# Software/Hardware Requirements Specification

**for**

# Anzhelka

**Version 1.0 approved**

**Prepared by**
**Luke De Ruyter**
**Cody Lewis**

**University of California, Riverside**

**May 4, 2012**

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# Revisions

Current project status and files can be found at

**blog.anzhelka.com**
**code.anzhelka.com**

| Version | Date | Changes | Commiter |
|---|---|---|---|
| 0.01 | April 30, 2012 | Initial layout of file was created. | Cody |

# 1 Introduction

## 1.1 Purpose

Anzhelka is a complete system intended for autonomous quadrotor flight. Included as a part of Anzhelka is both hardware and software. This includes the quadrotor frame, control electronics, ground station software, and the complete system documentation. Anzhelka is completely open source, and all project files are available for download. You can find in this document any instructions necessary for understanding the functionality of Anzhelka components. This includes hardware and software interfaces, features, and system requirements.

## 1.2 Document Conventions

## 1.3 Intended Audience and Reading Suggestions

This document is written for Anzhelka developers. This document is intended to refine development direction, and to bring new developers up to speed. For this document, developers include software writers, hardware designers, and system testers.

You should read this document based on your background with Anzhelka. Current developers can find the appropriate section to read. New developers should read the introduction, overall description, and system features sections. If you are a non-developer for this project, and don't intend to ever become one, you should avoid this document. Look on the Anzhelka website for something more appropriate to your needs.

## 1.4 Product Scope

Anzhelka consists of four main components: a quadrotor hardware frame, custom quadrotor software, ground station software, and detailed documentation via the Anzhelka website. Even without a degree in control systems, you can use Anzhelka components to make an autonomous quadrotor system. By using these components you can customize the functionality of the system to suit your needs, or use them directly to perform predefined commands.

## 1.5 References



# 2 Overall Description

## 2.1 Product Perspective

Figure 1: This is an artistic rendering of the frame used for Anzhelka.

We are taking an existing open hardware frame as our base platform. We have chosen to build on top of this hardware because of its expandability and its durability. We have designed a custom control board that will be able to run all of Anzhelka's software and house all the necessary components.

*¡Describe the context and origin of the product being specified in this SPECIFICATION. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SPECIFICATION defines a component of a larger system, relate the requirements of the larger system to the functionality of this software or hardware and identify interfaces between the two. A simple diagram that shows the major components of the overall system, subsystem interconnections, and external interfaces can be helpful.¿*

## 2.2 Product Functions

Anzhelka will be equipped with a Parallax Propeller Multicore Processor. It will have two separate batteries. One will provide power for the motors and servos and the other to power the electronics. There are pin headers that have been broken out for expandability. Some of the pin headers are broken out in servo style arrangements for ease of use. The motors and servos will have voltage and current monitoring. Anzhelka has been designed so that one can easily add multiple expansion boards.

## 2.3 User Classes and Characteristics

*¡Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the most important user classes for this product from those who are less important to satisfy.¿*

### 2.3.1 User Example #1

### 2.3.2 User Example #2

Figure 2: Jason Lariart

**Age:** 28
**Education:** Some College
**Marital Status:** Open
**Occupation:** Videographer
**Hobbies:** Photography, Videography, Art, Protesting
**About Jason:** He is an avid videographer and likes to push the limits of his skills, screw, and equipment. He likes to take pictures and videos of things that not just any ordinary person can do. Jason is currently an amateur photographer, but wants to make a professional carrier out of his work.

**Scenario:** Jason was preparing for remote video shoot and realized that he wasn't going to be able to get his aerial shot because a helicopter was out of his budget. Jason told the client that he was going to have to spend more money if wanted to get the aerial shot as planned. The client was upset to hear about this and had no choice but to drop the scene from the shoot.

# 3 External Interface Requirements

## 3.1 User Interfaces

## 3.2 Hardware Interfaces

## 3.3 Software or Hardware Interfaces

## 3.4 Communications Interfaces



# 4 System Features

## 4.1 System Feature 1

### 4.1.1 Description and Priority

### 4.1.2 Stimulus/Response Sequences

### 4.1.3 Functional Requirements

## 4.2 System Feature 2 (and so on)



# 5 Other Nonfunctional Requirements

## 5.1 Performance Requirements

## 5.2 Safety Requirements

## 5.3 Security Requirements

## 5.4 Software or Hardware Quality Attributes

## 5.5 Business Rules

# 6 Other Requirements

# A Glossary

# B Analysis Models

# C To Be Determined List