Proposal Revision History

Revision #	Date of Revision	Changes Made
1.0		

Note: The below given prices is an estimation and may vary according to the circumstances.

• Introduction

Medical alert systems, also known as personal emergency response systems, offer a fast and easy way for the elderly, people with health issues, and those who live alone, to get help during an emergency, whether it be a medical issue, a fall, a fire, or any event that requires an immediate response. In a nutshell, these systems contain a help button that dials up an emergency response center and connects you to a live agent

The most basic systems use a landline and consist of a base unit and a portable help button you can wear around the house, but there are cellular options and GPS-based mobile solutions for people on the go, as well as options that automatically send an alarm when a fall is detected. Some services will even call you to remind you to take your medications.

Medical alert systems are incredibly easy to install. The portable help button can be worn as a pendant necklace or on your wrist like a watch. It is designed for use inside and around the home, although there are mobile buttons with embedded GPS technology available that you can travel with. If you are in the house or in your backyard and need assistance, just press the pendant/wristband button to initiate a call to the response center.

A fall-detection pendant does everything that a regular help button pendant does, but has built-in sensors that can detect if you've taken a spill, at which point it will initiate a call to the response center.

This product is mainly intended for homes, industries, all types of companies. The specified product will be programmed in Visual Studio Code to perform its operations. Medical Alert system is a need of an hour and has a very broad scope. For more information refer to the provided references.

• Proposal and Response to RFQ

• Specification Development

2.1.1 Hardware Specifications

The proposed hardware will be built around following specifications.

- 32-bit Controller Chip
- GSM
- GPS Board
- Accelerometer
- Door lock system

The main design considerations in this step are to fit in the identified components and create interactions among them as per desired functionality. The main concern in specification development for the hardware would be to conserve space and power.

2.1.2 Firmware / Software Requirement Specifications

Visual studio is required for the development of firmware of the system.

2.2 Component Development

2.2.1 Hardware Component Development

In the first step we will use atmega328p chip as microcontroller and GSM for the cellular network. GSM will be used to communicate with the station or the concern person. There will be a manual button to active communication through GSM.

In the second step we will add GPS to give the current location of patient to concern department/station or person. To improve the processing speed as well as the performance atmega328p microcontroller chip will be replaced with 32-bit microcontroller chip.

In the third step we will add Gyroscope to the system for fall detection and automatic unlocking of door lock. And then will add microphone and speaker to communicate with concern department or person.

In the 4th and last iteration, to ensure aesthetic sense and premium look we will 3d design its final prototype and then we will 3d print the final prototype using high precision 3d printer. Here is a block diagram showing flow of the procedure.

2.2.2 Software Component Development

The controllers mentioned in the first iteration will be programmed in Arduino IDE. This software will be user for the development of the prototype of first iteration.
In 2nd and 3rd iterations 32-bit controller will be programmed in Visual studio code. Fusion 360 and blender will be used for the 3d designing of the device.

2.3 Hardware

An expected cost of the hardware in the prototype is as follows:

Sr. No.	Part Name	Qty.	Cost (USD)
1	GSM Kit	1	18.6
2	GPS Board	1	15.0
3	Gyroscope angle sensor	1	6.0
4	Microcontroller	2	12x2
5	Power Supply	2	9.6x2
6	Battery	1	20
7	Speaker	1	8.6
8	Power Jack	1	1.5
9	Microphone	1	4.26
10	Door Lock System	1	45
11	3D Printed Prototype Model	8	0.4/gram

2.3.1 Production Phase:

Note:

- All the production phase prices given below are estimation and may vary according to circumstances (Exact prices can be quoted after finalization of prototype).
- This cost is one time cost. If changings will be required on demand of client, then cost will be different (increased).

Sr. No.	Part Name	Qty.	Cost(USD)
1	Mould-1 (Main Body Front)	1	5000
2	Mould-2 (Main Body Back)	1	5000
3	Mould-4 (Charging Kit)	1	1000
4	PCB Fabrication	1000	3000
5	PCB assembly	1000	8000
6	PCB Quality Checking	1000	5000
7	Packing	10000	4000

2.4 Software

The roadmap to deliver the software is mentioned below in each module of software development using agile/scrum methodologies.

2.4.1 RTOS Build System Development

After the development of hardware and software, next step is the integration of hardware with the software which will be done using the GSM, GPS and microcontroller firmware. Microcontroller communication with the GSM and GPS to complete the Real Time Operating System Development.

2.4.2 Software Components Integration

Gyroscope will be integrated with the device which will communicate with microcontroller.
Microcontroller will send the electronic message to door lock system to unlock the door automatically on fall detection.

2.5 Compliance / Testing

2.5.1 Unit Testing

Manufacturer will conduct for both HW and SW. Formal test report for unit testing will be generated and shared with CLIENT and test results generated out of unit testing will be internally consumed by manufacturer team for its own development.

2.5.2 Integration Testing

Testing of medical alert device will be done by running a test by pressing the help button on the base unit to make sure everything is working.

2.5.3 Functional/System Testing

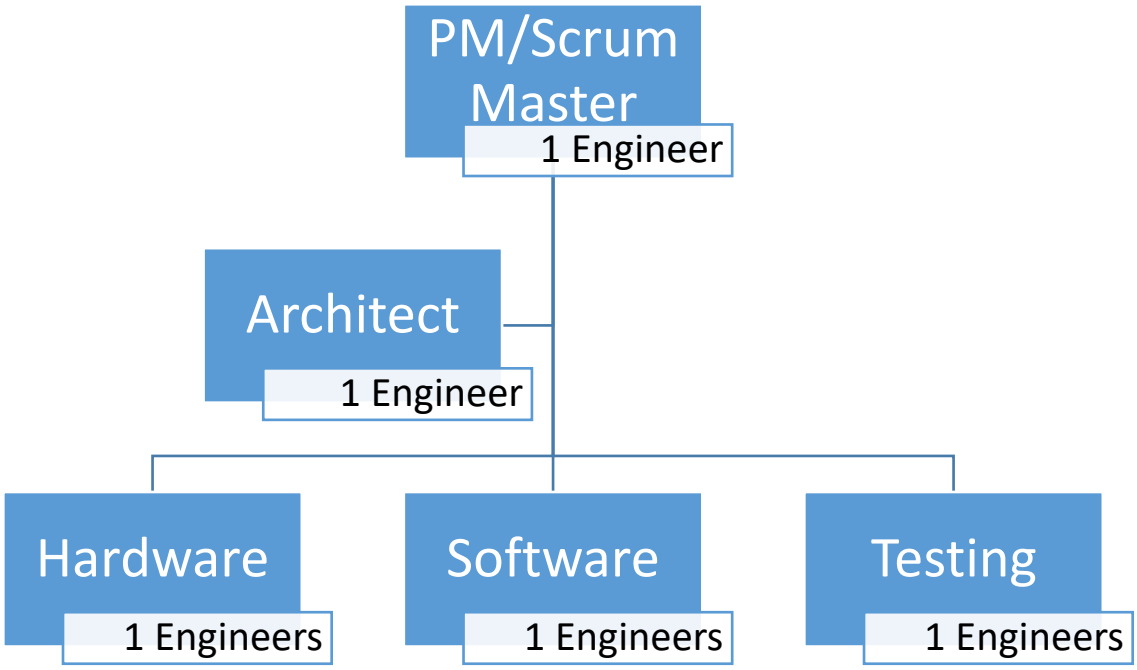
Manufacturer will jointly conduct with CLIENT; scope for each to be discussed during test planning.

2.5.4 Device and Data Visualization using

Prerequisites/Assumptions

2.6 Personnel

A tentative organization chart and RACI matrix is given below: -



2.7 Pricing, Schedule and Milestones

The schedule and timelines for the Medical Alert Device Development are as follows:

Time Span	Milestones	Details
M0	Kickoff	Proposal Acceptance & Project Kick-off Architecture & Project Setup
M1	M0 + 1 month	Preliminary Design Release HW: Architecture & PCB structure reviewed and finalized. SW: Build System Development, Integration of frameworks.
M2	M0 + 2 month	Prototype Design Release & Development with EVM HW: Architecture & PCB structure reviewed and finalized; Critical modules selected and finalized. HW: Release of EVM based setup to enable SW development. SW: Build System Development, Integration of frameworks.
M3	M0 + 3 months	Final Prototype and Development Testing HW: Release of Revised design after review and approval from CLIENT (ready for Production phase)

		SW: Integration & Final Testing
M4	M0 + 4 months	HW: Product Design from prototype HW: Finalization of mould and dye SW: Improvements in final commercial version
M5	M0 + 5 months	Regression Testing and Porotype Transfer HW: Mechanical integration and alignment for final updates SW: Regression Testing & Bug fixes. SW: Final release after bug fixes of system testing and regression testing.
M6	M0+6 months	Establishment of assembly line for large scale production.

2.7.1 Assumptions and Dependencies

Assumptions

Assumptions	Validity	Status	Comments
Components delivered on time		Not Confirmed	
Delivered Components are not faulty	50-70% Chances	Not Confirmed	

Dependencies

- Depending upon the exchange rate the prices may vary.
- Molds price and time span depends upon vendor.

2.7.2 Financials

Project Type

The project would be executed in **Fixed Price (FPP)** mode.

Financials

Fixed price value of **USD $ (based on March 13th, exchange rate)**

Wages

Title	Per Month (USD)	Total (USD)
Scrum Master	509	1,527
Architect	445	1,335
Hardware Engineer	445	1,335
Software Engineer	445	1,335
QA Engineer	381	1,143

Acceptance Criteria

Testing will be done as per the acceptance test plan prepared by Manufacturer and mutually agreed with CLIENT. Acceptance testing will be done in the test-environment provided at CLIENT by CLIENT engineering team with the support of Manufacturer engineering team.

Term of Proposal

The initial term of this proposal will be valid for 30 days and may be extended by written approval of VENDOR and CLIENT.