

Future of Lightweighting Entry



Cyclone Racing CR22 Swan Neck Wing Mount

During fall 2016, the 2017 team made a decision to convert welded spar mounts to a swan-neck type wing mount. This decision was made from a weight reduction, ease of manufacturing, and aerodynamic efficiency perspective.

The decision to convert to a swan neck type design, included several design considerations. The first was efficiency of the aerodynamic package. In changing the team's design to leave the under-side of the wing airflow undisturbed, the team boasted a more efficient design in terms of drag vs. downforce. The second reason for this design decision was ease of manufacturing. The steel parts used in prior years were heavy, expensive, and very time consuming to maintain. In this new design, the team could design two, identical, 2D profiles that would be waterjet cut for ease of manufacturing. The design also incorporated a system that allowed the team to adjust wings on-the-fly without wing removal. The last and most successful design consideration was the decrease in weight.

The new design allowed the team to reduce the total weight of the vehicle by over 25 lbs. Using Altair Inspire, the team was able to create data-driven designs based on simulation of aluminum material. Early-stage development of aluminum profiles allowed for the team to optimize their design and meet cost, strength, and manufacturability constraints.

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