Introduction: Race car performances depend on a large set of parameters. Aerodynamic forces can be used to enhance tire adhesion which increases cornering speeds. Nevertheless, adding inverted wings does not come without a price. To maintain the car’s efficiency on high speed straights as well as its quick cornering capabilities, it would be ideal to add or remove the wings when needed. This is where the Drag Reduction System (DRS) comes into play. The DRS modifies the position of the wings on the car in order to reduce the generated drag when downforce is not needed and increase normal forces on the tires while cornering.

Reducing drag on straights:
• The rotation axis is set at the aerodynamic center of inertia of the 2\textsuperscript{nd} element.
• By turning the 2\textsuperscript{nd} element around this axis, the angle minimizing the drag is found.
• A mechanical system minimizing the stresses in the rods is designed to move the 2\textsuperscript{nd} element from open to closed position.

Generating downforce for quick cornering:
• After finding a high downforce airfoil, a 2\textsuperscript{nd} element wing is built.
• The position and angle of each wing is optimized using the panel method.
• The shape of the wings is then modified using the MGM inverse design and adjoint methods.

Building the rear wing out of composites:
• The airfoil profiles are CNC machined in Rohacell foam.
• Flax fiber is then laminated around them.
• The diffusion and solidification of the epoxy matrix is done under vacuum.