

The Race

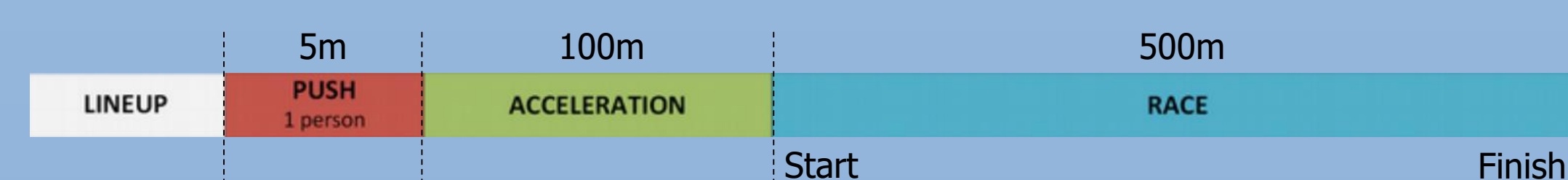
Powered **BY** the wind, racing **INTO** the wind



Current World Record: 114%

What? Racing Aeolus' Wind Powered Car Race
Where? Den Helder, Netherlands
When? 20th-22nd August, 2020

Endurance Race



- Highest average Wach number wins
- Racing into the wind $\pm 15^\circ$

$$\text{Wach no.} = \frac{\text{avg car speed}}{\text{avg wind speed}}$$

Drag Race

- 100m head-to-head race between teams
- Knock out style tournament

The Team

Scotland's first wind powered car team



- Set up by Wind & Marine Energy Systems CDT students
- 10 CDT students, 3 postgraduate students, 5 undergraduate students
- Multidisciplinary team from across the university

Main project groups:

- Auxiliary power system
- Control system
- Drivetrain
- Rotor over-speed protection
- Testing
- Yaw system

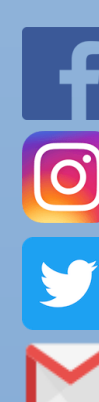
Contact Details

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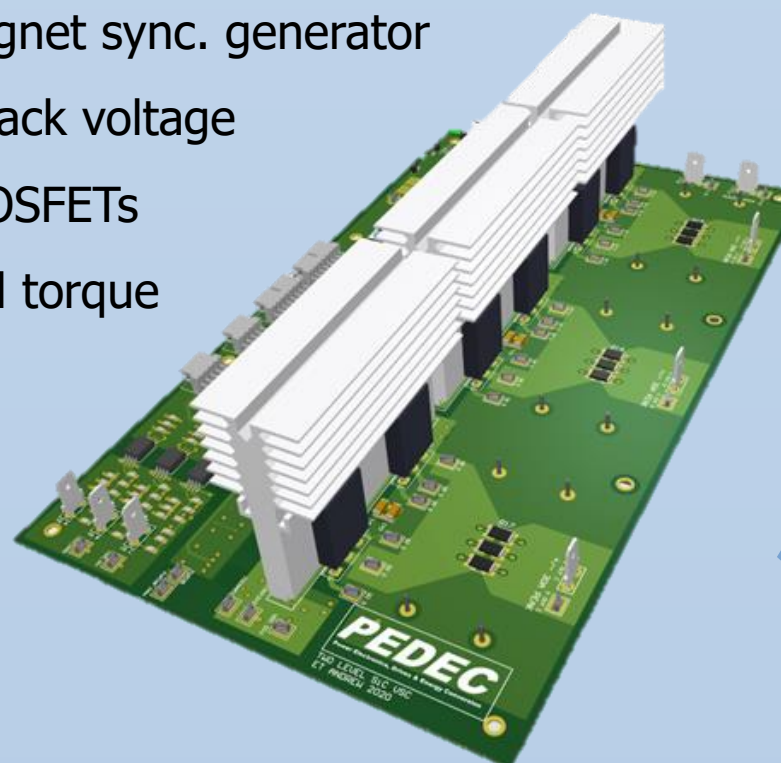
The Car

'The Flying Scotsman'



Drivetrain

- Electrical drivetrain
- 1kW 48VAC permanent magnet sync. generator
- Custom designed back-to-back voltage source converter using MOSFETs
- 2kW motor tracking optimal torque and speed
- 1:3.5 gearing to axle
- Design ground speed: ~50% wind speed



Rotor & Duct

- FuturEnergy 3 blade rotor system
- Designed to be interchangeable with 5 blades
- Variable speed, fixed pitch
- Generator torque control
- Ducted for safety with aerodynamic benefits
- Lightweight duct design



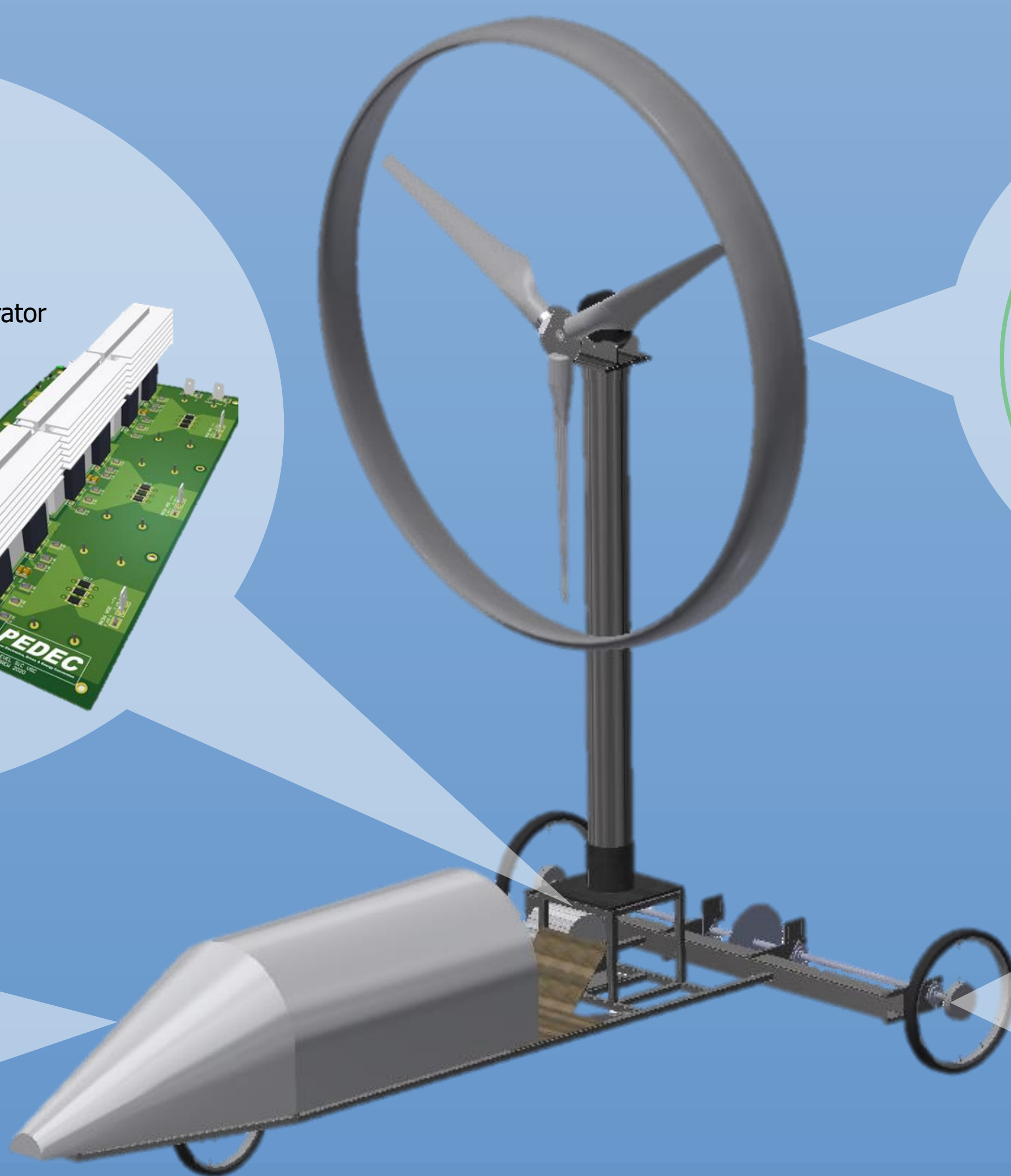
Chassis & Structure

- Simple welded aluminium chassis
- Structural box section for motor housing and mast support
- Minimal structure and forward steering for simplicity and weight benefits



Body

- Repurposed wind turbine nacelle cover
- Aerodynamic shape
- Not load bearing
- Easily removed for ease of access



Industrial Sponsors



With special thanks to:

Strathclyde Alumni Fund
Wind & Marine Energy Systems CDT
Electronic & Electrical Engineering Dept.
Design, Manufacturing & Engineering Management