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**Project Development Plan**

**Bluetooth Android Intern Project**

**Semester Extension**

**ABB Inc.**

**7051 Industrial Blvd.**

**Bartlesville, OK 74006**

**August 28, 2013**

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| --- | --- | --- | --- |
| **Version Number** | **Implemented**  **By** | **Revision**  **Date** | **Description of Change** |
| 1.0 | Blaine Tiernan | 8/28/13 | First Draft |
| 1.1 | Blaine Tiernan | 9/3/13 | Added Terry Cox as Program Manager, Retitled Bruce Sievers as Program Supervisor |

**INTRODUCTION**

Half of ABB’s G4 devices are able to be monitored via the internet, the remaining half do not have this capability and therefore must be connected to locally. The field technicians that monitor the latter half of these G4 devices do so by linking their PCCU running system to the G4 device with a male to male USB. Harsh weather and physical obstacles make doing this difficult or in some cases impossible. To remedy this issue ABB’s research and development (R&D) team will develop an Android application that connects the field technician to a local G4 device via Bluetooth and displays the readings necessary to meet marketing requirements.

**PROJECT MANAGEMENT APPROACH**

The Project Manager, Blaine Tiernan, has the overall authority and responsibility for managing and executing this project according to this Project Plan. The marketing requirements have been provided by the Product Manager, John Green. The project team will consist of Software Developers Lee Easton, and Nathan Lea and Victoria Som de Cerff. The project manager will work with the Program Manager, Terry Cox, for all resources to perform project planning. All funding decisions will also be made by the overseeing manager Bruce Sievers. The project manager is responsible for communicating with each of the software engineers on progress and performance directly.

**PROJECT ORGANIZATION**

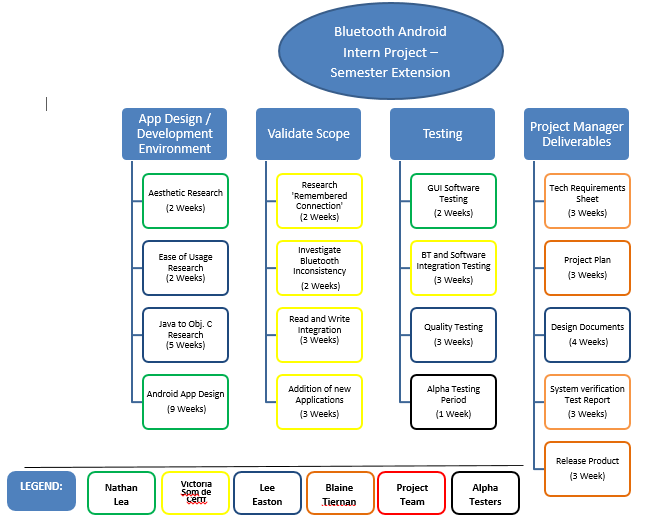
**PROJECT SCOPE**

The scope of this project is to allow the local transmission of readings from the Totalflow G4 devices that are not networked to an android device with the **ABB Totalflow app** through a Bluetooth connection. The application shall be designed and tested to ensure that all marketing requirements are met. It shall present each of the data points defined in the marketing requirements with the ability to turn on or off data points for display. It shall also provide an additional screen with a user defined set of data points not listed in the marketing requirements. The app shall have a general settings page for general configurations settings such as communication settings for Bluetooth. The Project Plan is a living document that will continue to evolve throughout the life of the project.

The extension of the original project shall include the ability to remember connection information from previously connected devices. It shall include an autocomplete function as well to reduce the time it would normally take a technician to access device registers. It shall also include the ability to read as well as write on plunger lift options, gas lift and valve control. Pulse accumulator shall also be added to the applications list representing flow rate today’s volume and yesterday’s volume. A more comprehensive and task oriented Help menu shall also be included to make navigation less confusing to those new to android.

If the tasks above are successfully completed and time remains the stretch scope would include the conversion of the android application to the Objective C programming language to run on Apple devices.

**WORK BREAKDOWN STRUCTURE**

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**CHANGE MANAGEMENT PLAN**

The following process will be undertaken for project change:

Step #1: Identify the need for a change (Any Person Relevant to the Project)

Step #2: A ‘Change Request’ form (https://abb-interns-2013.googlecode.com/hg/ABB- Change-Request-Template.doc) must be filled out and delivered to the project team as well as the project manager.

Step #3: If the change remains relevant Blaine Tiernan will bring the document to the Program Supervisor and possible modification options will be discussed.

Step #5: If an option is selected the change will be implemented and the project scope will be revised with the modification. All changes will be recorded by the project manager.

* Modified documents include but are not limited to the Project Charter, Project Development Plan, Work Breakdown Structure, Project Schedule, Weekly Status Report, and Technical Requirements Specification. The revised document will be saved with a version suffix to denote its revision chronology and to allow for document change tracking. Document revision will logged with a table like the one below to keep track of each specific modification.

|  |  |  |  |
| --- | --- | --- | --- |
| **Version Number** | **Implemented**  **By** | **Revision**  **Date** | **Description of Change** |
| 1.0 | *<Author name>* | *<mm/dd/yy>* | *<description of change>* |
|  |  |  |  |
|  |  |  |  |

**COMMUNICATIONS MANAGEMENT PLAN**

This Communications Management Plan sets the communications framework for this project. It will serve as a guide for communications throughout the life of the project and will be updated as communication requirements change.

The Project Manager will take the lead role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix below. The Communications Matrix will be used as the guide for what information to communicate, who is to do the communicating, when to communicate it, and to whom to communicate.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Communication Type | Description | Frequency | Format | Participants/ Distribution | Deliverable | Owner |
| Weekly Status Report | Email Summary of Project Status | Weekly Tuesday | Email | Project Team | Status Report | Project Manager |
| Weekly Project Team Meeting | Meeting to review action register and status | Weekly  Monday | In Person | Project Team | Updated Action Register | Project Manager |
| Work Schedule | Times when we are each scheduled to work | Monday:  4:30-7:30pm  Tuesday:  3:30-6:30pm  Thursday:  3:30-6:30pm | In Person | Project Team | Various Deliverables | Project Team |

Project team directory for all communication is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Title | E-mail | Office Phone | Cell Phone |
| Blaine Tiernan | Project Manager | Blaine.tiernan@okstate.edu | ---------------------- | 918-760-6146 |
| Lee Easton | Software Developer | leeee@okstate.edu | ---------------------- | 918-521-6832 |
| Nathan Lea | Software Developer | nathahl@ostatemail.okstate.edu | ---------------------- | 918-440-0890 |
| Victoria Som de Cerff | Software Developer | vsomdecerff@gmail.com | ----------------------- | 918-720-8182 |

The Weekly Status Reports and any other document relevant to the group shall be located on the Project Wiki (code.google.com/p/abb-interns-2013/wiki/mainpage?tm=6)and accessible to each member of the Project Team as long as internet is accessible. This will grant the whole of the project team a means by which to keep up with the direction the project is headed whether at work or ill and away. The ABB SharePoint site will also be used as a similar resource to host all relevant group documents so as to be viewed whenever needed.

**Meetings:**

The Project Manager shall notify each group member personally either in conversation or by email previous to any meeting. Meetings can be called at any time from during the work schedule. Holidays are an exception. All group members are expected to be present for each meeting, if someone cannot do this the project manager must be informed and he will decide to either reschedule or press on without the missing persons and catch them up at a later date personally. All attendees are expected to gainfully contribute to the meeting by preparing sufficient material ahead of time and sharing this material during the meeting. A brief informal daily meeting can be expected to occur near the start of each shift to commend accomplishments and prepare the project team for upcoming milestones and expected deliverables. These daily meetings are to be attended by the project team and lead by the project manager.

Since the Project Team is working offsite for the entirety of the semester, meetings including the Program Manager, Program Supervisor and/or Product Manager shall be virtually hosted across Skype or Google Hangout. These services provide video and audio to all participants at no cost. If a digital meeting is deemed insufficient by the Program Supervisor the Project team will then discuss options for relocation to meet in person.

**Informal Communications:**

While informal communication is a part of every project and is necessary for successful project completion, any issues, concerns, or updates that arise from informal discussion between team members must be communicated to the Project Manager so the appropriate action may be taken. All members of the project team are linked and can be contacted at any hour by the ‘Group Me’ phone application. Meetings called via this application are mandatory to attend. If this cannot be done then the absentee must connect to the rest of the team through either Skype or Google Hangout to ensure the meetings contents are presented to everyone.

**PROCUREMENT MANAGEMENT PLAN**

The Project Manager will provide oversight and management for all procurement activities under this project. The Project Manager is authorized to approve all procurement actions up to $0.00. Any procurement actions exceeding this amount must be approved by the Program Supervisor.

While this project requires minimal or no procurement, in the event procurement is required, the Project Manager will work with the project team to identify all items or services to be procured for the successful completion of the project.

In the event procurement becomes necessary, the Project Manager will be responsible for contacting the selected vendor or external resource. The Project Manager will also measure performance as it relates to the vendor providing necessary goods and/or services and communicate this to the purchasing and/or contracts groups.

**PROJECT SCOPE MANAGEMENT PLAN**

Scope management for this project will be the sole responsibility of the Project Manager. The scope for this project is defined by the Scope Statement and the Work Breakdown Structure (WBS). The Project Manager, Product Manager, any stakeholders, and Team Members will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements.

Proposed scope changes may be initiated by the Project Manager, Stakeholders or any member of the project team. All change requests will be submitted to the Project Manager who will then evaluate the requested scope change. Upon acceptance of the scope change request the Project Manager will submit the scope change request to the Program Supervisor for acceptance.

The Project Manager is responsible for formally accepting the project’s final deliverable. This acceptance will be based on a review of all project documentation, testing results, beta trial results, and completion of all tasks/work packages and product functionality.

**SCHEDULE MANAGEMENT PLAN**

The following will be designated as milestones for all project schedules:

* Gate 1:
  + Marketing Requirements Specification (Project Charter)
  + Work Breakdown Structure
  + Package Effort Estimates
* Gate 2:
  + Technical Requirements Document

1. Detailed product requirements based on Marketing Requirements Specification
2. High level architectural solution (Hardware, Software, Mechanical, …)
3. Traceability back to Marketing Requirements Specification
   * Product Development Plan
4. Development strategy
5. Resource requirements
6. Detailed schedule
7. Development costs
8. Project risks & mitigation plan
9. Gate model deviation requests/approval

* Gate 3:
  + Software/Physical Design Specification
    1. Software/Physical Component Definition
    2. Detailed Design Document
    3. Traceability to Technical Requirements Document
* Gate 4a:
  + Software
    - Code and unit testing
    - Integration testing (white box)
    - Software design verification testing (white & black box testing)
  + Test Station
    1. Engineering Test Station Design
    2. Engineering Test Station Implementation
  + System/Quality Testing
    1. System Test Plan/Procedures (Black box testing – requirements)
    2. System Automation Test development.
* Gate 4b:
  + System/Quality Testing
    1. System Verification Test Execution – Multiple iterations
       - The test executions will be performed by Lee Easton.
    2. System Verification Test Report
  + Alpha Unit Build

1. Alpha testing will be scheduled after the design phase. Testing will be coordinated by the project manager and the testing customers will be interns Kevin Bright, Nathan Lea, and Trevor Hermosillo.

* Gate 5:
  + - Software release

**Key Stakeholders in this project are as follows**:

* Project Manager (Blaine Tiernan)
* Project Team (Nathan Lea, Victoria Som de Cerff, Lee Easton)
* Product Manager (John Green)
* Program Manager (Terry Cox)
* R&D Software Manager & Program Supervisor (Bruce Sievers)
* R&D Software Head (Raymond Crow)
* Field Technicians that take reading from G4 Devices
* Bluetooth dongle distributor

**Specific Roles and responsibilities for schedule development are as follows:**

The project manager will be responsible for facilitating work package definition, sequencing, and estimating duration and resources with the project team. The project manager will also create the project schedule using MS Project and validate the schedule with the project team, stakeholders, and the program supervisor. The project manager will obtain schedule approval from the Program Supervisor and baseline the schedule.

The project team is responsible for participating in work package definition, sequencing, duration, and resource estimating. The project team will also review and validate the proposed schedule and perform assigned activities once the schedule is approved. The project team is also responsible for any assigned deliverables during the development cycle.

The Program Supervisor will participate in reviews of the proposed schedule and approve the final schedule before it is base lined.

The project stakeholders may participate in reviews of the proposed schedule and assist in its validation.

**QUALITY MANAGEMENT PLAN**

All members of the project team will play a role in quality management. It is imperative that the team ensures that work is completed at an adequate level of quality from individual work packages to the final project deliverable. The following are the quality roles and responsibilities for the project:

The Program Supervisor, Program Manager and Product Manager are responsible for approving all quality standards for the project. They will review all project tasks and deliverables to ensure compliance with established and approved quality standards. Additionally, they will sign off on the final acceptance of the project deliverable.

The Project Manager is responsible for quality management throughout the duration of the project.

The Project Manager is responsible for implementing the Quality Management Plan and ensuring all tasks, processes, and documentation are compliant with the plan. The Project Manager will work to establish acceptable quality standards. The Project Manager is also responsible for communicating and tracking all quality standards to the project team.

The remaining members of the project team, as well as the stakeholders will be responsible for assisting the Project Manager in the establishment of acceptable quality standards. They will also work to ensure that all quality standards are met and communicate any concerns regarding quality to the Project Manager.

**Goals**

Goal 1 – Increase defect containment

* Utilizing unit testing to localize defects.

Goal 2 – Increase software reliability

* Expected 0 Critical errors or major bugs found by customers

Goal 3 – Decrease software defect density

* Fewer than 10 defects per 100 executable lines of code.

Goal 4 – Increase Bluetooth successful connection likelihood

* Should successfully connect 9 out of every 10 attempts

**Measure areas**

* Delivered defects and delivered defects per size
* Adherence to the schedule
* Accuracy of estimates
* Number of open customer problems
* Times that problems remain open
* Software reliability

Metric 1 - Effort estimation accuracy (EEA)

EEA = Actual project effort/estimate project effort

Metric 2 – Total Defect Containment Effectiveness (TDCE)

TDCE = Number of prerelease defects/(number of prerelease defects + number of post release defects)

Metric 3 – Failure Rate

FR = Number of failures/execution time

Metric 4 – Number of release defects (TRD)

TRD = Number of released defects/assembly –equivalent total source size

Metric 5 – Number of customer found defects

CRD – Number of customer found defects/assembly – equivalent source size

Metric 6 – Assembly equivalent total source size

SP = Assembly equivalent total source size/software development effort

**CONFIGURATION MANAGEMENT PLAN**

To manage software configuration we shall use a suffix oriented version control. The first release being ‘1.0’ and the following updates taking on sequential suffixes. This will allow for updates to be monitored and to prevent a loss of progress due to unsuccessful code rewrite. Specifically the every update must be monitored and recorded in a table like the one presented in the Change Management Plan, located near the start of each document. The description must be as inclusive as possible mentioning what lines were modified, why they were modified, and what was the outcome. This technique will permit time efficient comparisons of differing software versions to help minimize the need to rewrite lost sections due to incident. The location of the Google Code repository that we are using to record each software update is: <https://code.google.com/p/abb-interns-2013/wiki/mainpage?tm=6> .

**RISK MANAGEMENT PLAN**

The approach for managing risks for the project includes a methodical process by which the project team identifies, scores, and ranks the various risks. Every effort will be made to proactively identify risks ahead of time in order to implement a mitigation strategy from the project’s onset. The most likely and highest impact risks were added to the project schedule to ensure that the assigned risk managers take the necessary steps to implement the mitigation response at the appropriate time during the schedule.

Upon the completion of the project, during the closing process, the project manager will analyze each risk as well as the risk management process. Based on this analysis, the project manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

# Risk Register

The strategy used to assess each risk Quantitatively and Qualitatively simply permits the organization of each risk by size taking into account an integer value from 1 to 5 (5 being the most problematic) to address each risks impact to the schedule, scope, budget and quality. Then those values are added and multiplied by an estimated likelihood (scaled 0-100%) that the risk actually occurs or becomes a problem. The resultant value can be as low as 0 and as high as 20. Risks scoring higher on this chart require more attention and should be handled before addressing the lower scoring risks. After each risk is quantified a mitigation technique must be recorded and implemented to ensure that each risk impacts the resultant product as little as possible. As a project progresses the status of different risks change from ‘Open’ to ‘In Progress’ to ‘Closed,’ the Status column is used to identify which stage each risk is currently on.

Below is an example of how the chart looks.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Risk Description | Schedule Impact | Scope  Impact | Budget  Impact | Quality Impact | Total  Impact | Likelihood Multiplier | Quantitative Risk Value | Status | Mitigation |
|  |  |  |  |  | 0 |  | 0 |  |  |
|  |  |  |  |  | 0 |  | 0 |  |  |

**STAFFING MANAGEMENT PLAN**

Staffing requirements for the project include the following:

Project Manager (1 position) – responsible for all management for the project. The Project Manager is responsible for planning, creating, and/or managing all work activities, variances, tracking, reporting, communication, performance evaluations, staffing, and internal coordination with functional managers.

Software Engineer (3 positions) – responsible for coding and programming for the project. All coding and programming tasks will be reviewed by the Lead Software Engineer prior to implementation. Responsibilities also include assisting with risk identification, determining impacts of change requests, and status reporting. The Software Engineer will be managed by the Project Manager and feedback will be provided to the functional manager for performance evaluations by the Project Manager.

**TEST STRATEGY**

The product will be tested by the software developers themselves informally throughout the design process. Once the product reaches Alpha then official testers Kevin Bright, Nathan Lea, and Trevor Hermosillo will test the software and follow up with suggestions and bugs, they will have 3 days with the alpha version of the software.

To test the code during development the project team has agreed to implement unit testing to isolate bugs to later allow for effective system level testing. Unit testing will allow us to better meet the quality management goals outlined earlier in this document.

**COST BASELINE**

The cost baseline for the project includes all budgeted costs for the successful completion of the project. These costs are exclusively wage oriented since all of the testable components can be obtained without cost or borrowed temporarily for free.

$21.00 per hour, + ZeroChaos’ 18% of the hourly = $24.78 per hour.

4 Intern Engineers working 18 weeks at 10 hours per week.

The overall cost baseline for scoped project completion is $17,814.60.

**QUALITY BASELINE**

The project must meet the quality standards established in the quality baseline. The quality baseline is the baseline which provides the acceptable quality levels of the project. The software must meet or exceed the quality baseline values in order to achieve success.

Android application must link through Bluetooth and stay connected to the G4 device for the entire duration of information transfer.

Android application must be able to stay connected as long as the user is within a 20ft range of the G4 device.

Android application must be able to operate smoothly without crash.

**SPONSOR ACCEPTANCE**

Approved by the Product Manager, Program Manager and Program Supervisor:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bruce Sievers

Program Supervisor

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

John Green

Product Manager

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Terry Cox

Program Manager