

A fully automated rudder pedal system

In the ultralight aircraft category, most aircraft make use of a manual solution for adjustment of the rudder pedal position. The ambition of this thesis work was to find a solution that enables a fully automated system. The results proved that it is possible to implement an automated mechanism, which at this state requires a few additional actions of work in order for a strength-test to be performed and thus, acquiring an airworthiness certification.

The Swedish ultralight aircraft manufacturer, Blackwing Sweden AB, has requested a reinvention of their adjustable mechanism for the rudder pedal system in the BW600RG aircraft. Changing the pedal position in the current system is quite a complicated and non-ergonomic process which additionally requires for the aircraft to be stationary on the ground.



Figure 1. The BW600RG.

Master students Ana Beric and Simon Strand, Lund University, were put in charge of developing a concept covering a fully automated adjustment mechanism which works on the ground as well as during flight. In addition, the concept was to acquire an airworthiness certification which is necessary for the mechanism to be installed in the aircraft.

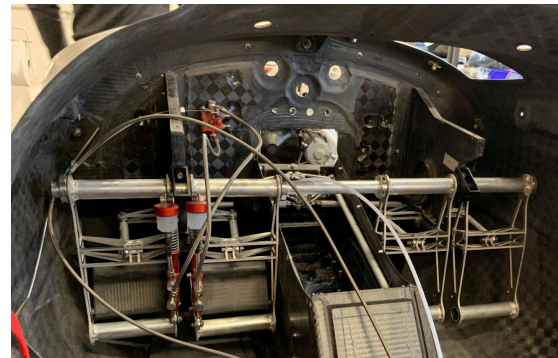


Figure 2. Rudder pedals in the BW600RG aircraft.

A CAD software was used for modelling, primarily to ensure a marginally accepted fit of the concept within the cockpit as well as for evaluating the motion of the concept components as they interact with the rudder pedals. Lastly, a finite element analysis was performed which showcased that the proposed solution is functional. A few additional actions of work are necessary in order to fully integrate the concept in the BW600RG aircraft. These actions include: selecting fasteners, selecting a linear actuator of suitable size and lastly, designing a mounting rig for the linear actuator.

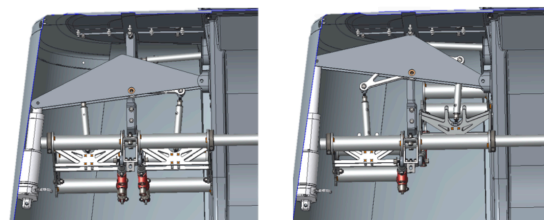


Figure 3. The concept (not yet fully developed and optimized) modelled in the CAD software Creo Parametric 3.0.

By completing the additional requirements, a strength-test can be performed which subsequently allows for an airworthiness certification and thus for implementation of the fully automated rudder pedal system in the BW600RG aircraft.