Why Do Wind Turbines Make Swishing Noises?

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Process:

Abstract:
Wind turbines produce aerodynamic noise:
- Influences:
  - Public acceptance
  - Rotor size
  - Siting

Experimental Methods:
Developed a software that predicts aerodynamic noise from a Horizontal Axis Wind Turbine (HAWT)

Flow Chart Representation of code:

Key Aerodynamic Noise Sources:
- Trailing edge noise
- Leading edge noise

References:

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Results:
Noise levels at different blade positions
- models “swishing” noise

Visualization of noise experienced by an observer on ground (Courtesy Oerlemans)

Conclusions:
- Developed a software to model HAWT aerodynamic noise
- Demonstrated the phenomenon of blade swishing
  - Swishing due to amplitude modulation
- Software can be used for optimizing turbine micrositing and operation

Further Work:
- Software will be extended to account for:
  - multiple observers
  - multiple wind turbines
  - and eventually full wind farms