Meteor Care Co. ltd.

"Making life easier with simple unique solutions"

Prepared for: 440 Project Evaluators Panel

October 2008

October 14, 2008

Dr. Andrew Rawicz
School of Engineering Science
Simon Fraser University
Burnaby, British Columbia
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Re: ENSC 370 Functional Specifications for Digital Care System

Dear Dr. Rawicz:

Attached document is the *functional specification for a digital care system* that provides an encapsulation of project requirements and final product. Meteor Care is currently working to implement a device to give physically disabled people to stay more in comfort and independency by helping them with on- demand tasks.

Meteor Care company consist of four committed, innovative and goal oriented engineering students: Aidin Mirsaeidi, Ashkan Z. Deylami, Siavash Rezaei, and Niusha Nikkholgh who are committed to implement a novel product that will take an important steps in the health care industry.

If you have any concerns, comments or if you require more details about our product, please feel free to contact me at **(604) 312-4346** or by email at **amirsaei@sfu.ca**.

Sincerely,

Aidin Mirsaeidi

Aidin Mirsaeidi

President and CEO

MeteorCare Innovations

Enclosure: *Functional specification for a digital care*

Patient Comfort System

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Submitted to:
Dr. Andrew Rawicz
Mike Sjoerdsma
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Executive summary

For the past month Meteor Care group has been exploring different possible configuration of a device which would be used as an entertainment unit in patient care system. The market analysis and some general ideas of the product were presented in the document labeled as "Proposal". Here in this document, we present the functional specification of the product. This document should be reasonably accurate to be used as a guide by the research and development team to help them progress in improving the project.

The device shall be used in the patient room with pre-planned architectural setting, and furniture positioning. The main system shall be small enough to be placed under a bed, or over a desk. A mini PC would be sufficiently small for such requirements. The touch screen component of the system should be chosen according to the detailed requirements specified in this document.

Consequently, for a short term development and rapid prototyping we will impose certain guidelines which would assist us in developing the product and decision of which components to choose from.

In the next stage, the device should be configurable and presentable enough for actual use by a sample person from pre designated niche market segment. The device should be acceptable from the perspective of both cosmetics and functionality.

Obviously from the shareholder points of view, there should be a Plan B for the product. This will ensure that the money invested would generate a return in case of the first plan's failure. Consequently, we chose these requirements so with little adjustments the product could be used as a home entertainment system. As the patient room imposes more restrictions than an entertainment room, and whereas we impose patient room requirements, we believe our way of tackling the problem should provide a piece of mind for our valuable investors.

The first phase of the development of the product which would include a rapid prototyped device is planned to be completed by December of 2008.

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Glossary

UI……………………………………………………………………………………User Interface

FCC…………………………………………………………………………..…..The Federal Communications Commission

UL……………………………………………………………………………..…..Underwriter Laboratory

PSU………………………………………………………………………………Power Supply Unit

LCD…………………………………………………………………………Liquid Crystal Display

IEEE………………………………………………………………………………Institute of Electrical and
Electronic Engineering

1. Introduction

One characteristic of aging is deterioration of physical abilities. The purpose of MeteorCare product is to improve the quality of life by introducing a device that gives older adults and physically challenged people more control over their actions. The system basically consists of the MeteorCare user interface application that runs on the computer; MeteorCare Hardware is connected to the PC via serial port and interfaces with MeteorCare application. The product helps bedridden patients with various activities such as controlling the lights, curtains, TV as well as adjusting the bed, etc. More details of MeteorCare product and its functionality have been provided in this document.

a. Scope

The scope of this document is to provide details on functional requirement of MeteorCare Product. This document fully describes the interaction between UI and the hardware. The listed requirements will outline future design of MeteorCare product.

b. Intended Audience

The intended audience of this documentation is MeteorCare team members. This document shall be used as blueprint for the progress and management tool of the MeteorCare product. Members of MeteorCare Company shall refer to this document to point out their work steps and to keep track of their goal.

This document will be used as a progress report and project manager shall refer to this document to ensure all the steps are properly operating.

c. Classification

The following convocations shall be used to assign priority to each of the functional specifications:

[Xn_p] A functional specification

Where X is from the followings:
GR………………………………………………………………..General Requirement

PR…………………………………………………………………….Physical Requirement
En……………………………………………………………….. Environmental Requirement
OR……………………………………………………………….Operating Requirement
ER……………………………………………………………….. Electrical Requirement
SR……………………………………………………………….. Safety Requirement and Standards
DR……………………………………………………………….. Reliability and Durability
UR……………………………………………………………….. Usability Requirement
LF………………………………………………………………. Luxury Functions
UI………………………………………………………………. User Interface Unit
UD………………………………………………………………… User Documentation

n is a functional specification number and p indicates the priority of each functional requirements. Below indicates special values of p:

      I.   Denote requirements for proof_of_concept model.
     II.   Denote requirements for final production model.

2. System Requirement

This section outlines the various requirements applicable to MeteorCare product. This information shall be used to inform audience about the basic configuration of the company's product.

a. System Overview

MeteorCare is taking steps to design a product that improves the quality of life. This product allows patients and older adults to have control over certain actions and to decrease dependency on other people, which can cause serious emotional problem.

The system basically consists of the MeteorCare UI application that runs in the computer, and the hardware that is connected to the PC via serial port and interfaces with MeteorCare application.

Figure1 demonstrate possible configuration of Meteor Care device. Mounted on the wall there is a TV screen; in the menu list different options will be provided to the user. User can choose whether he/she wants to watch a TV, play a video, play puzzles, look at the doctor notes, call a nurse, or to control few physical components such as light, curtains or bed adjustor.
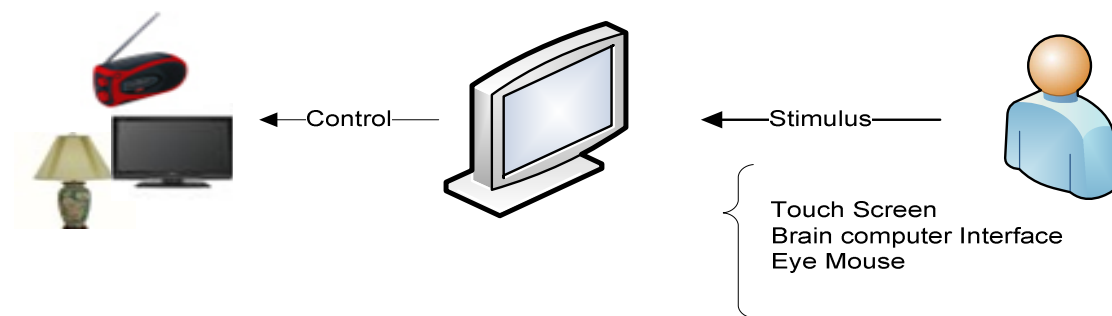

Figure 1 The general System overview[1]

After spending considerable amount of time exploring different families of microcontrollers, HSC08GT60 has been selected. HSC08GT60 is part of 8-bit processors by Freescale and it has shown to meet all the hardware design requirements. A communication protocol has been implemented to make UI abstractly interface with the controller. PWM signal is employed to control some outside components such as dimmers and actuators. Touch screen TV, High quality Speakers, lighting controller, bed controller, and curtain controller are the other hardware parts of the project that will be connected to the output of the Controller which is interfacing with MeteorCare external hardware.

b. General Requirement

[GR1_I] The system will intend to both increase patient's independency.

[GR2_I] The system will intend to enhance the patient's knowledge.

[GR3_II] The UI shall be turned on instantly after a normal booting time

[GR4_II] A Serial port to connect MeteorCare hardware to the PC and interfaces with MeteorCare application.

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[1] Created by Ashkan Z. Deylami using art works available in Visio 2007

[GR5_II] Product dimensions will be reasonably small for in hospital use

[GR6_I] UI must be easy enough for the older adults and physically challenged users

[GR7_I] The Meteor Care will be an easy to use program with a simple UI.

c. Physical Requirement

Considering the patients comfort level, Physical requirements are to ensure that product will be available.

[PR1_II] Dimensions of the main unit will not exceed: 18 " x 15" x 3" (458 mm x 382 mm x 77 mm)

[PR2_II] The weight of the Touch screen monitor will not exceed 25lbs (11.3kg)

[PR3_II] Monitor viewable screen size will not exceed 19 inches (48.26cm).

[PR4_II] A speaker driver will be mounted on the front of the unit.

[PR5_II] Bed mounting Pedestal will be used to support touch screen monitor

[PR6_II] The mounting device will be used to Support LCD Flat Panel Display of at most 22" (55.88)

[PR7_II] The mounting device Components will be an articulating arm, desk clamp mount and pole

[PR8_II] Weight of the mounting device will not exceed 20lbs (9.07 kg)

[PR9_II] The arm length will not exceed 19.6” (500 mm)

[PR10_II] The height of the mounting unit to center of display will not be more than 19.6”

(500 mm)

[PR11_II] Maximum arm rotation will be more than 60 degrees

[PR12_II] Maximum load weight of the mounting device will be less than 13lbs (5.89kg)

[PR13_II] A monitor size of 12 to 19 inch will be applicable to this mounting device

Figure2 is a sample of LCD desk mount:

Figure 2 The LCD Desk Mount overview[2]

d. Environmental Requirement

[En1_I] The system shall be used in hospital rooms and homes.

[En2_II] The system shall work in temperature less than 40°C (104°F)

[En3_II] The system will not operate in humidity more than 80%

[En4_II] The system will be able to tolerate vibration less than 0.2G while operating and 1G while not operating.

[En5_II] The system power consumption will be less than 60 W

e. Operating Requirement

[OR1_II] The system shall be interface with the infrared remote sender.

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[2] (Online image. Dell Canada Inc.http://accessories.dell.com/sna/products/Displays/productdetail.aspx?c=ca&l=en&s=dhs&cs=cadhs1&sku=A1621873#Overview)

[OR2_II] The Remote Extender can be used to control television.

[OR3_II] The system will have a touch screen monitor.

[OR4_I] The production will have an easy maintenance.

[OR5_I] People with no computing background will be able to use the touch screen computer.

f. Electrical Requirement

[ER1_I] PSU will be used to drawn a power for the system.

[ER2_II] PSU will support 110/120 V power to the system.

[ER3_I] Power consumption shall be kept at minimum when the production is not operating

[ER4_II] The power cord will be long enough to maintain flexibility.

g. Safety Requirements and Standards

[SR1_II] The main unit shall comply with normal standards of PC manufacturing standards

[SR2_II] The unit shall be designed to meet FCC certification

[SR3_II] The unit shall be designed to meet UL certification

[SR4_II] The unit shall be designed to meet VCCI certification

[SR5_I] The product electronic components shall not cause interface with other components

[SR6_I] The product failure shall not cause any danger to the users

[SR7_II] The product mounting unit shall be safe enough

[SR8_II] The product shall not be water resistance.

h. Reliability and Durability

[DR1_I] The unit will be designed for most demanding hospitality and have a high functionality and reliability.

[DR2_I] The unit shall be able to work for 3 years.

[DR3_I] The unit software is upgradeable.

[DR4_II] The system will have a power conservation mode when not operating.

i. Usability Requirement

[UR1_I] Older adults and physically challenged people will be able to use the system.

[UR2_I] The unit will perform on the room temperature.

j. Luxury Functions

[LF1_I] Touch screen computer will be available for the users.

[LF2_II] Glossy buttons will be available on the screen of the computer

[LF3_II] For the touch screen buttons there will be a picture to explain the related button.

3. User Interface Unit

[UI1_I] The system will have an easy to use UI for the potential users.

[UI2_I] Older adults and physically challenged people need no training to work with the UI.

[UI3_II] The unit will have a button to change the font size.

[UI4_II] The unit will have a button to control light.

[UI5_II] The unit will have a button to control curtains

[UI6_II] The unit will have a button to turn on and off the TV.

[UI7_II] A button will be available for the movie option.

[UI8_II] A button will be available for the pictures option.

[UI9_II] A button will be available for the doctor notes.

[UI10_II]   A button will be available for the Nurse call.

[UI11_II]   A button will be available for adjusting the bed.

[UI12_II]   The device will include a button to turn on and off the speakers.

[UI13_II]   The device will include a button to raise and lower the volume.

4. User Documentation

[UD1_II] A user manual will be available in documentation of the produced device in English, French and Farsi.

[UD2_II] Detailed instruction process and operating instruction will be explained in the manual

[UD3_II] The Manual will be supplied by troubleshooting and device configuration sections.

[UD4_II] Users should be able to work with the MeteorCare product with minimal effort of learning.

[UD5_II] Contact information will be provided in the manual for additional support of the Operation MeteorCare product.

5. System Test Plan

Several Test Plans have been in order to certify that the product operates successfully such as functionality and UI tests. UI tests are to ensure that the system is feasible and easy to use by the users of the product.

6. Conclusion

This document outlines all the functional specifications in detail for design and creation of the MeteorCare product. Listed requirements will ensure the safety, usability and functionality of the device. The specifications in this document are tentative and subject to change without prior notice. This document will be served as a blueprint for the Meteor care members toward completion of the project and to give audience essential insight of the product.

Meteor Care device will be designed to make a significant difference in life of the older adults and patients of the hospitals. The main purpose of Meteor Care device is to bring more comfort and independency to the life of older adults and hospital patients. By December 2008 the proof_of_concept model in which all requirements has been indicated as [Xn_I] will be implemented.

Following the completion of the first milestone, the production model in which all specification has been indicated as [Xn_II] will be implemented

7. References

[1] Regulatory Agencies and Compliance Requirements,
http://www.elotouch.com/Products/agencies.asp

 [2] LCD Desk mount,
http://accessories.dell.com/sna/products/Displays/productdetail.aspx?c=ca&l=en&s=dhs&cs=cadhs
1&sku=A1621873#Overview

[3] Black Resistive Touch Screen LCD Monitor,
http://www.tigerdirect.ca/applications/SearchTools/itemdetails.asp?EdpNo=3601847&CatId=1449

[4] Dual LCD Lift Stand,
http://accessories.dell.com/sna/products/Displays/productdetail.aspx?c=ca&l=en&s=dhs&cs=cadhs
1&sku=A1742415