

**OpenWeather++**

**OpenSource Forcasting**

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# 1.0 Executive Summary

The OpenWeather++ project is a collection of technologies based around individual and crowd sourced atmospheric data collection. These technologies include Dallas Semiconductor’s One Wire protocol and it’s integrated circuits, Arduino compatible AT Mega based microcontrollers, and Argent Data Systems weather monitoring circuits. While the use of propriety technologies is currently necessary the project aims to be as open source as possible. All source code used in this project is published under the GNU Public License and is freely available to the public.

The project aims for three fundamental goals. The first is to provide anyone with basic understanding of Arduino based microcontrollers a guide to construct a standardized weather station. The second fundamental goal of the OpenWeather++ project is to centralize the libraries used in this project. Before this project the required libraries where fragmented across the web with no clear explanation to their use or implementation of version control. The project will host an open repository on GitHub for distribution and version control, as well as a build guide with examples. The third and final fundamental goal is to provide a web based API and framework for accessing the organizing the data into information

Two future goals for the project include expansion into other platforms, such as the ARM based Raspberry Pi, and community based source maintenance.

A future fourth goal for the project is to develop an open source community to maintain the source code and provide further development.

# 2.0 Problem Definition

The OpenWeather++ project arose out of library issues when constructing a weather station kit purchased from SparkFun.com. Most of the libraries where incomplete or outdates with poorly written usage examples. The increased number of weather monitoring modules only furthered this problem, which eventually led to a need for a central repository for source maintenance.

After assembling and updating the necessary libraries came the issue of correctly using the libraries.

Problem Definition

# 3.0 Scope

## 3.1 Target Audience

OpenWeather++ is targeted towards individuals with a willingness to learn, or currently holding the following skill sets: Soldering, C++ based programming, and microcontroller driven development. OpenWeather++ provides these individuals with a base source code, examples and documentation to construct a fully operational weather station.

## 3.2 Development Scope

At the time of the first version of this document Aug 14, 2012, OpenWeather++ is in a prototype alpha stage.

# 4.0 Requirements Analysis

## 4.1 Hardware

4.1.1 Arduino Compatible Prototyping Board (Arduino UNO)

Description: Atmel AVR Atmega 328 based development board. The Arduino UNO, while not required for a final prototype is necessary for testing and development. The Arduino UNO contains 6 analog input/output pins, 13 digital input/output pins as well as pulse width modulation and an Atmel Atmega 328 processor.

<http://www.arduino.cc/>

4.1.2 Solderless Breadboard

4.1.3 Hobby Boards 6 Channel Power Hub

4.1.4 Hobby Boards Humidity/Temperature/Solar Sensor

4.1.5 Hobby Boards Barometer

4.1.6 Hobby Boards Lightning Detector

4.1.7 Development Computer

Description: An x86 based computer to run the Arduino API for development. The computer must be able to run the Arduino API as well as communicate to the Arduino UNO via USB.

4.1.8 Web Server

Description: This requirement is optional if the OpenWeather++ build is not using the Wunderground API. The webserver will not only serve as a data collection node, but will also be responsible for serving the weather data to end-users.

4.1.9

## 4.2 Software

4.2.1 Arduino Integrated Development Environment (IDE)

4.2.2 Dallas Semiconductor One-Wire Arduino Library

4.2.3

# 5.0 Design Specifications

Development Methodology

Project Management

Maintenance and Life Cycle

Definition of terminology used in this document