

CYCLING COMPUTERS

Wind Tunnel Test Summary

April 13, 2017



REFERENCE

- The following graph will be displayed using CdA values from testing with the units of drag area (m^2).
- Lower values are faster, higher values are slower.
- Each division on the graph is equal to roughly four seconds over 40km or ~1 watt at 40kph.
- The standard deviation of the test set up is included as error bars on each plot.
- The second graph is time savings over 40km versus the slowest configuration (Garmin 1000 mounted on the stock Garmin mount).
- The third graph is time savings over 40km versus the Garmin 520 mounted on the stock Garmin mount). A positive value denotes time savings.

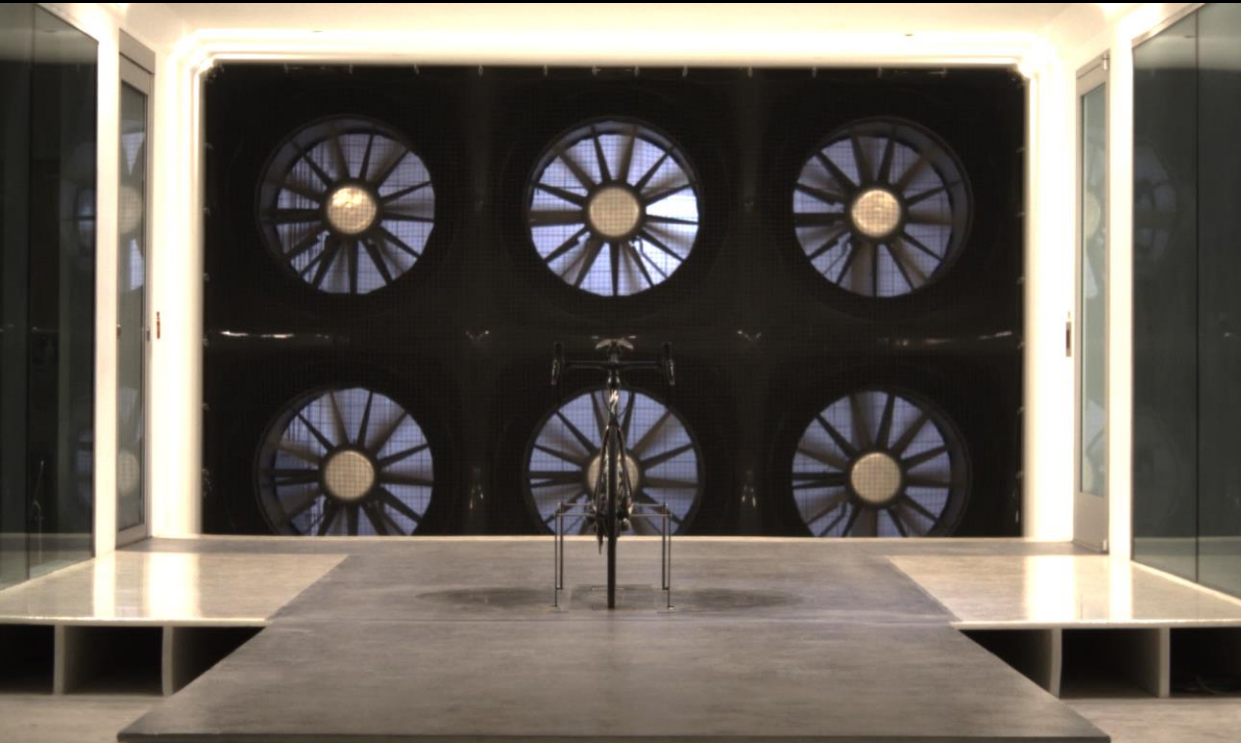


TEST SET UP

- Today's testing was conducted on a Venge Disc, with eTap HRD levers, CLX64 tubular wheels with FMB casing tires.
- The computer mounts were mounted onto a cockpit consisting of a traditional -6deg stem with an Aerofly bar.
- Computers (unless noted) were mounted at 0deg.
- Tests were conducted at 50kph.
- Wheels were not spinning, as it helped to increase the resolution of the testing, and did not affect aero performance.
- Yaw (crosswind) sweeps were conducted from -10 degrees to 10 degrees in 5 degree increments. Each point was the average of 30 seconds of data collection.



TEST SET UP



TESTING PHOTOS



Garmin 520



Garmin 820



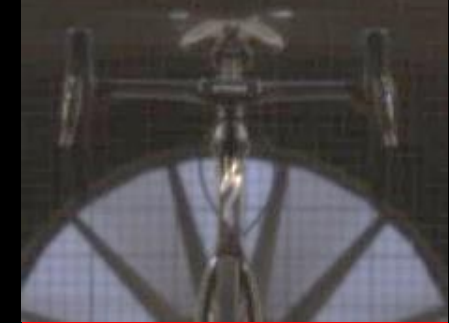
Garmin 1000



Wahoo ELEMNT Bolt



Bolt (+6deg)



Stages Dash



Polar M460



Polar V650



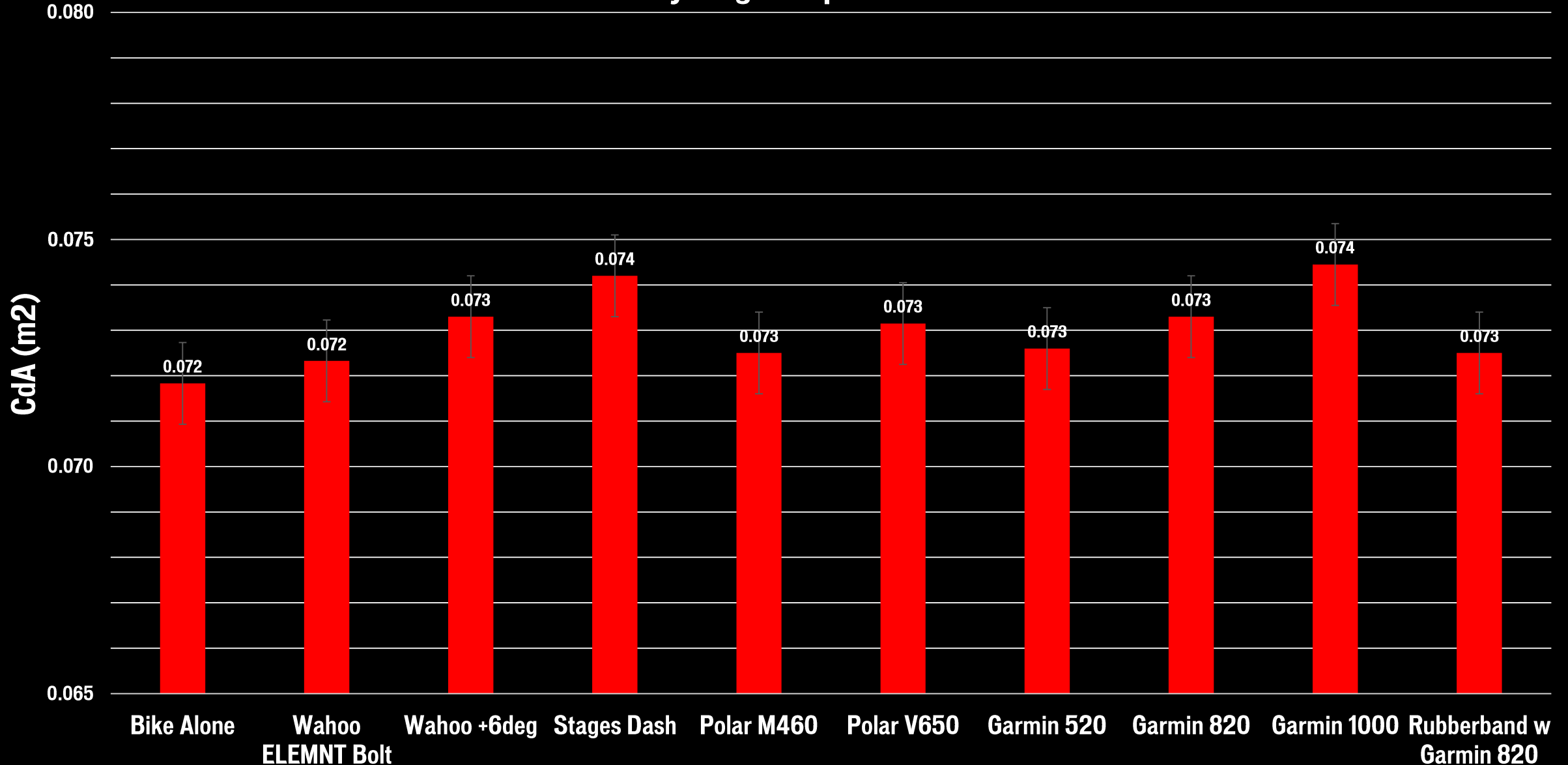
Rubberband Garmin 820



TESTING RESULTS

Raw data labels do not include a fixture tare and are representative of the entire test configuration (complete bicycle). The only thing changed between tests were the computers and OEM mounts.

Cycling Computers



TESTING RESULTS

*Positive value signifies a savings (benefit)

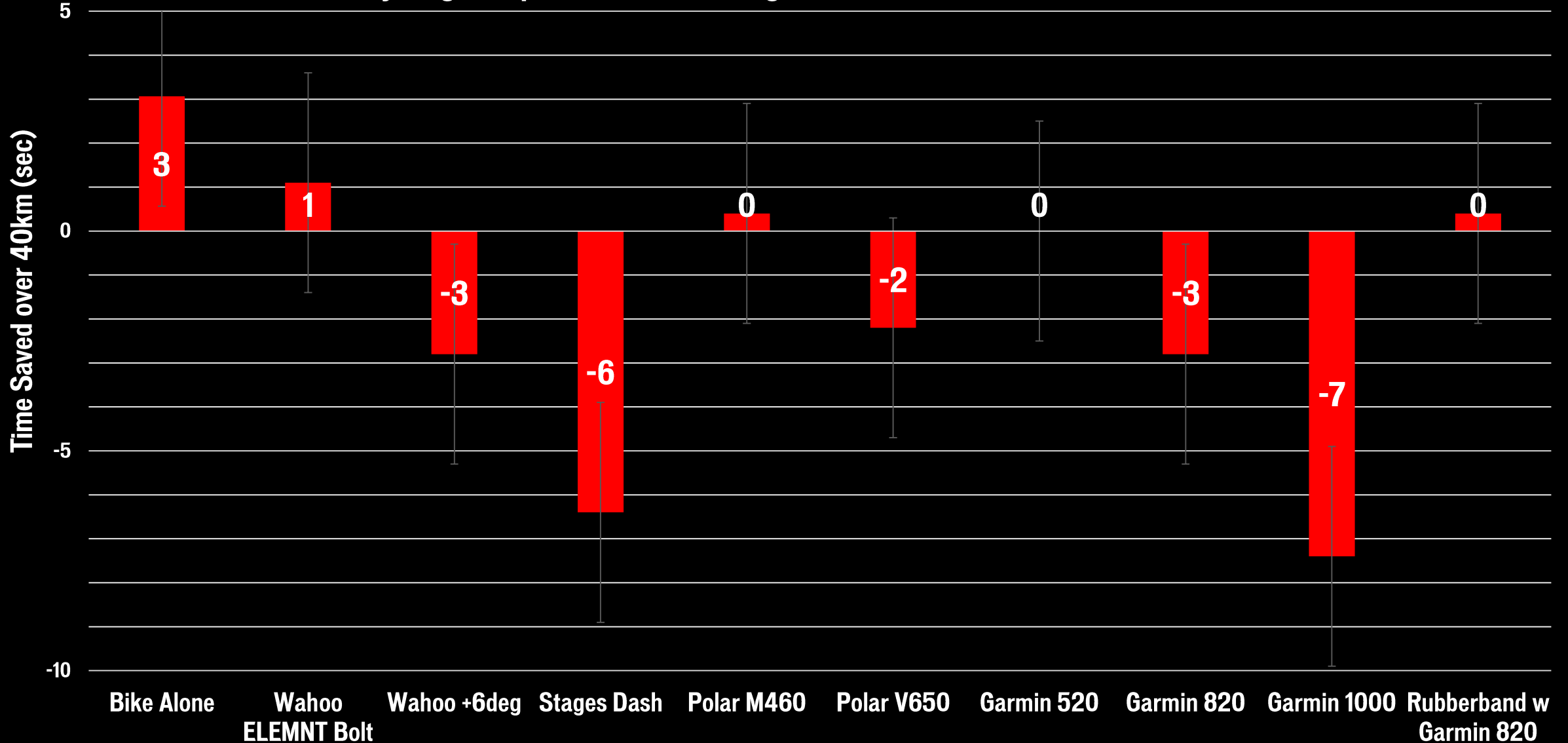
Cycling Computers - Time Savings over 40km versus Garmin 1000



TESTING RESULTS

*Positive value signifies a savings (benefit)

Cycling Computers - Time Savings over 40km versus Garmin 520



KEY TAKE AWAYS

- Data trends in directions were as expected – with larger computers performing slightly worse.
- Additionally, the computers that were not in-line with the stem did not perform as well as those in-line.
- Within error – those computers in-line with the stem performed almost the same as bike alone.
- The rubberband mount was a surprise, but with a -6deg stem, the computer sits behind an already angled stem.

