Volatile Organic Compound Monitor

Requirements Details

Sentient

Saturday, October 12, 2013

Contents

[Introduction…………………………………………………………………………………………………………………………………………..3](#_Toc307136025)

[Functional Requirements……………………………………………………………………………………………………………………….3](#_Toc307136026)

User Communication[………………………………………………………………………………………………………………………….3](#_Toc307136027)

Web Application…………………………………………………………………………………………………………………………………4

VOC Interaction………………………………………………………………………………………………………………………………….[4](#_Toc307136029)

File System[……………………………………………………………………………………………………………………………………......4](#_Toc307136030)

Control System……………………………………………………………………………………………………………………………………5

Hardware Maintenance………………………………………………………………………………………………………………………5

[Non Functional……………………………………………………………………………………………………………………………………….5](#_Toc307136031)

Communication[…………………………………………………………………………………………………………………………………..5](#_Toc307136032)

Platform[……………………………………………………………………………………………………………………………...................6](#_Toc307136033)

Monitor Hardware[………………………………………………………………………………………………………………………………6](#_Toc307136034)

Power Supply……………………………………………………………………………………………………………………………………..6

Web Application…………………………………………………………………………………………………………………………………6

Physical Layer……………………………………………………………………………………………………………………………….......6

**Introduction**

This report contains a summary of requirements for the Volatile Organic Compound (VOC) monitor. These requirements describe the features and operations of the finished system. The requirements are divided into two main categories: Functional and Non Functional. Functional requirements describe the operations and tasks the system shall perform. Non Functional requirements describe how the system shall accomplish the functional requirements. The Functional and Non Functional requirements are divided into groups of related requirements.

**Functional Requirements**

The area of Functional requirements describes operations the system is intended to perform. Each requirement depicts a single behavior. Requirements are divided into groups based on relation. Each group of functional requirements illustrates a functional module that will be treated as a single task in development, testing and deployment.

Functional Requirements are prioritized as follows:

* H-A : High Priority, Architecture – These requirements are mandatory for architectural integrity of the system technical operation.
* H : High Priority – These requirements are part of system basic operation. Without these requirements, the system cannot be considered operational.
* M : Mid-Level Priority – These requirements are necessary for a final delivered system. The system will function without these operations; however, it may not be useful from and end user perspective.
* L : Low Level Priority – These requirements are items that may be added to the system if time allows

Functional Groups:

**User Communication**

The User Communication includes those requirements involved with the direct communication with the users of the VOC monitor. This is considered a secondary function of the system.

1. The system shall have an alert system.
   1. The system shall send an e-mail to e-mail list M
   2. The system shall e-mail protection and symptom information M
2. The system shall allow web application users to submit e-mail.
   1. The system shall require zip-code with e-mail submission. M

**Web Application**

The Web Application contains those requirements involved with the web application including aspects on what the web application will contain and how the web application is affected by the VOC data retrieval. This is considered part of the core system functionality and the primary purpose of the overall system operation.

1. The system shall display toxic levels of VOC
   1. The system shall differentiate between VOC’s HA
   2. The system shall display a vertical line on graphs HA
2. The system shall have a web application
   1. The system shall have time vs. VOC level graphs HA
   2. The system shall provide raw VOC data H
   3. The system shall color coordinate VOC levels H
   4. The system shall have a map locating all VOC monitors M
   5. The system shall provide protection and symptom information M
3. The system shall update the web application after each retrieval from VOC monitor
   1. The system shall update all VOC graphs H
   2. The system shall update raw VOC data H

**VOC Interaction**

The User Interaction contains those requirements involved with the direct interaction the VOC monitor. This is considered part of the core system functionality and necessary for the operation if the primary purpose of the overall system.

1. The system shall display GUI windows when retrieving VOC data
   1. The system shall provide an option to download new or old VOC level data M
      1. The system shall be able to download last week’s data H

6.1.2 The system shall be able to download the last two week’s data M

6.2 The system shall display a window if VOC retrieval fails M

6.3 The system shall display a window when VOC levels retrieving is complete M

**File System**

The File System contains those requirements involved with the storage of VOC levels. This is considered part of the core system functionality and necessary for the operation if the primary purpose of the overall system. These functions encompass the secondary software of the system.

1. The system shall store VOC data
   1. The system shall have time stamps for VOC level HA
   2. The system shall have GPS stamps for VOC levels HA
2. The system shall have a database
   1. The system shall be written in SQL H
3. The system shall delete VOC level data from SD once uploaded to web application

9.1 The system shall delete week old data L

**Control System**

The Control System contains those requirements involved with the interpretation and analysis of VOC levels. This is considered the core system functionality and the primary purpose of the overall system. These functions encompass the primary software of the system.

1. The system shall interpret VOC levels
   1. The system shall define toxic VOC levels. HA
   2. The system shall convert VOC data to Part Per Million (PPM)

**Hardware Maintenance**

The Hardware Maintenance contains those requirements involved with the hardware of the VOC monitor including storage and protection. These functions encompass primarily the hardware of the system.

1. The system shall be protected from elements

11.1 The system shall be stored in a bird house. L

11.2 The system shall expose VOC sensor outside the bird house. L

**Non Functional Requirements**

The area of Non Functional requirements describes the implementation areas of the system. Each requirement depicts a single rule for construction of the system. These requirements are not related to operational behavior. Requirements are divided into groups based on relation. Each group of Non Functional requirements will be single items that drive construction and platform details.

Non Functional Groups:

**Communication**

1. The system shall support TCP/IP communication
2. They system shall support XBEE communication

**Platform**

1. The system shall be written in C++
2. The system shall support a windows application

**Monitor Hardware**

1. The system shall store VOC levels on an SD card
2. The system shall store VOC levels on SD through an Arduino SD shield
3. The system shall retrieve VOC levels through TGS2620 sensor
4. The system shall communicate to a PC through an XBEE
5. The system shall retrieve VOC levels from VOC sensors through an Arduino UNO R3
6. The system shall retrieve VOC levels through a thumb drive

**Power Supply**

1. The system shall be powered with a solar panel
2. The system shall store power from solar panel on a 9volt battery

**Web Application**

1. The system shall display each VOC level through a time-line graph
2. NF The system shall make raw VOC level data accessible on web application
3. The system shall provide protection and symptom information through web application
4. The system shall export a map from Google maps
5. The system shall have a map locating all VOC monitors through web application
6. The system shall send alerts to users through an e-mail mailing list

Physical Layer

1. The system shall protect VOC hardware with a bird-house structure