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| Capstone Project Report 2 |
| Wireless and its applications |
| DIGISKY GROUP |
| **Supervisor: Dr. Phan Duy Hung** |
| **5/20/2011** |

**Record of Changes**

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| --- | --- | --- | --- | --- |
| Date | Change Item | Description | Author | Version |
| 05/19/2011 | All | Create document | TungTT | 0.1 |
| 05/20/2011 | Task sheet | Add Task Sheet | TungTT | 0.2 |
| 05/21/2011 | Timetable | Add Master Plan | TungTT | 1.0 |
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# Problem Definition

## Name of this Capstone Project

The name of this project is **Wireless and Its Applications** (or **WIA** in abbreviation). The main purpose of this project is all in its name: to develop an electronic board that includes wireless components and to make applications base of that board.

## Problem Abstraction

We, as a group of student, realized that in the future, everything will be wireless. It is the essence of the evolution of technologies. We all want the technologies powerful, comfortable, and portable and even more. The Wireless has them all, and many other great properties. In Vietnam, wireless has been applied in many fields such as telecommunications, wireless networking, wireless controlling… But the potentiality of wireless is still enormous. The applications of it can be used in communicating, controlling and many other things that we can think of. A lot of works that we have to do manually can be done extremely quickly and automatically with the help of wireless controlling. On the other hand, wireless makes wired device less interesting: Who wants to use cord-and-string devices compare to a delicate and portable wireless device? So we decided to do this project in order to create a general solution for those kinds of applications. The project has two main parts: the hardware is a electronic board that includes a microcontroller, wireless components and is made for general purpose, the software is the applications we make for the board: controlling led message board over GSM and GPS locator.

The project has no customer, but we expect once the project is finished, we can sell its applications as solutions or completed products.

When finished, the product must have following properties:

* Be able to compatible with other devices.
* Can be manipulated for any purposes.
* Have a good quality, durability.
* Can be mass produced (Optional).

## Project Review

### The Current System

We make the circuit board independently, so there is no current system. But there are several solutions provided in the market for controlling led message board using WIFI.

### The Proposed System

The proposed system involves two main components:

* Hardware includes microcontroller, GSM/GPS module and Led message board.
* Software includes PC and mobile applications.

The hardware interface can be compatible with any GSM or WIFI (Optional) device. Users can use the device for any purpose. The software part is actually applications that are built upon the hardware to demonstrate its function. The application is controlling LED message board over SMS. Any user can modify the LED board content from distance using the application. Another application of the device is GPS locator: the mobile phone software will show the position of the LED board on map. An option that we consider is controlling the LED board over WIFI, but this option will depends on the project status.

### Boundaries of the system

The boundaries of the system under-developed include:

* A complete circuit board
* Completed LED board controlling solution.

# Project Organization

## Development Process

The design of the system needs both software and hardware is being designed in parallel. The design process can be divided into 7 phases:



## Roles and Responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| No | Full name | Role | Responsibilities |
| 1 | Thái Thanh Tùng | Project Manager, Developer | * Managing * Creating documents * Coding * Testing |
| 2 | Trần Xuân Đạt | Project Technical Leader, Developer | * Managing documents. * Coding * Testing |
| 3 | Bùi Văn Thái | Developer, Business Analyst | * Coding * Requirement Elicitation, Clarifying. * Testing |
| 4 | Nguyễn Bá Thuận | Developer, Quality Assurance | * Coding * Creating Test Plan, Test Case * Testing |
| 5 | Nguyễn Anh Quân | Developer, designer | * Designing * Coding * Testing |
| 6 | Trần Hải Linh | Developer, Designer | * Designing * Coding * Testing |

## Tools and Technique

Microcontroller programming tool: MPLAB IDE, CCS

Emulation tool: Proteus

Printed circuit design tool: Protel

Mobile Phone Application development tool: Eclipse IDE/ Android 2.2

PC Software development tool: Microsoft Visual c++/ Visual c#

# Project Management Plan

## Tasks

### Project Kick-off

#### Description

Officially start the project. Forming the team and appoint members to the team.

#### Deliverables

Project Charter

#### Resources Needed

All team members and Supervisor / 1 day

#### Dependencies and Constraints

N/A

#### Risks

N/A

### Create System Requirements Specification

#### Description

Create System requirements specification (Hardware/Software)

#### Deliverables

System Requirement Specification (SRS) document

#### Resources Needed

All team members/ 1 week

#### Dependencies and Constraints

N/A

#### Risks

Conflicted requirements from all team members

### Circuit Designing and Making

#### Description

Design the circuit and hire a company for making it

#### Deliverables

Printed circuit design & the electronic board

#### Resources Needed

All team member for 1 week

#### Dependencies and Constraints

SRS document

#### Risks

The welded circuit may not operate well as the intended design

### Create Software Design Description

#### Description

Design the software system

#### Deliverables

Software Design Description

#### Resources Needed

6 people/1 week

#### Dependencies and Constraints

SRS document

#### Risks

Designing the software relies so much in the hardware design, so the designed software system may not be able to adapt to the hardware system.

### Coding

#### Description

Implement the software system based on the design document

#### Deliverables

PC/Mobile/embedded applications & source codes

#### Resources Needed

6 people/6 weeks

#### Dependencies and Constraints

SRS, SDD document, Circuit board

#### Risks

* Lacking of requirements.
* Testing applications of embedded system may cause many problems.
* Hardware does not operate well as intended design.

### System Test

#### Description

Perform system test for the system

#### Deliverables

System Test Document

#### Resources Needed

6 people/ 1 week

#### Dependencies and Constraints

Task 1.5 is finished.

#### Risks

* Lack of experience in testing embedded system.
* Developers are also testers so it could cause lacking of test cases.

### Closing Project

#### Description

Officially close the project.

#### Deliverables

Lesson learned document

#### Resources Needed

All team member/ 1 day

#### Dependencies and Constraints

Task 1.6 is finished

#### Risks

None

## Task Sheet: Assignments and Timetable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No | Task Name | Duration | Start | Finish | Predecessors | Resource Names |
| 1 | **WIA Project** | **60 days** | **Mon 5/9/11** | **Fri 8/5/11** |  |  |
| 2 | **Initiating** | **1 day** | **Mon 5/9/11** | **Mon 5/9/11** |  |  |
| 3 | Register Capstone Project | 0 days | Mon 5/9/11 | Mon 5/9/11 |  | TungTT |
| 4 | Kick-off Meeting | 1 day | Mon 5/9/11 | Mon 5/9/11 |  | DIGISKY TEAM |
| 5 | **Planning** | **2 days** | **Tue 5/10/11** | **Wed 5/11/11** |  |  |
| 6 | Develop Project Plan | 2 days | Tue 5/10/11 | Wed 5/11/11 | 4 | TungTT |
| 7 | Plan Approved | 0 days | Wed 5/11/11 | Wed 5/11/11 | 6 | DIGISKY TEAM |
| 8 | **Executing** | **55 days** | **Thu 5/12/11** | **Wed 8/3/11** |  |  |
| 9 | **Definition Stage** | **8 days** | **Thu 5/12/11** | **Mon 5/23/11** |  |  |
| 10 | Brainstorming Requirements | 6 days | Thu 5/12/11 | Thu 5/19/11 | 7 | DIGISKY TEAM |
| 11 | Writing System Requirement Specification (SRS) | 2 days | Fri 5/20/11 | Mon 5/23/11 | 10 | TungTT,DATTX |
| 12 | SRS Completed | 0 days | Mon 5/23/11 | Mon 5/23/11 | 11 |  |
| 13 | **Solution Stage** | **11 days** | **Tue 5/24/11** | **Tue 6/7/11** |  |  |
| 14 | Circuit Design | 3 days | Tue 5/24/11 | Thu 5/26/11 | 11 | DIGISKY TEAM |
| 15 | Create Software Design Description | 8 days | Fri 5/27/11 | Tue 6/7/11 | 14 | DIGISKY TEAM |
| 16 | Design completed | 0 days | Tue 6/7/11 | Tue 6/7/11 | 14,15 |  |
| 17 | **Implementation** | **28 days** | **Wed 6/8/11** | **Fri 7/22/11** |  |  |
| 18 | Order circuit board | 7 days | Wed 6/8/11 | Thu 6/16/11 | 16 | ThaiBV |
| 19 | Coding | 28 days | Wed 6/8/11 | Fri 7/22/11 | 16 | DIGISKY TEAM |
| 20 | Implementation Completed | 0 days | Fri 7/22/11 | Fri 7/22/11 | 18,19 |  |
| 21 | **Testing** | **8 days** | **Mon 7/25/11** | **Wed 8/3/11** |  |  |
| 22 | Writnig System Test Case | 2 days | Mon 7/25/11 | Tue 7/26/11 | 20 | ThUANNB |
| 23 | Executing Test | 5 days | Wed 7/27/11 | Tue 8/2/11 | 22 | DIGISKY TEAM |
| 24 | Create System Test Document | 1 day | Wed 8/3/11 | Wed 8/3/11 | 23 | ThUANNB,LinhTH |
| 25 | System Test Completed | 0 days | Wed 8/3/11 | Wed 8/3/11 | 24 |  |
| 26 | **Closing** | **2 days** | **Thu 8/4/11** | **Fri 8/5/11** |  |  |
| 27 | Conducting Project Postmortem | 1 day | Thu 8/4/11 | Thu 8/4/11 | 25 | DIGISKY TEAM |
| 28 | Closing Project | 1 day | Fri 8/5/11 | Fri 8/5/11 | 27 |  |

## Meeting minutes

### Meeting minute 05/09/2011

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Meeting | | | |
| 5.9.2011 | 10:30-12:00 | | FPT University |
| Meeting called by | | Dr. HungPD | |
| Type of meeting | | Offline | |
| Supervisor | | Dr. HungPD | |
| Note taker | | DatTX | |
| Timekeeper | | TungTT | |
| Attendees | | TungTT, DatTX, QuanNA, ThaiBV, ThuanNB, LinhTH | |

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| Key points Discussed | | |
| No | Topic | Highlights |
| 1 | Point out potential capstone project idea | There are three possible project idea:   * Wireless and Its applications * ATM Security solutions * Controlling solution using voice |
| 2 | Discuss pros and cons and select capstone project subject | The group selected Wireless and Its applications (WIA) as capstone project subject |
| 3 | Discuss developing plan, develop a draft requirement of the system | The group decided to make a circuit board and port applications into it. |
| 4 | Selecting group name | The group chose the name DIGISKY |
| 5 | Selecting project Name | The group chose the name WIA |
| 6 | Assigning responsibilities to all group members | Project manager : Thai Thanh Tung  Project Technical Leader: Tran Xuan Dat  Developer: All Team Members  Business Analyst: Bui Van Thai  Quality assurance: Nguyen Ba Thuan  Test Leader: Tran Hai Linh |
| 7 | Define communicating channel, working environment | Chat and meeting online: Skype  Weekly offline meeting  Gmail |
| 8 | Define rules | Every member MUST inform the group that he can or cannot attend a meeting  Has a duty/responsibility for finishing assigned task.  If any member has problems, he has to share with the rest of the team. |

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| Action Items | Person Responsible | Deadline |
| Decide next meeting Date | All team members | 05/17/2011 |
| Create introduction document | TungTT, DatTX | 05/15/2011 |

### Meeting minute 05/17/2011

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| --- | --- | --- | --- |
| Report 1 Review Meeting | | | |
| 5.17.2011 | 21:00-23:00 | |  |
| Meeting called by | | TungTT | |
| Type of meeting | | Online-Skype | |
| Facilitator | |  | |
| Note taker | | DatTX | |
| Timekeeper | | TungTT | |
| Attendees | | TungTT, DatTX, QuanNA, ThaiBV, ThuanNB, LinhTH | |

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| Key points Discussed | | |
| No | Topic | Highlights |
| 1 | Present the abstraction of WIA project | The main purpose of the system is to provide a general solution that can be applied dynamically to communicating over wireless  Create an application of using wireless for controlling led message board over GSM |
| 2 | Discuss about current system, similar products | Advantages, disadvantages of those products (See section I.3.1 for more details) |
| 3 | Brain storming about WIA requirements | Led message board controlling over WIFI/GSM  GPS Locator |
| 4 | Decide tasks, resources and deadline | See section II.1 and II.2 for more details |

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| --- | --- | --- |
| Action Items | Person Responsible | Deadline |
| Decide next meeting Date | All team members | 05/18/2011 |
| Create Project Management Plan | TungTT | 05/20/2011 |

### Meeting minute 05/18/2011

|  |  |  |  |
| --- | --- | --- | --- |
| Kick-off Meeting | | | |
| 5.18.2011 | 10:30-12:00 | | FPT University |
| Meeting called by | | HungPD | |
| Type of meeting | | Offline | |
| Supervisor | | Dr. HungPD | |
| Note taker | | DatTX | |
| Timekeeper | | TungTT | |
| Attendees | | TungTT, DatTX, QuanNA, ThaiBV, ThuanNB, LinhTH | |

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| --- | --- | --- |
| Key points Discussed | | |
| No | Topic | Highlights |
| 1 | Present team members | Introduce all other team members to supervisor |
| 2 | Present WIA, its purpose, scope, project plan, problems | The project involves a lot of risks.  The scope can be extended depends on the project status. |
| 3 | Dr. HungPD Shared experience of doing embedded system projects and his opinions about the capstone project subject | WIA is a feasible project with interesting technical problems.  Advance option for enhancing the project: controlling over WIFI besides GSM. |

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| Action Items | Person Responsible | Deadline |
| Create Project Management Document | TungTT | 05/21/2011 |
| Study about assigned tasks | All team members | 06/08/2011 |