Smart interior blind control system

# Introduction

Customer wrote:

“I would like you to have one of the guys look into this development task and let me know what you require to get going with this:

We would like to develop an add-on product for our new interior blind system ([www.ziptrak.com.au/interior)](http://www.ziptrak.com.au/interior)). Our interior blind is installed on the inside of a window and creates an insulation buffer between the glass and the fabric on the blind. The blind fully seals the window, so is very good for insulation. We would like to develop a product that helps people conserve energy at home and in high offices/apartments by automatically closing to keep the house cool in summer or opening to warm the house in winter.

 Currently use for interior blinds:

* 240VAC tubular motors with wireless remote (radio, not Infrared)
* Solar tubular Motors with a 12V DC motor, solar panel, battery and wireless remote
* Manual spring balanced operation

 Would like to develop a motor system or an interface to the motor with some intelligence:

1. Detect temperature differences between the outside and the inside of the home.
2. When the temperature outside is high and the temperature inside is increasing then lower the blinds to restrict the temperature increase.
3. When the temperature outside is cool but the sun shining and the blinds are closed, then open the blinds to try and warm the house.
4. Ensure that this only happens when there is nobody in the house (motion detection).
5. Create an alert (e.g. beep) when the blind will actually do something on its own.
6. Detect sun glare and lower blinds as required.
7. Allow WIFI connection to the blinds for users to control setup and settings (app development, website?).
8. Collect data about the use of the blind and send back to servers.
9. Allow central control of many blinds (office buildings, high rise apartments etc…)
10. Check battery health and solar panel on the DC motors.
11. Set open and close timers

Implementation options:

1. Work with a motor manufacturer to obtain motors that allow us to integrate our own electronics.
2. Create a small interfacing device between motor and remote control?
3. Obtain non-wireless motors only, create a control box device + obtain remote controls to use with our control box.”

# Project development

## Stage 1: Investigation

Perform investigation of existing solutions. Discuss various implementation options and choose one we should follow. Define typical workflows and operating modes.

### Prerequisites:

* Documentation (datasheets) for existing hardware modules
* Development board (Raspberry Pi?)

### Goal:

* Investigate technical possibility to control the hardware from control module
* Analyze possible implementation options and choose optimal one
* Make a decision about software and hardware frameworks
* Define type and number of external modules (sensors, motors, etc.) that could be connected to the control module
* Write technical specification for the control module and approve it with customer
* Make estimation for time and resources

### Time: 1-2 months

## Stage 2: Prototype

Produce evaluation sample (no user interface, just a board with connectors where all kinds of sensors/motors can be connected).

### Prerequisites:

* Development team
* Samples of all hardware components

### Goal:

* Make a prototype that can be evaluated by the customer
* Perform testing and validation
* Write technical specification for the user interface and approve it with customer
* Estimate price and development time

### Time: 2-3 months

## Stage 3: Production sample

Make a final solution, including mechanical, hardware and software design.

### Prerequisites:

* Stage 2 completed

### Goal:

* Prepare all technical documentation required for production
* Produce the samples and test them in real conditions
* Test control software for usability and functionality

# Resources

Required human resources will be evaluated at stage 1. Raw estimation is:

* Project manager (Nick Yegorov)
* Control board programmer (Nick Yegorov)
* Electronic engineer (?)
* Mechanical designer (?)
* User interface programmer (Andrey?)

Resource usage estimation:

