

ReWright- A HUMAN POWERED AIRCRAFT IN THE MAKING

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Abstract. Human powered aircraft is as close as you come to the ultimate dream of bird flight.

The human powered aircraft dream also exists at Linköping University where it has become more or less a habit to design and build model aircraft or demonstrators of full sized aircraft. This approach makes it possible to discover potential problems and flight behavior in general, before you enter full size development.

Designing, building and flying model aircraft has been the motto for aircraft education at Linköping University for many years now and has turned out to be a good approach to teach students the very essential, but at universities non the less almost totally neglected, coupling between theory and practice.

In 2014 the design topic for the year was to design a human powered aircraft. The aircraft named “ReWright” was inspired by hang glider design, which means pitch control by weight shift and a typical hang glider, flying wing layout.

Why then this approach? The students needed something challenging and flying wing concepts are really challenging and human powered designs like these are not numerous. We started with conceptual design, basic calculations and sizing of the full sized aircraft and then decided to design and build 3 demonstrators.

The first demonstrator was designed to demonstrate weight shift as a control measure and to evaluate different measures to make the aircraft turn. The aircraft was made unpowered.

The second demonstrator was designed as a ground vehicle, basically designed to test the transmission (pilot to propeller) and to check out the in house designed propeller performance, i.e. whether we could power the aircraft from standstill to takeoff speed without pitch change.

The third demonstrator was designed to be as close in behavior to the full sized vehicle as possible. It was a double sized version of the first demonstrator, but electrically powered.

Much of the work with the first and second demonstrators was completed in 2014, but we didn't have time to finish the third demonstrator.

We continued the project in 2015 where we concentrated on getting the third demonstrator ready for tests, while also looking at other possible design evolutions. We also initiated work on a propeller pitch system design.

This paper goes deeper into the design of the aircraft, possible design evolutions, challenges met and lessons learned.