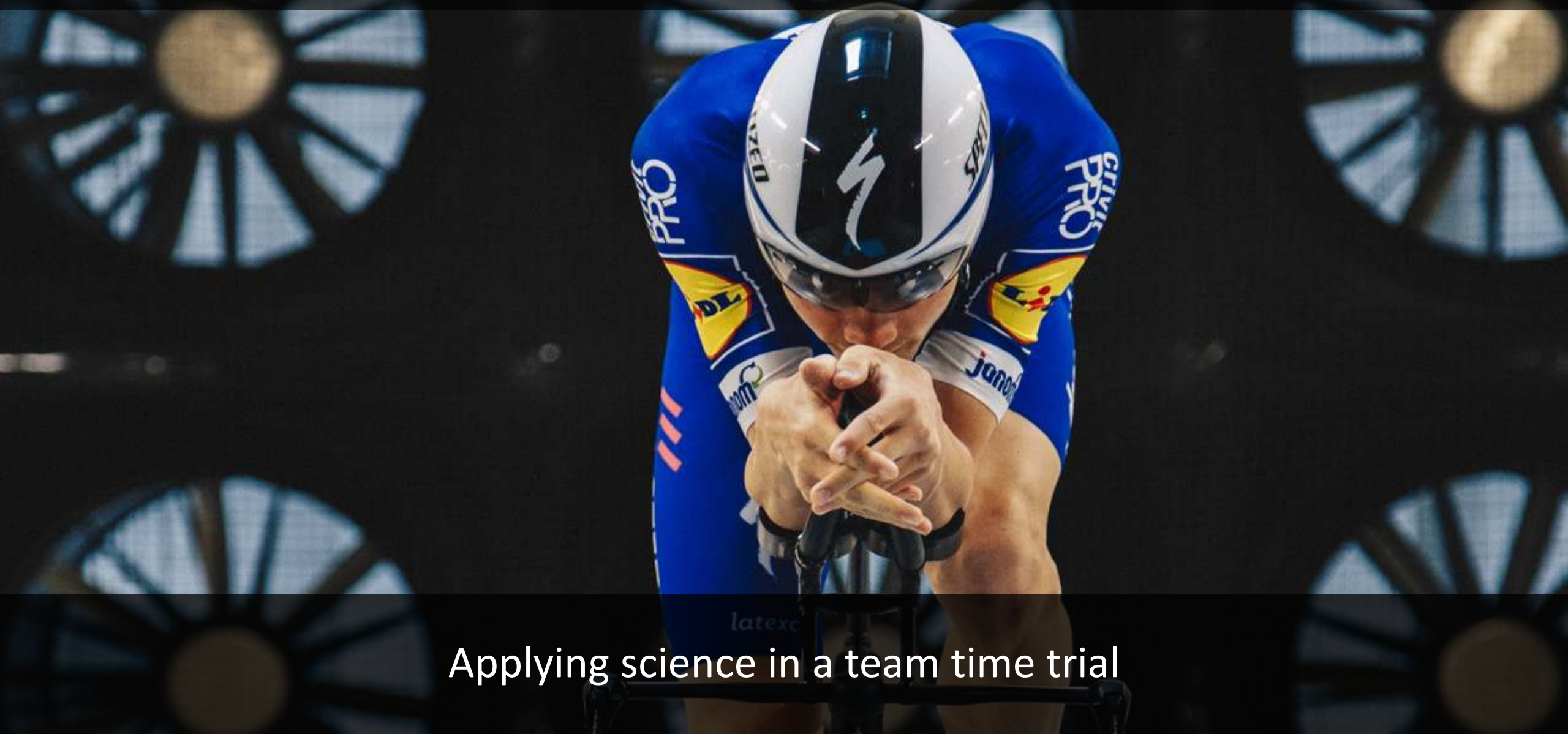
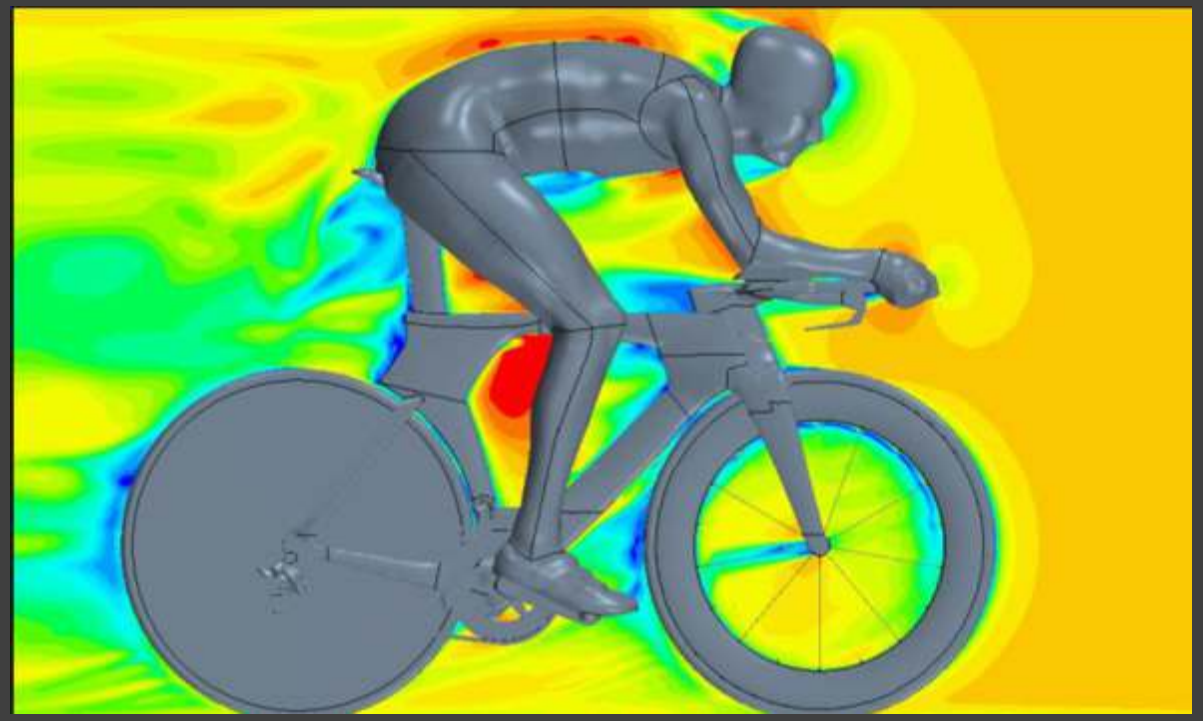
Preparing the Team Time Trial:



Applying science in a team time trial

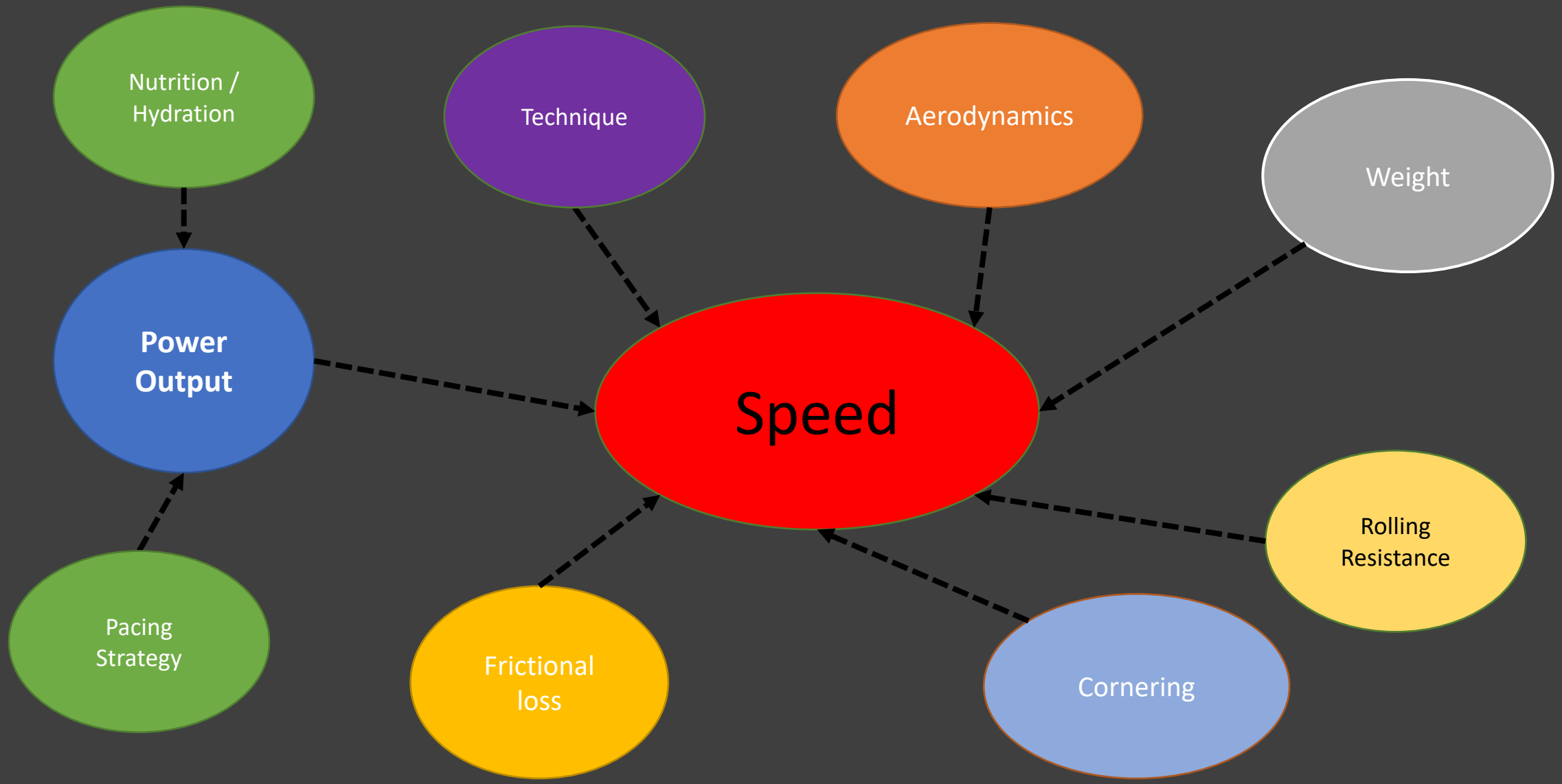
Two crucial determinants in a TT(T):

- Aero



- Engine

Determinants of a TTT result:



Testing Aerodynamics:

- **Windtunnel testing**
- **Track testing**
- **Field/Road testing**

Windtunnel:

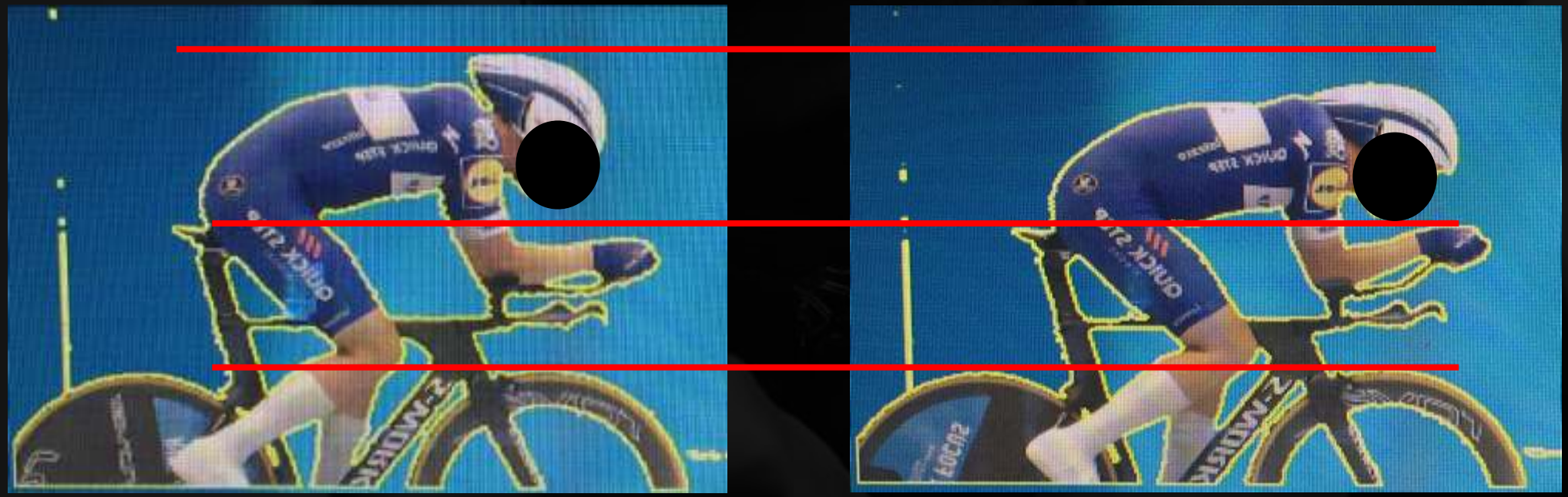
Time Trial Position Testing

- Basic Bike fit
  - Asses current position (‘baseline’)
  - Flexibility / ROM rider
  - Rider feedback on current position
  - VO2 / efficiency

Time Trial Position Testing

- Current position from which you start ‘playing’ based on the pre bikefit / rider feedback
  - Up / Down
  - Wide / Narrow
  - Extension Type
  - Angle of extension

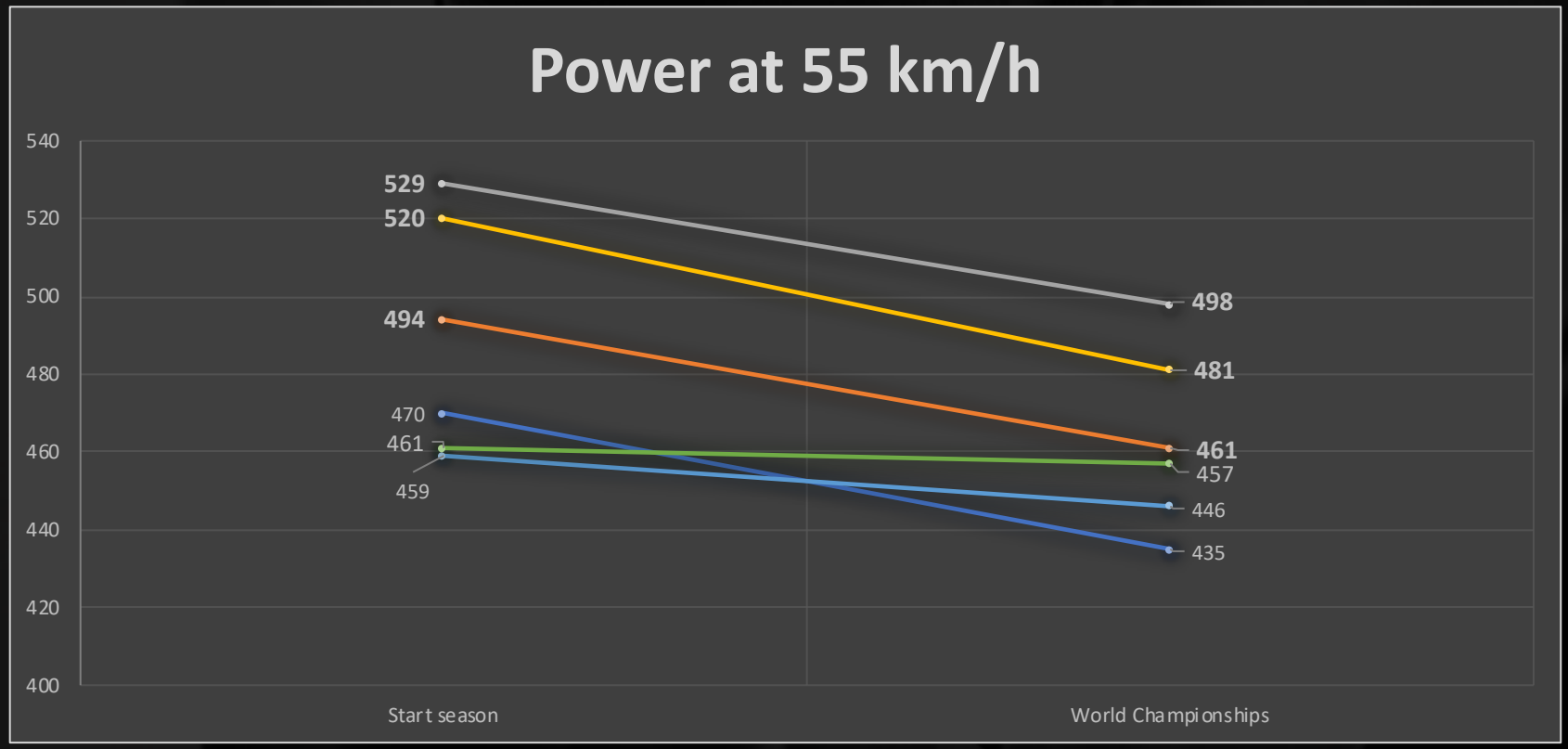
Pre vs Post Position



- CdA 0,245
- 437 W at 50 km/h
- 49’23s on 40 km

- CdA 0,227
- 407 W at 50 km/h
- 48’11s on 40 km

Team Gains:



Average power savings: **489 W → 463 W** **(26 W / 5%)**

Time on 40 km TT: **46:03 → 45:11** **(52 seconds)**

Material

- Apparel
  - Speedsuits — Up to 20 W
  - Helmets — 5-10 W
  - Cover shoes / aero socks — 5 W
  - Gloves — < 5 W
- Bikes / Wheels

Field / Road Testing:

- Reality and ‘Team interaction’ are not always measurable in a windtunnel or a model
- Practical
  - **Lead Times**
  - **Distance in between riders**
  - **‘Sitting up’**
  - **Team Order**

Lead Times:

- Flat Quiet Road
- Repeats on a lap of 6 km
- Only variation is lead times
  - Order, speed, equipment kept constant
- Calculating (normalized) Power
  - averaged for the team

Distance in between riders:

Far:




Close:




	Close	Far	
	Run 1	Run 1	Run 2
Speed	45,7	44,8	45,0
Average Power	283	275	275

Distance in between riders: