

Initial Project and Group Identification Document

1. **Project Title:** Wander Watch

Group Members:

Name: Jeffrey Rodriguez	Major: Electrical Engineering
Name: Alexis Timms	Major: Electrical Engineering
Name: Sarah Rassel	Major: Electrical Engineering
Name: Wendelyn Sanabria	Major: Computer Engineering

Customers: Alzheimer's patients, people with family members who have dementia, possibly nursing homes, special needs children

Sponsors: Hopefully Texas Instruments, looking into a few other sponsors

Significant Contributors: Possibly Professors Weeks, Chan, Rawlins, Leiwei, Leinecker

2. **Project Description:**

Designing a small and functional watch to notify a caretaker via mobile app if the wearer leaves a designated area, as well as track the wearer's location. One of our main objectives for this watch is to minimize the amount of power consumed by the components of the watch. We also want to make it lightweight, affordable, and easy to use.

Previous devices either tracked dementia patients with ankle bracelets or a small device that could be lost or left behind. These products often limited the trackers to communicate with a device that was sold with it, causing the price to increase. Our watch can be comfortably worn and will be able to tell time and the date, making it functional for the user. The creation of the application will allow the caretaker to track the user without having to buy a separate device to communicate with the watch. This is not only more convenient, but also more affordable.

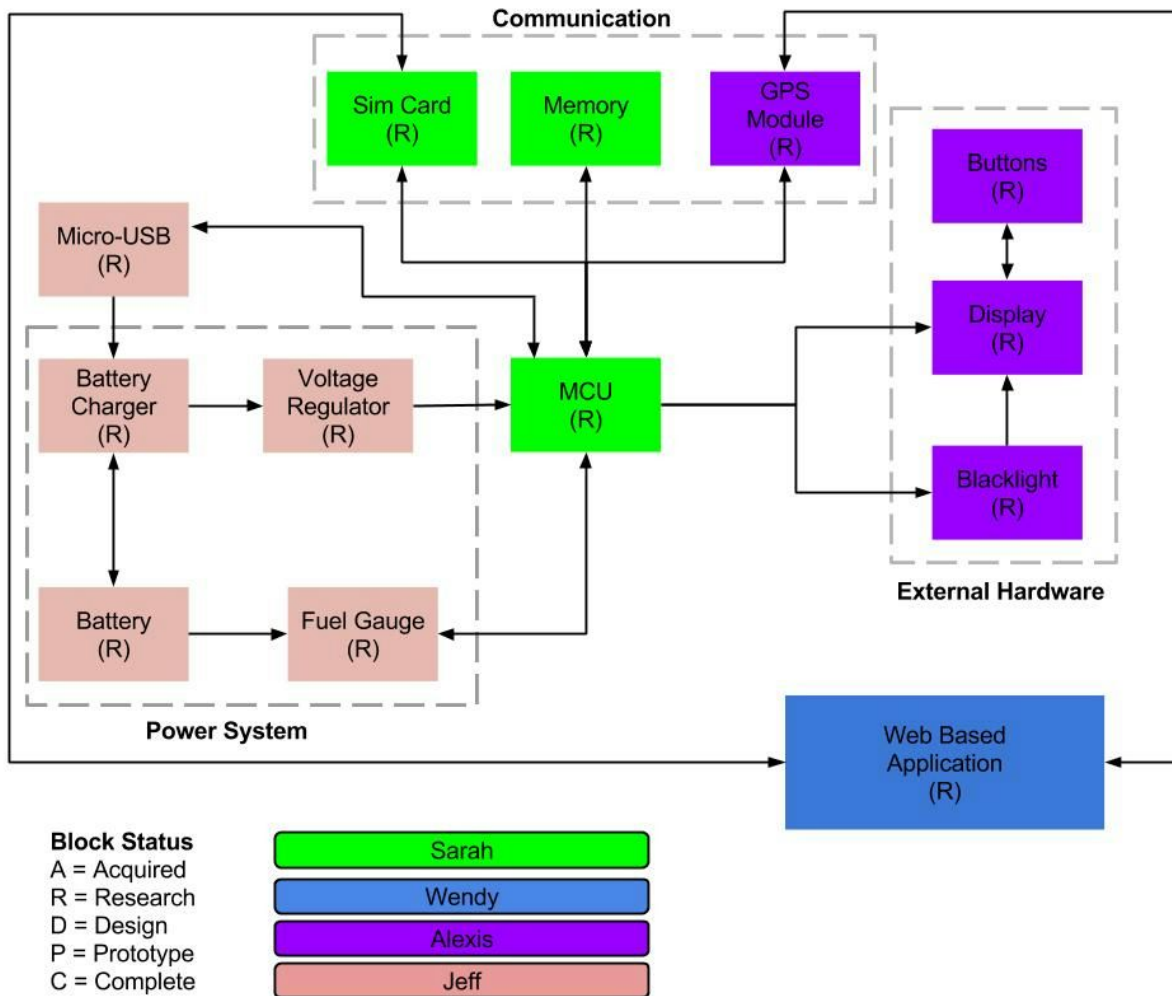
3. **List of Requirements and Constraints:**

The following are some of the quantitative requirements we will be taking into account for this project. This list is subject to change as we continue working on this project throughout Senior Design.

- Screen Size: 128x128 pixels
- Weight: less than 5 ounces
- Cost: \$75 or less
- Battery life: 2 years
- GPS accuracy within 3 meters (approximately 10 feet)
- Notification to the phone application within 1 minute
- Watch detects that it has left the designated area at least 5 seconds after leaving

4. Project Block Diagrams:

Below is the main block diagram we will try to follow. It shows the major parts of the projects, and which member is responsible for each part. This is subject to change as we continue to do research and testing. The arrow lines between each block are meant to show which parts will be connected or communicating to each other. For example, the web application will communicate back and forth with the GPS module and SIM card in the watch about its current location. Most of the input/output arrows between the parts are self-explanatory, such as the parts of the power system communicating with the MCU about power usage and regulation.



5. Estimated Project Budget:

An important goal of our project is to keep the watch affordable for many people. We are hoping to stay under \$1000. This will include the possibility of spending money due to trial and error. Probably most of this budget will be spent on the physical parts of the watch, such as the case and circuit board. At the moment, part of our research is also finding out the prices of the parts we need for the watch. We are currently compiling a spreadsheet of the prices and parts we have found so far. These prices and parts are subject to change as we continue the project.

Part Type	Name	Part No.	Manufacturer	Quantity	Unit Price	Link
LCD Display	LCD DISPLAY 128X128 CSTN TRANSMS	153-1146-ND	Varitronix	1	7.05	Link
MCU	ATMEGA 328P	ATMEGA328 P-AU	Atmel	1	3.58	Link
Battery	3.7V 150mAh Li-Po Battery	H7-05 TRC-375169	Tiny Deal	1	2.73	Link
Battery Charger	500-mA, 4.2-V Li-Ion Charger for Current-Limited App. w/Temp Sense in MSOP-8	BQ24200	TI	1	3.45	Link
Micro USB	50pcs Micro USB Type B Female 5 Pin SMT /SMD Socket Connector DIY	N/A	Ebay	1	11.7	Link
Regulator (LDO)	Single Output LDO, 150mA, Fixed (3.0V), High PSRR, Low Quiescent Current, Low Noise	TPS717	TI	2	1.13	Link

6. Initial Project Milestones:

For the first semester, our major milestone will be to finish all of the design-related aspects of the projects. We will have finished researching what we need to make the project feasible, determine what aspects are necessary and what can be saved for later improvements, and possibly started work on the prototype.

The second semester will be focused on the prototype and finishing up the documentation and presentation of the project. The development of the prototype will likely be split between the first and second semester, while the additional features and finishing up loose ends will be strictly in the second semester.

The first major milestone that we need to reach is finishing up our research. We have so far made good progress on gathering information for what we might need, and learning more about the possible aspects of this project.

The next milestone would be to narrow down what we have researched and determine exactly what we need for the project. This would mean specific types of parts, a concrete user interface for the app, and any programs or parts needed for the connectivity between the app and watch. At this point we would be able to have a much clearer idea of what needs to be done. Not to mention, we will have a better idea of how much of a budget we need to complete the project.

After this, we can work on the first prototype of the project. This will most likely be the milestone that will take the most amount of time to finish. Alongside this milestone we need to create and organize any documentation needed for the prototype and the project overall. This will probably end up being a big part of the thirty page paper each of us needs to write by the end of the semester.

Once the prototype is in working order, we can work on additional features for the watch, if we have time. One possible extension would be to increase the range of the watch, or at least make it adjustable. Another would be to allow multiple watches to work in the same area or be connected to the same account. Thus, someone could receive alerts from more than one watch.

The last major milestone after completing the prototype is to finish up any other necessary tasks related to the project for the Senior Design course. This would include preparing the final presentation and adding polish to the prototype.

7. Decision Matrix:

Below is the decision matrix for our project. We are mainly using this to show what parts or features may be more important to the project. In essence, size is the most important consideration for each part, while user functionality is the least important. This is meant to show how some parts will be more difficult to implement or manage.

	Cost	Weight	Size	User Functionality	Power Consumption	Totals
Weighting	3	4	5	1	2	
Components						
Casing	1	3	0	2	0	17
Display	3	3	3	3	3	45
Backlight	1	0	0	2	2	9
Battery	3	3	3	3	0	39
Buttons	1	3	3	3	0	33
SIM Card	3	3	3	0	3	42
MCU	3	3	3	0	3	42
Charger	1	0	0	3	0	6
Micro-USB	3	3	3	2	0	38
Voltage Regulator	2	2	2	0	1	26
Memory	2	0	0	0	1	8
Features						
Time & Date	0	0	0	3	0	3
GPS Module	3	3	3	3	3	45
Application	0	0	0	3	0	3
Low Battery Notification	0	0	0	3	0	3
Text Message Alerts	0	0	0	3	0	3
HUB	3	3	3	3	3	45
Bluetooth	3	3	3	3	3	45
Individual Identification	0	0	0	2	0	2
Medication Reminders	0	0	0	2	0	2
Call for Assistance	0	0	0	2	0	2
Geo-fencing	0	0	0	3	0	3

While the HUB and Bluetooth features are weighted heavily in the decision matrix, we will most likely not include them in our final product. The primary purpose of the HUB is to communicate

to the watch through Bluetooth. After researching, it was decided that the various ranges of Bluetooth did not meet the requirements needed to track the wearer of the watch once outside the home. In the end, it will be cheaper to use only GPS. Not only will we not need to construct and extra hardware component, but we will not need an extra communication device since GPS can track both inside and outside the home.