

Can One Bike Do It All?

As the bicycle specialist at the A2

Wind Tunnel in Mooresville, N.C., I repeatedly see that a dedicated triathlon bike generates significantly less aerodynamic drag than a traditional road bike, but that performance benefit comes with a sacrifice. Tri bikes are not well suited to riding in a group of cyclists or on sketchy roads, so an athlete either has to own two bikes or compromise between race-day speed and training-day functionality.

A new generation of road bike has emerged with aerodynamic tube shapes, a design feature that is typically reserved for triathlon bikes. The idea behind this style of bike is to combine the functionality of a road bike with the straight-line speed of a triathlon bike. If you are looking for an all-purpose bike that is equally suited to a

Saturday morning group ride and a Sunday morning triathlon, this new generation of road bike might be the answer. These bikes ride just like a typical road bike but the question is: How much aerodynamic performance do these aero road bikes sacrifice compared to a truly dedicated triathlon bike?

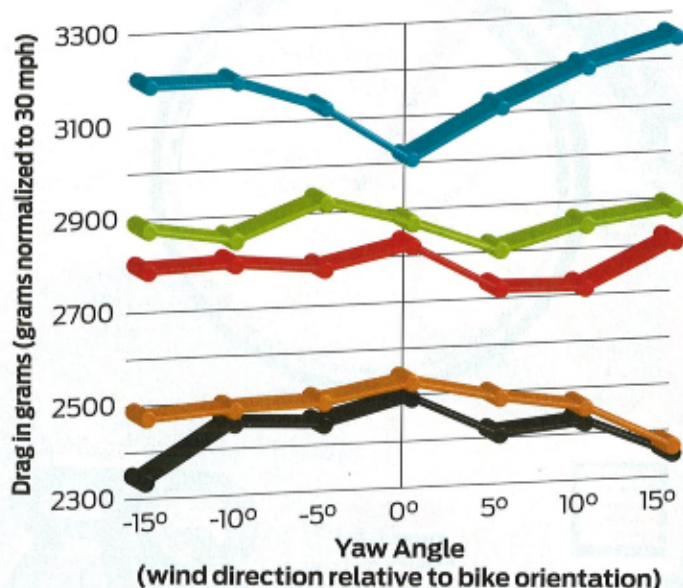
To answer that question, I compared the aerodynamic drag of four different bike-and-rider setups. The bike itself generates a significant amount of aerodynamic drag, but the rider's body creates most of

the wind resistance, and a key difference between road and tri bikes is the geometry. Triathlon geometry helps a rider achieve an aerodynamic and comfortable position, so I tested both road and triathlon-style positions. The bike-and-rider combinations I tested were:

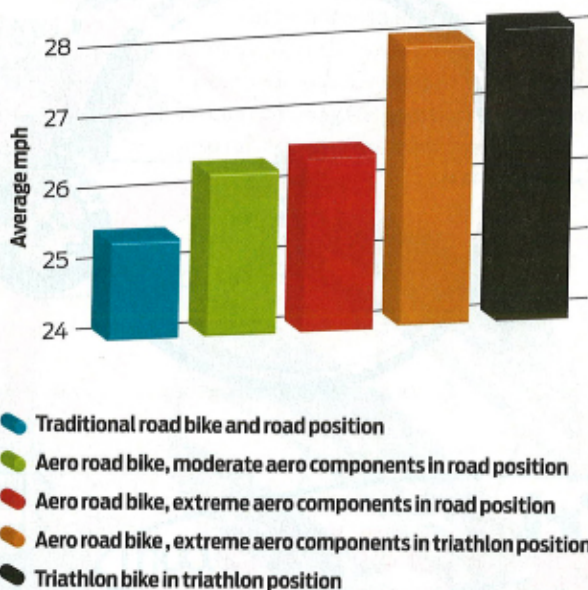
1. Traditional road bike with standard road components with a rider in a road position and a standard cycling kit.
2. Aero road bike, moderate aero components, road position and a standard cycling kit.



(Fig. 1) Drag in Grams vs. Yaw Angle



(Fig. 2) Track Test



3. Aero road bike, extreme aero components, triathlon position and a skinsuit.
4. Aero road bike (TT build), extreme aero components, triathlon position and a skinsuit.
5. Time trial bike.

The first test measured the aerodynamic drag of each combination in the A2 Wind Tunnel. Both road positions were identical and both triathlon positions were also identical.

The graph shows the drag differences between the bikes and positions tested in the conditions (Fig. 1). The wind sees the bike, components and rider as one complete system, so the drag savings cannot be attributed solely to the differences in position or equipment.

The results show that the standard road bike and position has dramatically more aerodynamic drag than the aero road bike and road position. The difference between the two triathlon-position setups, however, is much smaller.

Data collected in the wind tunnel provides reliable information, but triathlons aren't contested in a wind tunnel. To measure how these aerodynamic differences translate to speed when riding on a road, I conducted a riding test on two NASCAR tracks. The cyclist rode at a specific power level over an identical course in all conditions and I measured his average speed. These tests were run several times over several months under varying conditions, and

the data was averaged for the results below. In the end, the graph shows the results to be on par with the tunnel testing (Fig. 2).

This test indicates that there are major differences in speed between the aero road bike and the standard road bike, even though the rider was in the same position. There is also a large difference between the aero road bike ridden in a road position and an aero road bike ridden in a triathlon position. The difference between the aero road bike ridden in a triathlon position and the triathlon bike, however, is very small.

So can an aero road bike double as both a fun-riding road bike and a no-compromises triathlon bike? The tests I conducted show an aero road bike provides performance similar to a pure triathlon bike, but still sacrifices a little bit of aerodynamic performance. If you are trying to squeeze out every advantage, an aero road bike is not an equal substitute for a triathlon-specific bike. However, for those looking to have just one bike for every style of riding and racing, an aerodynamic road bike is definitely the best option.

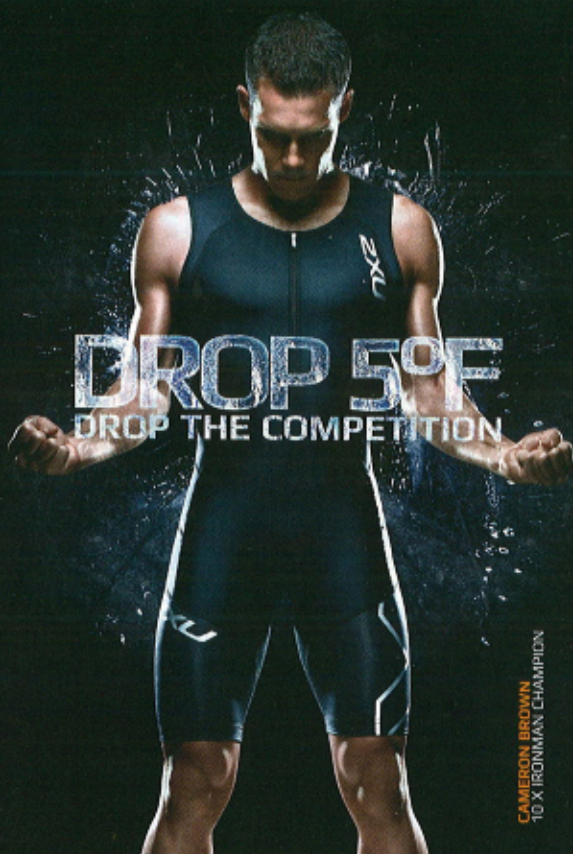
// MIKE GIRAUD

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