## **BENCHMARKING**

**Top 5 Germany** 



- Small front end plates with gurney along top and bottom.
- Wing lets along the side means more downforce
- Large end plates (bad in yaw)
- Radiator at the back



- Double element down the middle, double along wheels
- Triple along side
- Looks to be 50-60mm ground clearance
- A arm from nose to wing
- 4arms holding wing up
- Gurney on rear endplates

GFR



• Roll hoop goes to top of wing



- Looks like Double element rear with a wing underneath it all
- Very small side end plates, they cover the bottom ( maybe creating a larger low pressure region) and let air flow over the top



- One large diffuser with a single channel
- Looks like 2 sets of rear wings



- Triple element between tire and chassis, double in front of tire
- Large inlet side pods and small outlet
- Wing lets down side
- Triple element on rear wing
- Swan neck from roll hoop to rear wing

Stuttgart U



- Gurney on end plates
- Guide wire to edge of wing
- Swan neck that has material taken out to make light
- 50mm ground clearance
- Side wings go above tire
- High nose



- Makes it look like the 2<sup>nd</sup> and 3<sup>rd</sup> element are different chord lengths
- Small diffuser
- Exit of side pod is small
- Unsprung wings
- Driver is very low



- Wings follow the shape of the chassis
- Mounts underneath the front nose
- Side pod inlet in between the tire



- No gurney
- Multiple bolt holes for adjustability

Graz UAS

• Small rear end plates



- Triple element between tire and chassis
- Small double element infront of tire ( maybe angled in?)
- In wash end plates into side pod?
- Double element back



- Structural end plates
- No diffuser
- Side pod on one side only



- Front wings angled in
- Guide wire on wings
- Small wings in wash air onto tire/into side pod
- Plates between middle section extend to tip of main wing



- Fan blowing rear wing
- Side pod fan angled up maybe blow rear wing as well



• Side pod end is very small



- End plates inbetween the tire and chassis go very high
- Side pod has diffuser with strakes underneath it
- Swan neck mounting
- Beam wing
- Inlet of side pod is angled down

Graz TU



Triple element between tire and chassis covering the side pod Double element rear wing



Inlet to side pod is so small



Wing is attached to chassis by spacer (in white) They have brake ducts



Coburg UAS

Unsprung front wings

## Top 5 UK



Double front Triple rear Winged side pods Very large end plates



Delft University of Technolog Small diffuser Gurney on end plates Wing on diffuser



Side pod wings flick air up onto the rear wing Front wing stays to chassis



UAS Zwickau Double front wing Triple rear wing

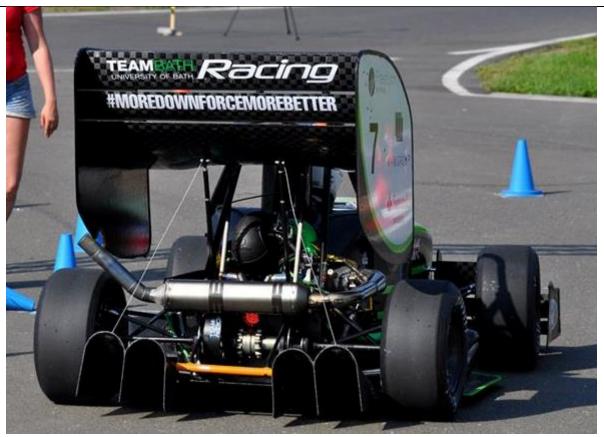


Triple element and double at front Guide wire holding it up Triple element back End plates wash out

University of Bath



3D front wing Side pods are fkn small 3D back wing



Channel diffuser



Rear mounting system has triangulated frame

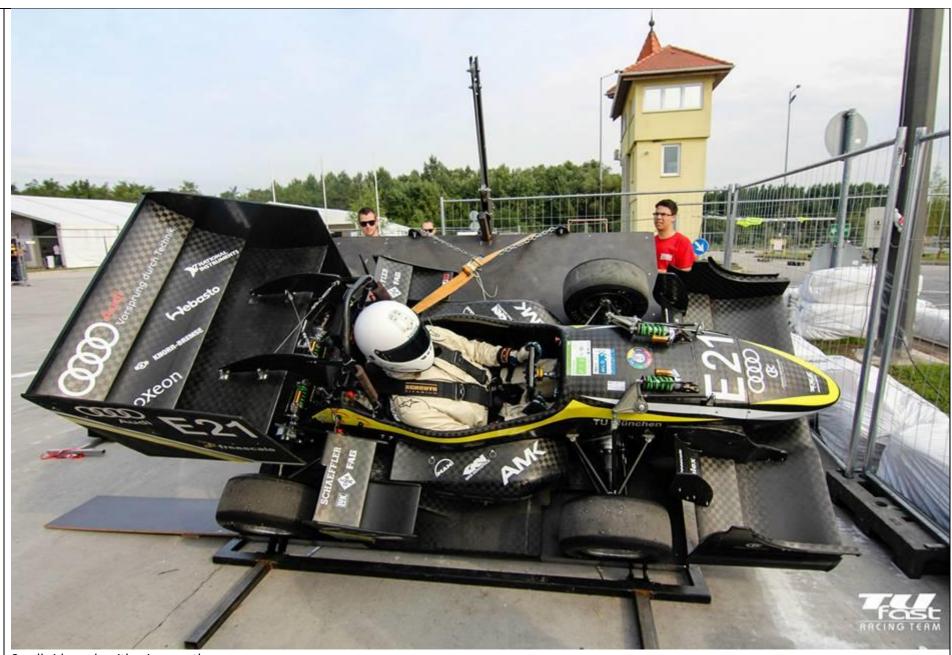


Triple element rear wing

Triple front Technische Universität

Winged side pods

End plates on front wing are very large München



Small side pods with wings on them
Swan neck mounting system with cross bars



Oxford Brookes

Triple element rear with wing on top

University Funky end plates

## Design



Double element front and rear Side pod with wings Small end plates ETH Zurich | Swan neck mounting system



3 wings on side pod



Wings are bent up



Norwegian University of Science and Technolog y

Double element front Triple element back Solid mounts to chassis



Side pods with wings Small front end plates Gurney on end plates



Karlsruhe Institute of Technolog y (KIT)

Side pods with wings
Low triple element and high double element
Front main has a complex shape



Triple element is just above the driver Left side pod has wing End plates are flat with interesting shape Large mounting plates on from wing

