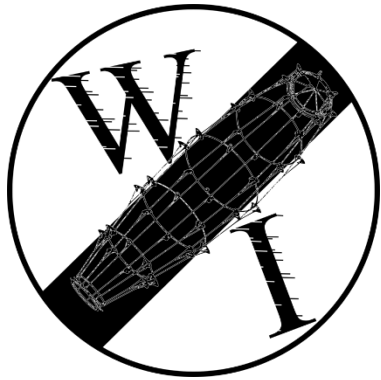


Development of Safe and Efficient Operation for an Airborne Wind Energy (AWE) System – a Rotary Design



Oliver Tulloch
oliver.tulloch@strath.ac.uk



Supervisors: Hong Yue & Julian Feuchtwang

Industrial Partner: Roderick Read - Windswept and Interesting Ltd

Why Airborne Wind Energy?

Rotary AWE Systems

Tensile Rotary Power Transmission

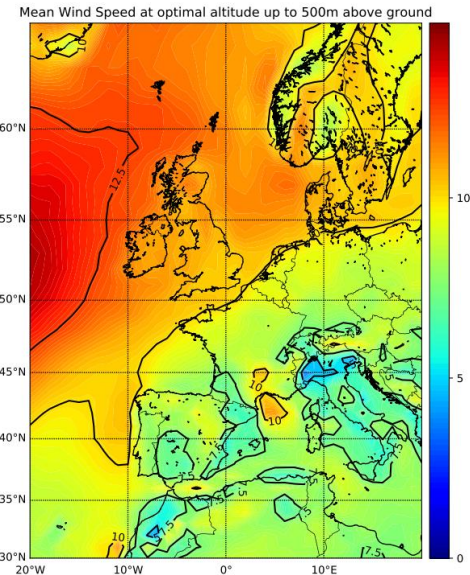
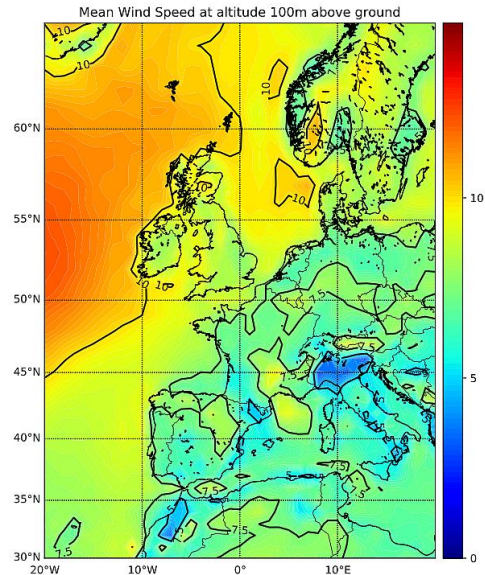
Field Tests and Results

Conclusions & Future Work

Why Airborne Wind Energy?

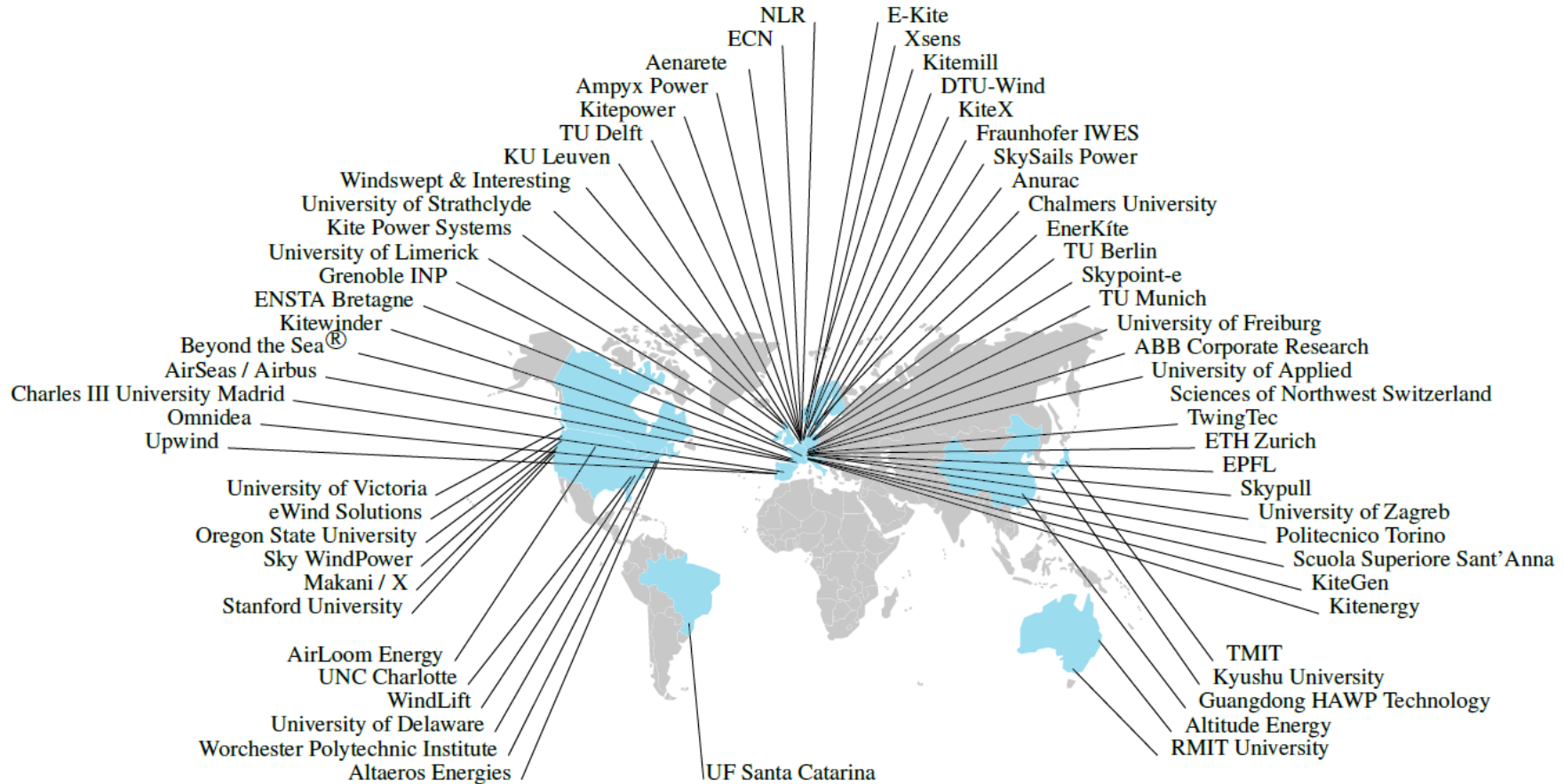
- Stronger more consistent winds are present at higher altitudes
- Technical and economic feasibility limit height traditional wind turbines can reach

100m

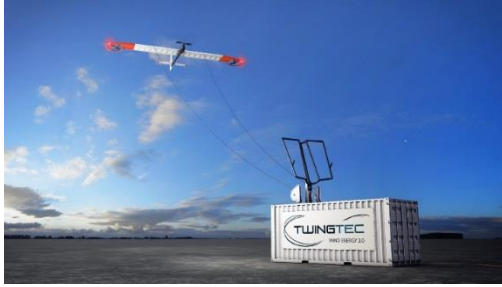


Optimal
height up to
500m

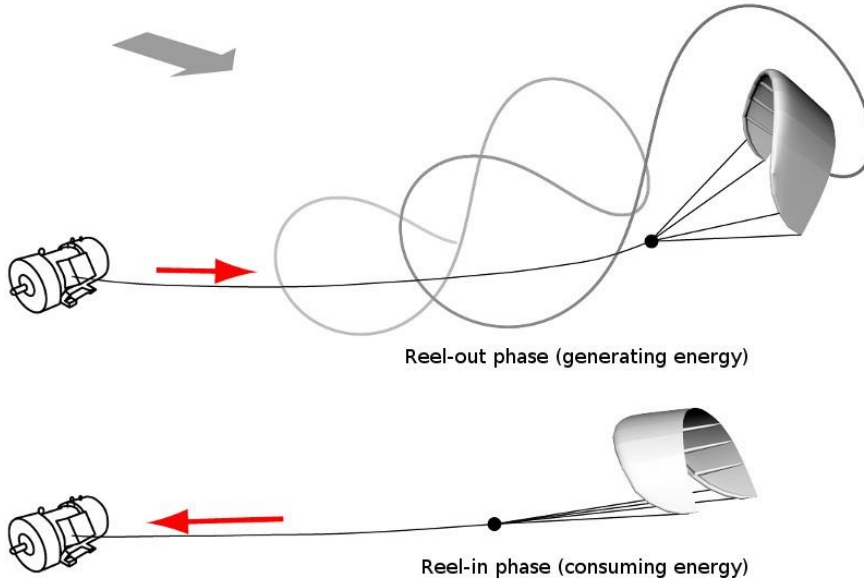
Why Airborne Wind Energy?



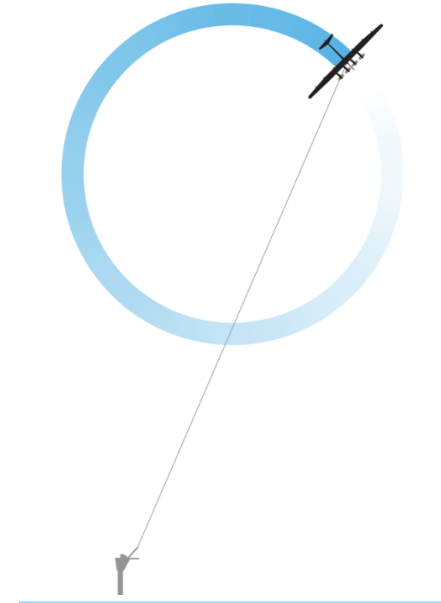
Why Airborne Wind Energy?



Why Airborne Wind Energy?

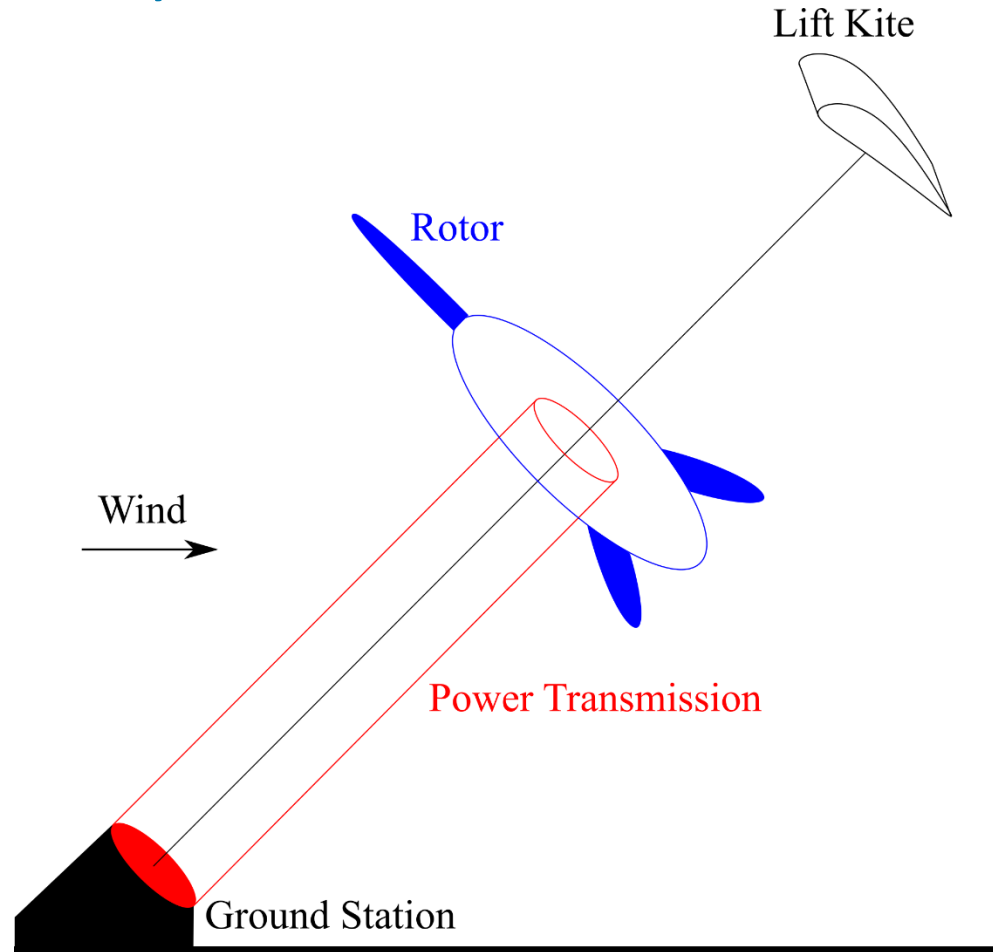


Ground Based Generation
Ground-Gen

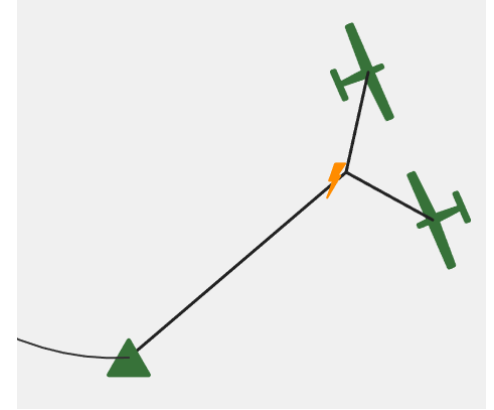


Airborne Based Generation
Fly-Gen

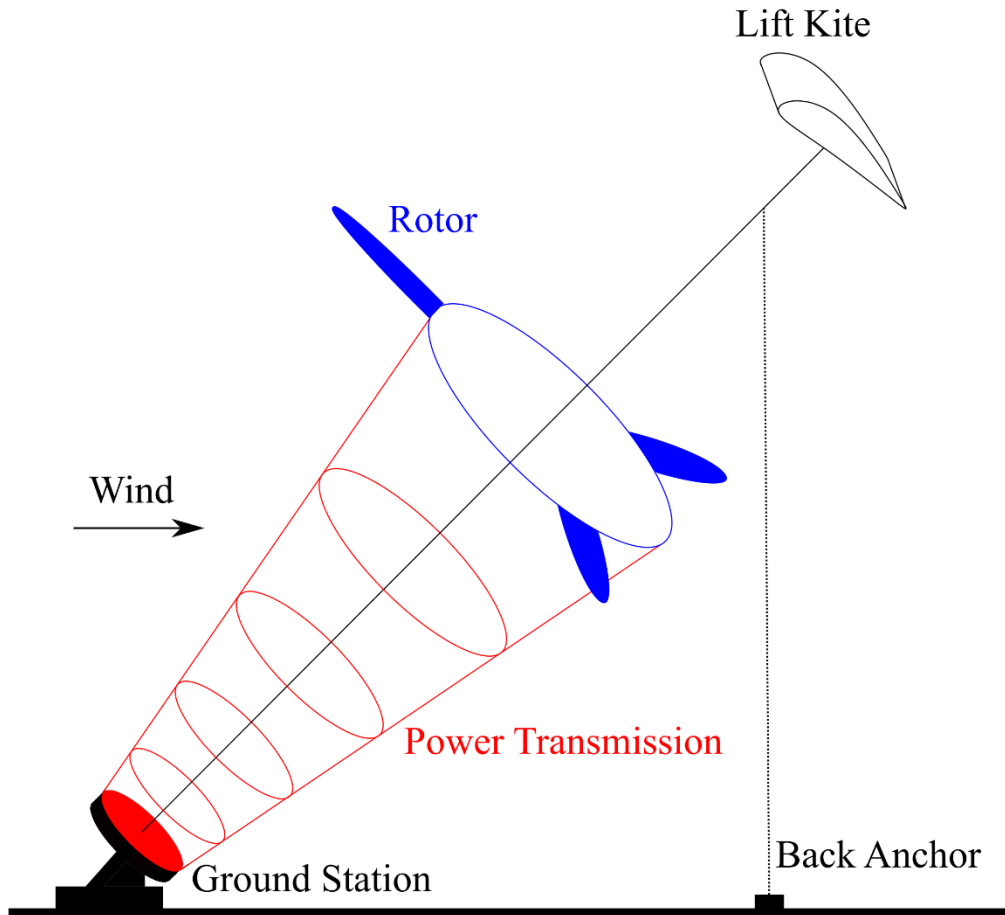
Rotary AWE Systems



Rotary AWE Systems



Rotary AWE Systems – The Daisy Kite



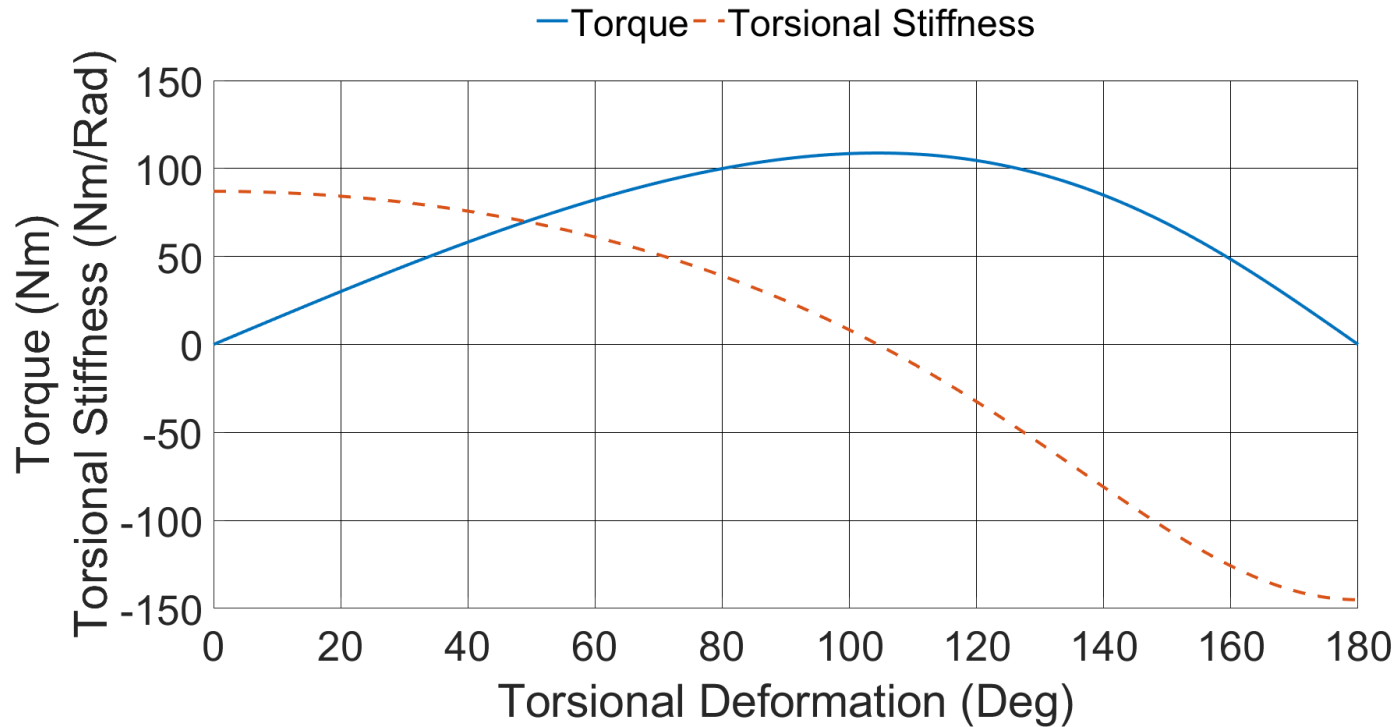
Rotary AWE Systems – The Daisy Kite



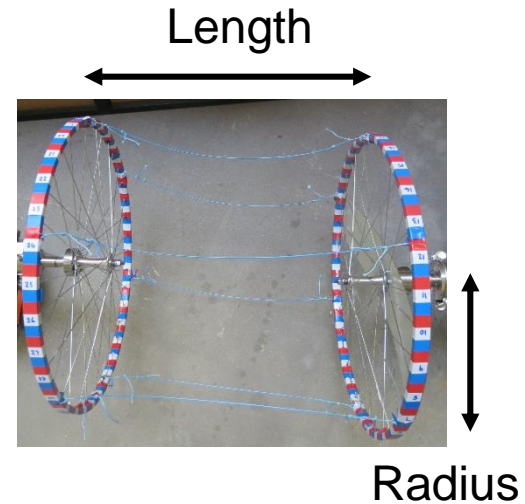
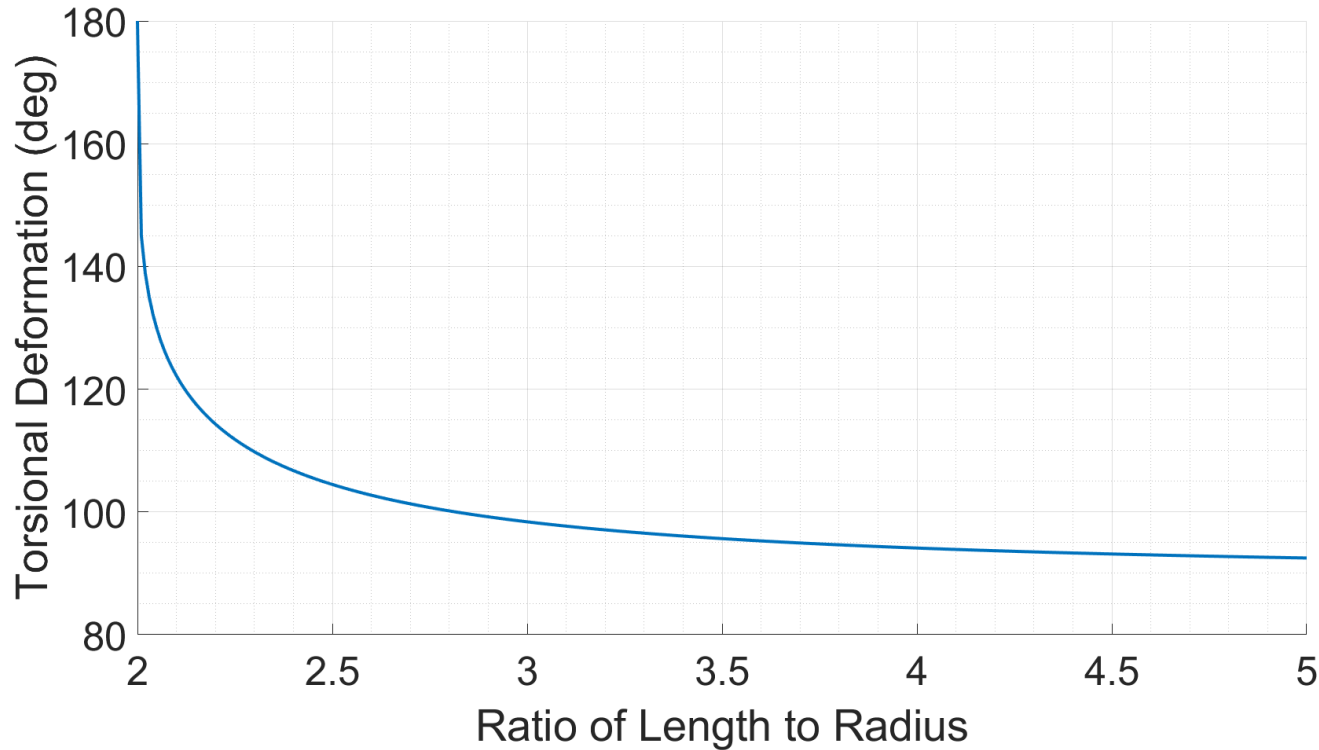
Tensile Rotary Power Transmission



Tensile Rotary Power Transmission



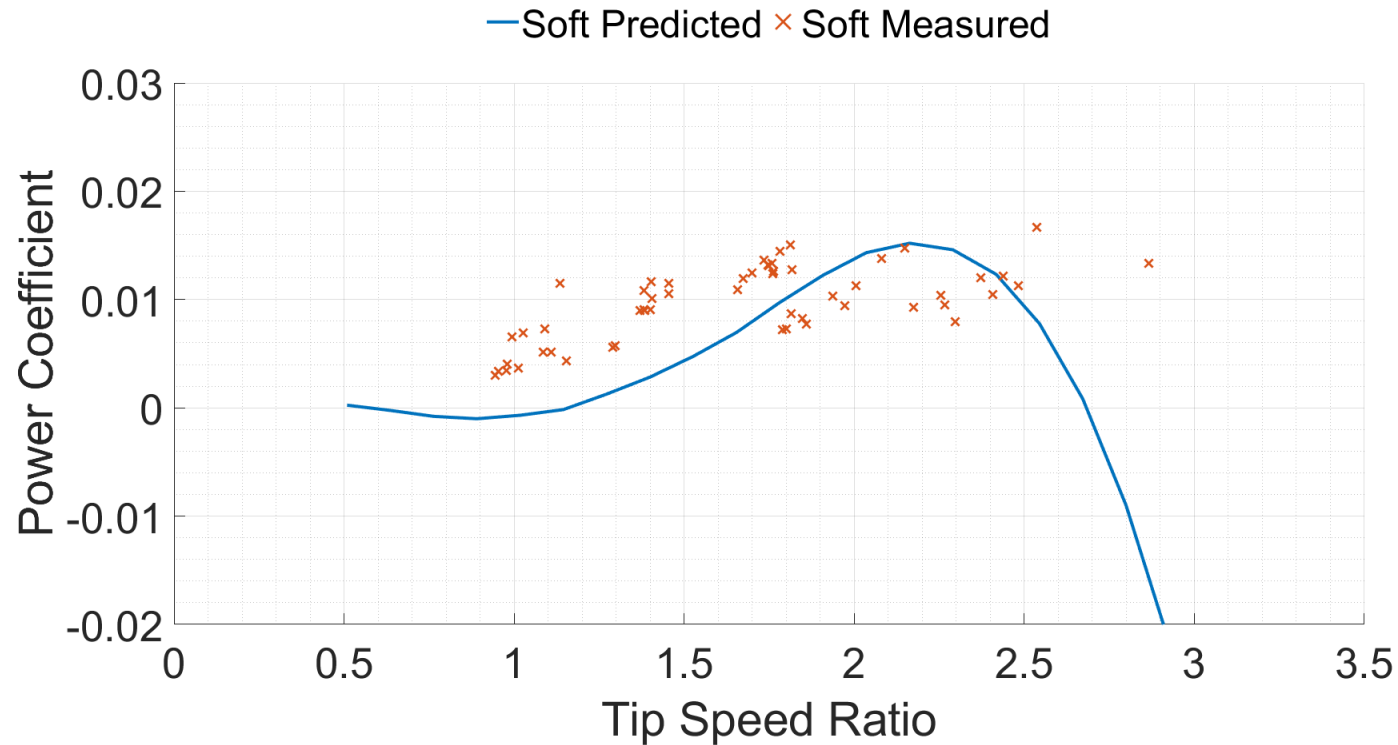
Tensile Rotary Power Transmission



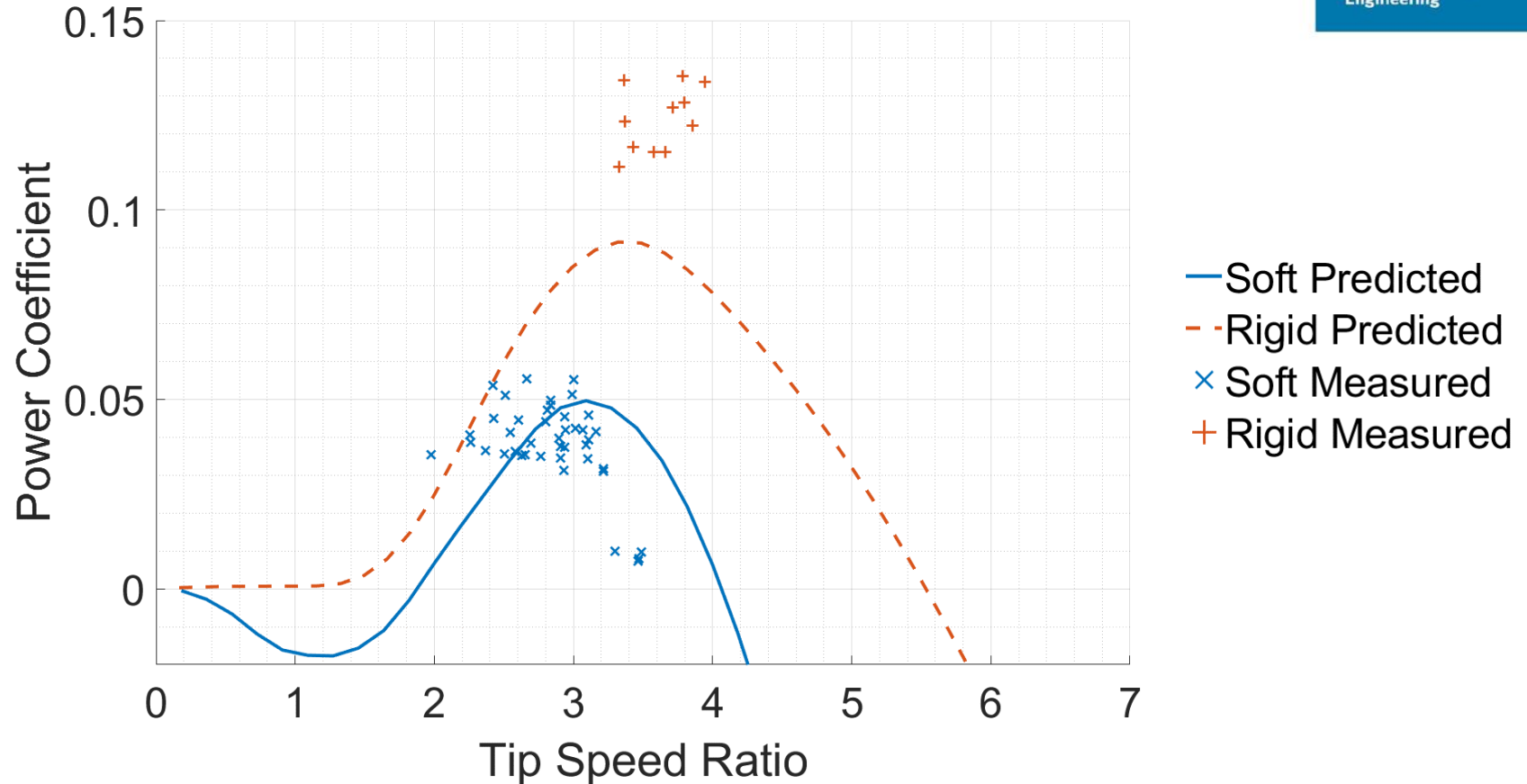
Field Tests & Results



Field Tests & Results



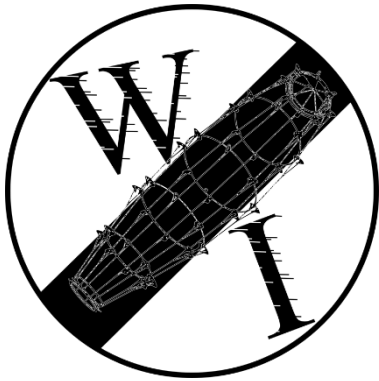
Field Tests & Results



Conclusions & Future Work

- Steady state analysis comparable to field tests
- Dynamic analysis of tensile rotary power transmission currently under development
- Model to be used to:
 1. Refine the Daisy Kite design
 2. Assess the scalability of rotary AWE
 3. Investigate potential operating and control strategy
- KITES ARE AWESOME!!

Thank you for your attention!!



Oliver Tulloch
oliver.tulloch@strath.ac.uk



Supervisors: Hong Yue & Julian Feuchtwang

Industrial Partner: Roderick Read - Windswept and Interesting Ltd