

# Report D: Electronics, documentation

## 01 Components

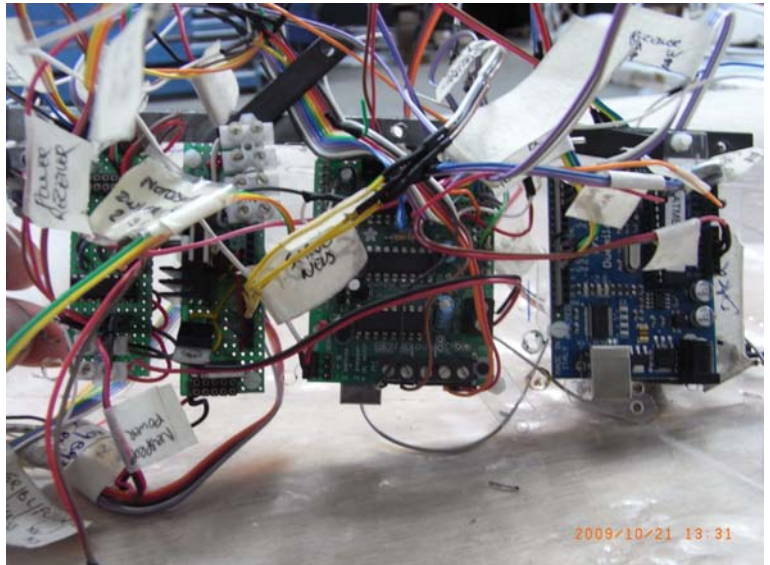
The model is controlled by 2 arduino-boards, mounted on the main beam.

Arduino 2 has a motorshield and controls the 3 horizontal and 2 vertical hinges in the structure. Each hinge has a sensor reporting its position. Arduino 1 receives signals from a Futaba 7-channel receiver and reports back to a remote laptop via a Bluetooth connection. This connection is bidirectional, so the model can also be controlled with the laptop.

Arduino 1 also sends signals to 2 mosfets on a separate little board to control the rotors.

The 2 Arduinos talk to each other over an I2C-connection.

The small board on the left distributes power. It receives power from a 7,4 V LiPo-battery, send this through some diodes to the motors and has a 5V voltage regulator for the electronics.

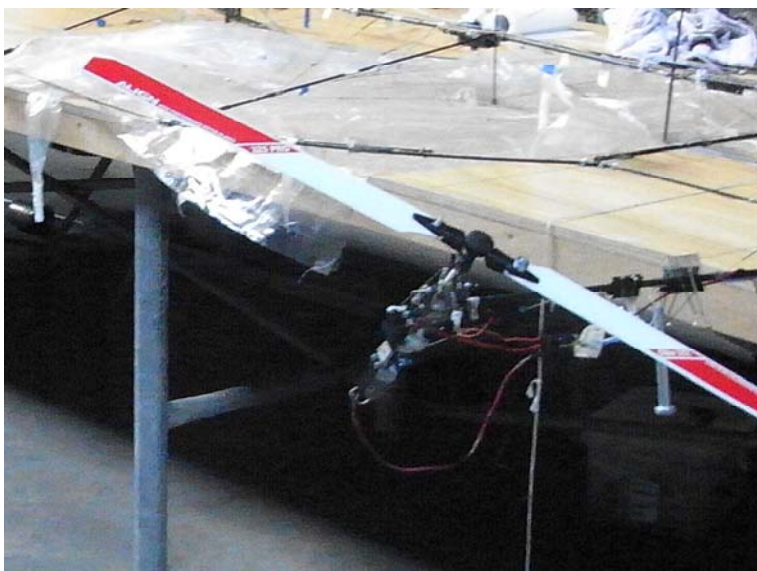


*From left to right: power board, motor control, Arduino 2, Arduino 1  
The receiver is mounted behind Arduino 1. All wiring is labelled and connected via pins.*

## 02 Rotors and motors



*Rotor test rig*



*Engine pod, showing a tilted rotor and the blade-angle servo mounted on the outside*

Both rotors are powered by a Graupner Speed 285 motor, through a nylon gearbox. The rotors can be tilted up and the blade angle can be adjusted. Both actions are performed by a small Graupner servo.

The noseprop is a small prop mounted directly on a Speed 260 motor.

The horizontal hinges are moved by Futaba 3151 servos, hacked for continuous rotation and a small winch mounted.

The vertical hinges are moved by Hytec Quarter Size metal gear servos, which have been customized in the same way.

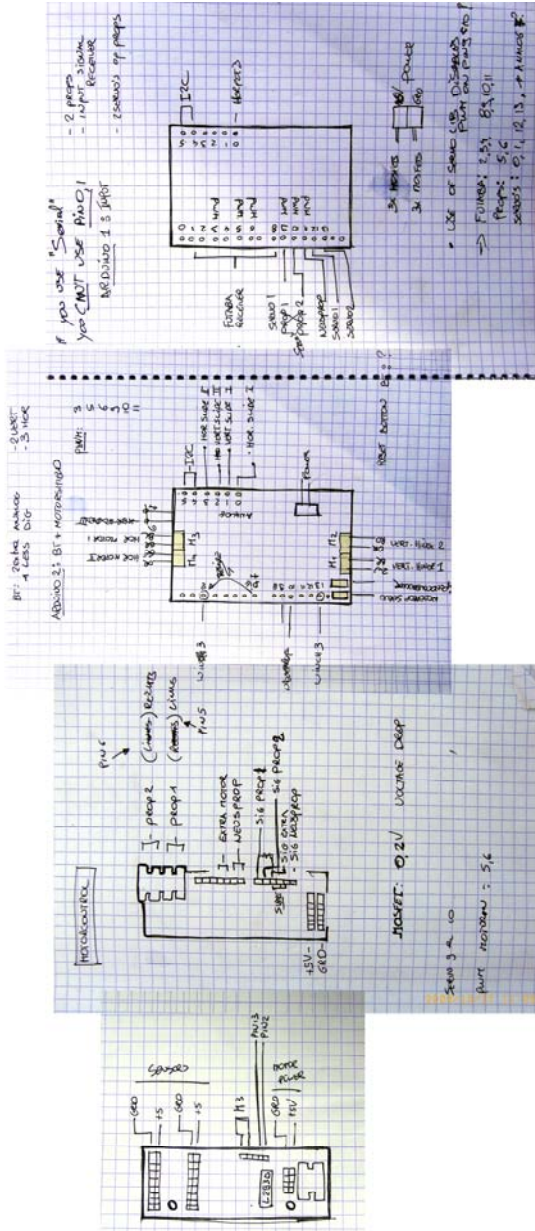


*Vertical hinge, showing the Hytec servo with winch, the hinge itself, and the position sensor, a slide resistor, at the bottom of the picture.*



*Futaba 3151 servo converted to winch, moving hinge 3 by pulling/releasing a small cable.*

# 03 Schematics



## 04 Code

The receiver-to-arduino code is based on the code from the Aeroquad-project. [www.aeroquad.info](http://www.aeroquad.info).


The motor-code is based on the examples from adafruit, <http://www.ladyada.net/make/mshield/>

The 'mirror'-sketch is the part which converts signal values to bytes and sends them back and forth between the arduinos over the I2C connection.

On-line resource: <http://hacknmod.com/hack/how-to-connect-multiple-arduino-microcontrollers-using-i2c/>

and for the string conversion, the communication examples from Tom Igoe:

<http://arduino.cc/en/Tutorial/HomePage>



```
void setsoname(int myinterval){
  CURRENTTIME=millis()-PREVIOUSSTIME;
  if (CURRENTTIME > myinterval){
    TICK++;
    PREVIOUSSTIME=millis();
  }
}

void setcestrvalue(){
  inputvalue1=200;
}

void print_mirror(){
  for(i=0;i<MIRRORLENGTH;i++){
```

The code isn't very well documented at this point, but I include it anyway. The zip-file contains the sketches for both Arduinos. It was written in version 17 of the Arduino-software. You will also need the Wire, Servo and AFMotor libraries.

<http://www.aeromodeller2.be/reports/AM2-model-code-2009-10.rar/>