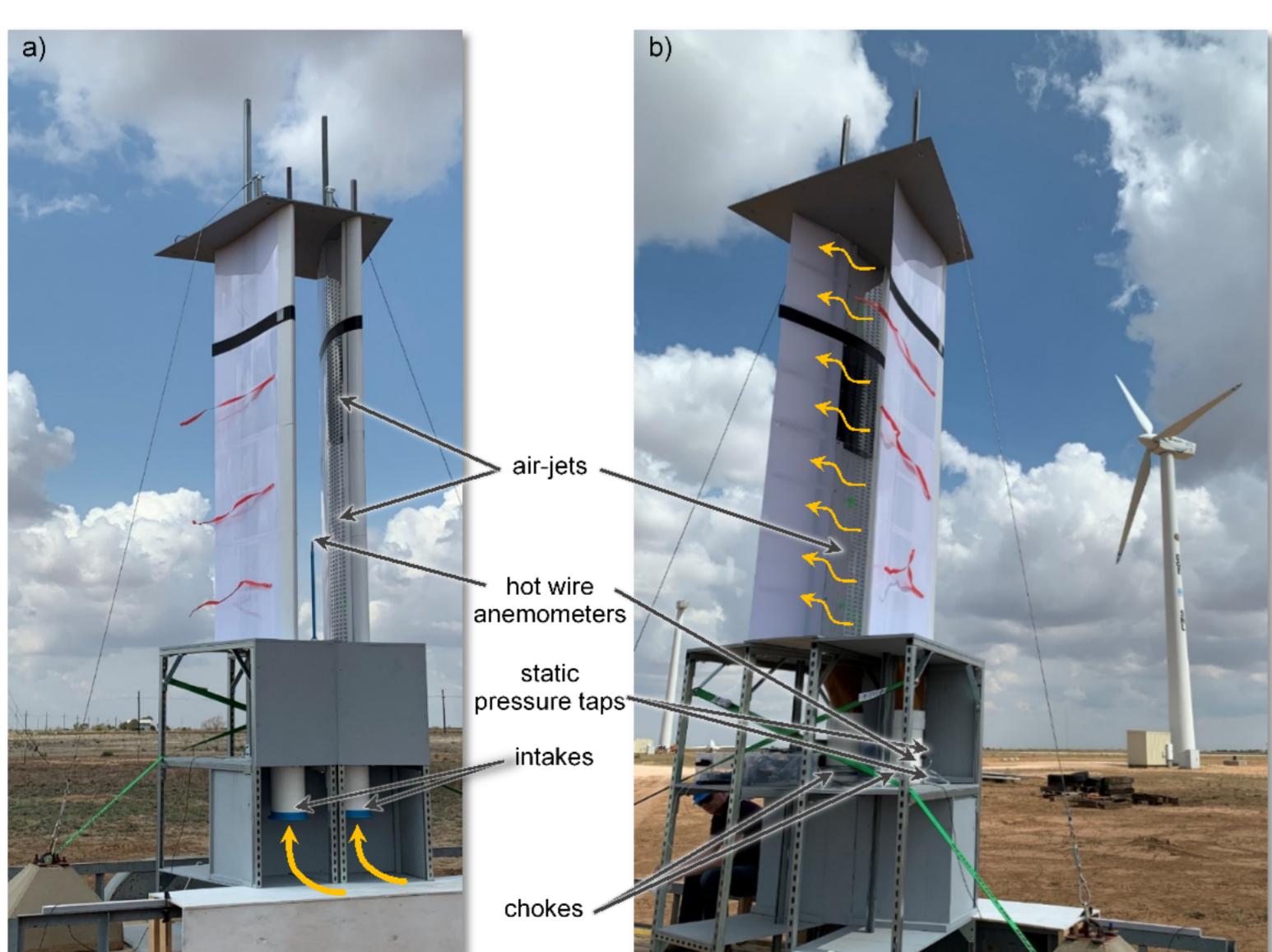
Early AeroMINE concepts on large format buildings

Large swept area → large power

No external moving parts → reliable, safe, quiet

Integrates with rooftop solar → complementary

Field Test



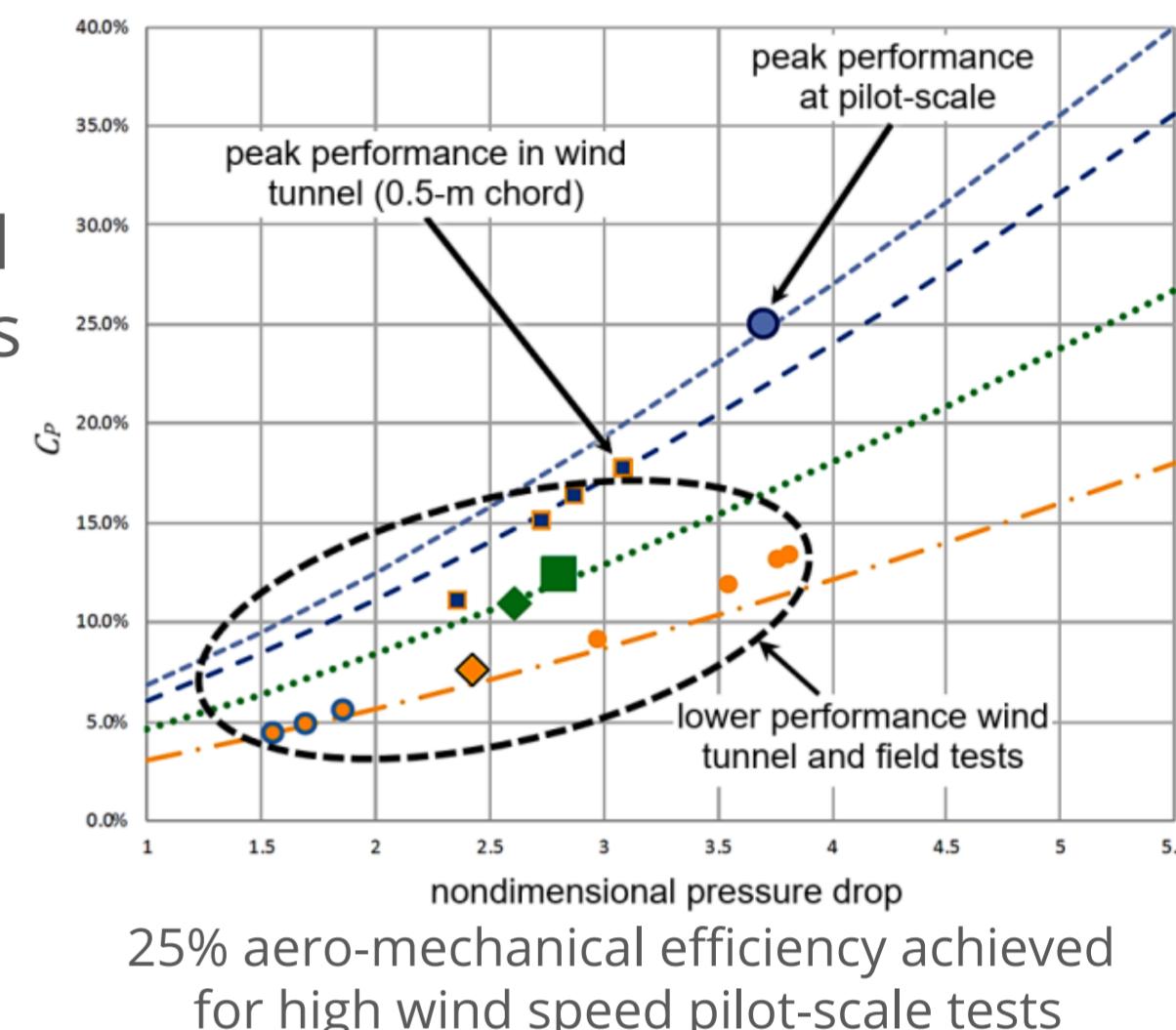
Pilot-scale (3-m tall, 1-m chord) AeroMINE test at SWIFT shown from a) the front and b) behind

Results

Good performance demonstrated in field tests

- 25% peak performance achieved (42% of Betz) in pilot-scale tests based on choke measurements

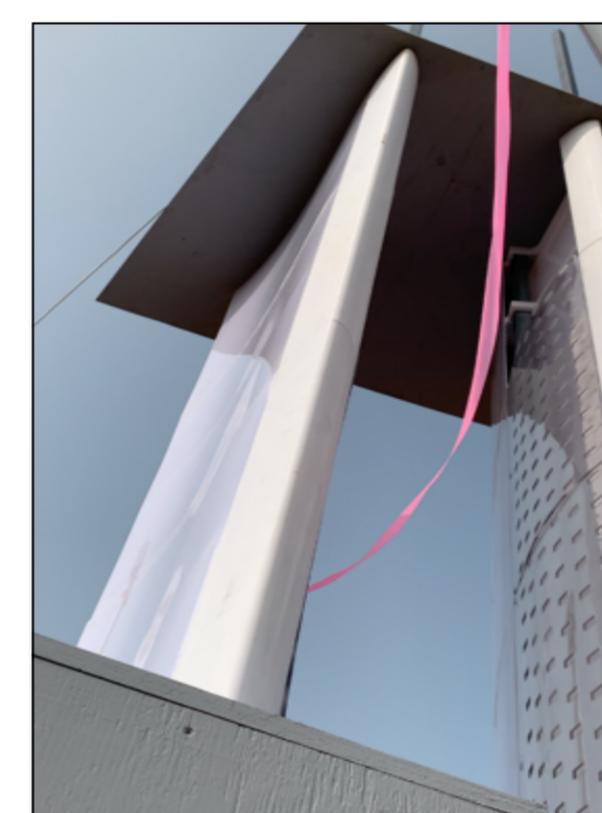
$$C_p = \frac{\Delta P_{choke} A_{duct} u_{duct}}{0.5 \rho A_{exit} U_\infty^3}$$



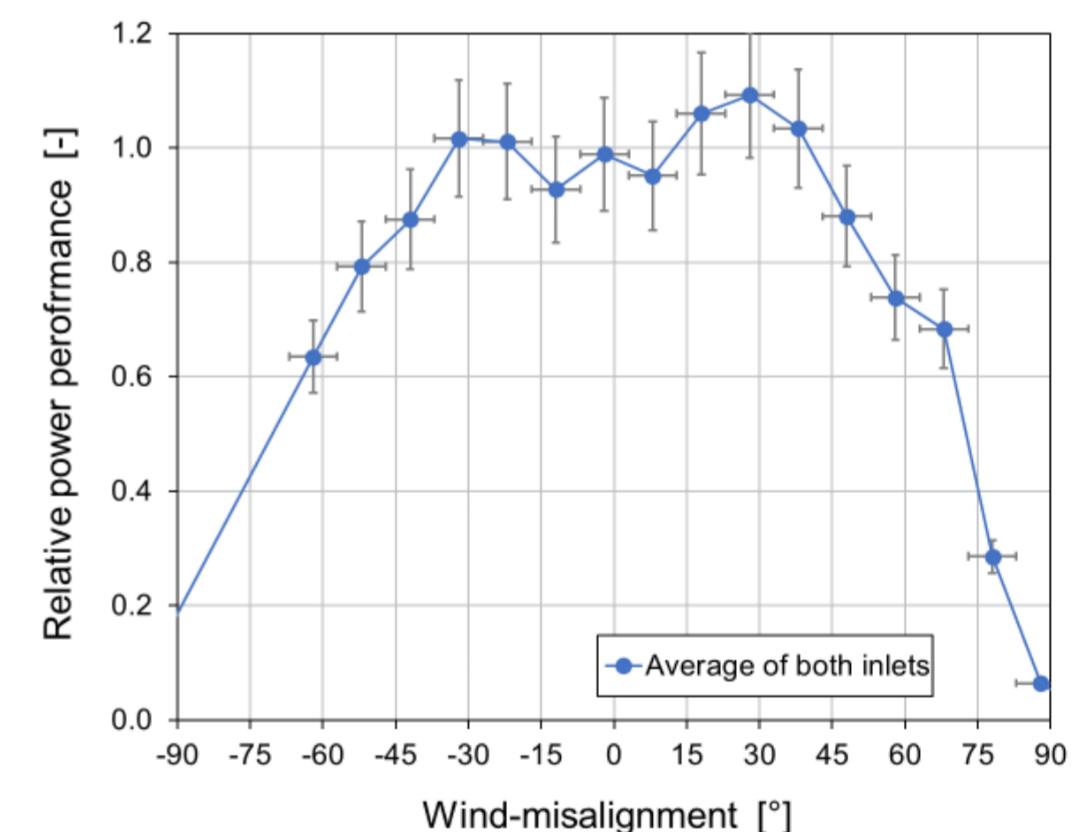
25% aero-mechanical efficiency achieved for high wind speed pilot-scale tests

Previous low wind speed off-axis tests¹

- excellent performance up to 30° misalignment in low wind



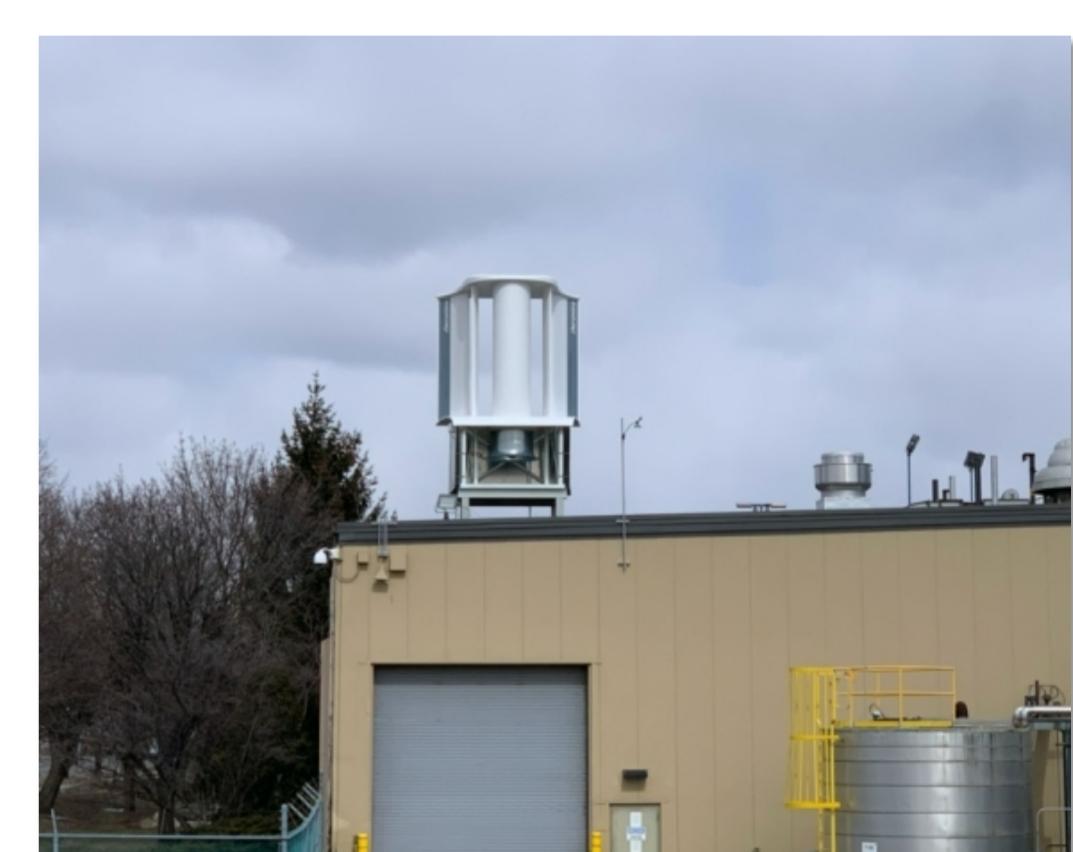
1. Houchens, et al., Pilot-scale performance of AeroMINE at low wind speeds. WESC, 2021.



Performance in off-axis, low-speed (~5 m/s) wind

Commercialization Efforts

First Aeromine delivered, installed and making power in March 2022*



*Aeromine Technologies, Inc. proprietary, used with permission

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AeroMINE

(Motionless, INtegrated Energy)



1-3 June 2022, Delft, NL