Indoor Positioning & Tracking System

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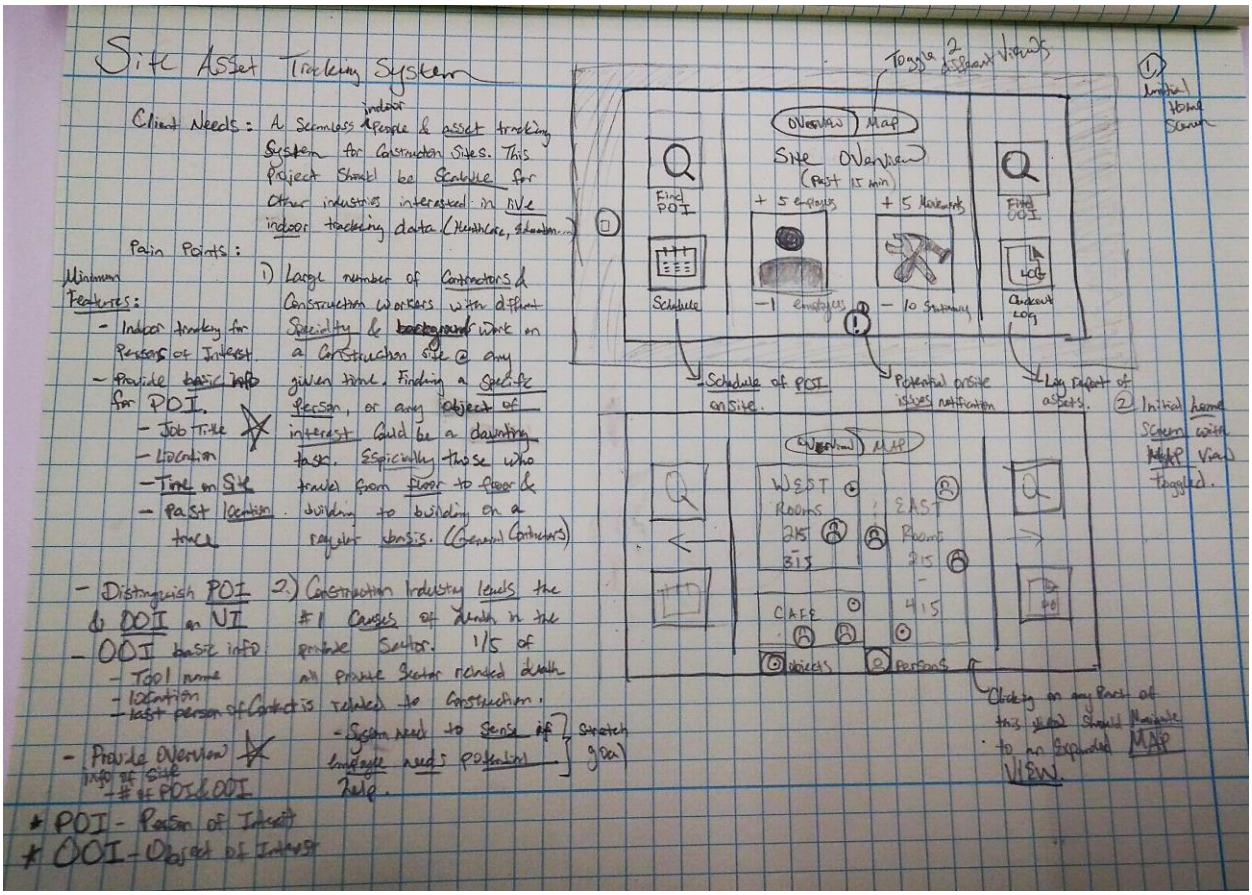
Tagtical Tracers

Client Company: Moss Construction Management

Coach: Professor Eisenstadt

*This is an active ongoing project during Fall 2016 semester

Software Component



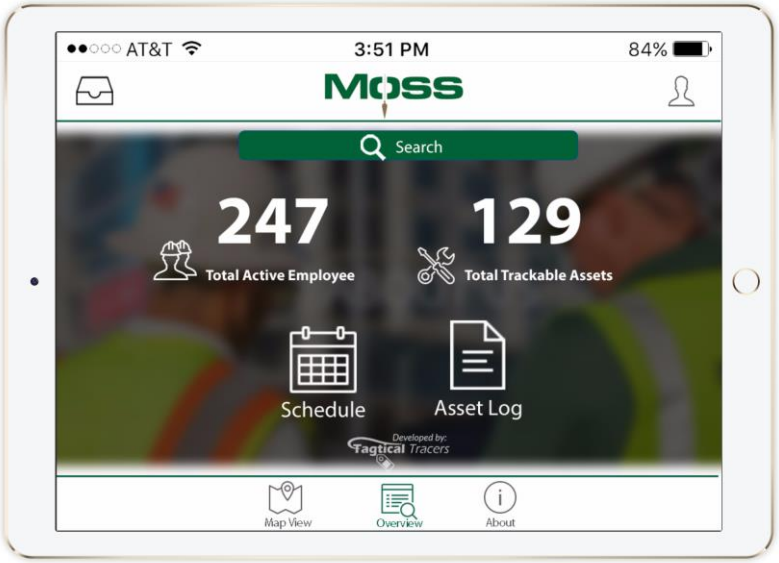
Summary:

We are creating a seamless IoT solution for indoor asset and people tracking. For this prototype, we are focusing on configuring the system to fit the construction industry specifically.

Paint points:

- Large numbers of contractors & construction workers of different specialty and background work on a construction site at any given time. Finding a specific person with a particular knowledge on an active construction is a challenge.
- Construction industry leads the #1 cause of death in the private work sector. With indoor live data on active construction sites, this system will provide the extra layer of protection in cases of emergency.
- Different indoor assets gets displaced all the time by different active workers, this system will provide a layer of asset tracking at the end of the day.
- From the initial UI sketches, you will find us focusing on the two pain features. Finding what we define as Person of Interest (POI), and Object of interest (OOI). In the center of the interface, we define to give an overview of the site actively from our tracking devices.

Sample UI:



System Overview Dashboard:

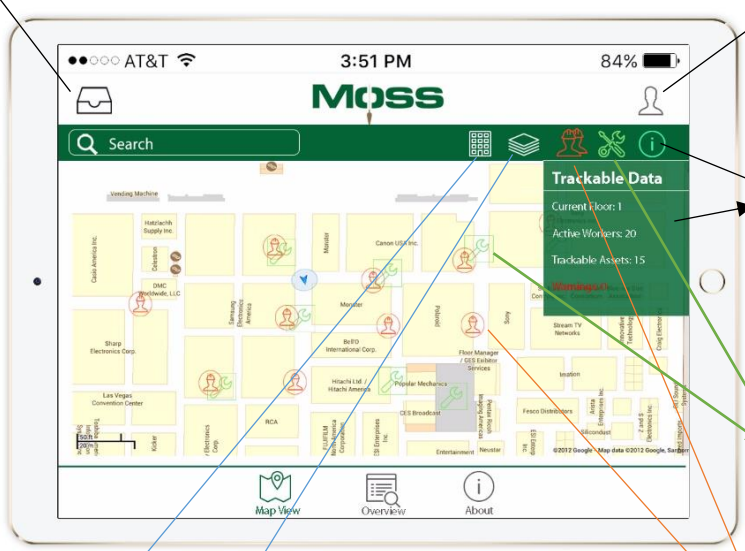
This screen provides an overview of across the entire company with all its ongoing projects. The numbers of active employees and trackable assets are being dynamically updated.

Schedule: A list of personnel whom is scheduled to be on an of the company site.

Asset Log: Provides a detail view of asset activity and their last known location.

Map overview

Inbox: Live messaging capabilities between overhead management



User Management: For overall security of our system, users will be managed and gated to specific access.

General Information toggle: Toggling this icon will enable the user to view general live indoor location data. (Specific info of current floor, building, and the activities on the current floor)

Asset location toggle: Toggling this icon will enable the user to view live indoor location data of trackable assets.

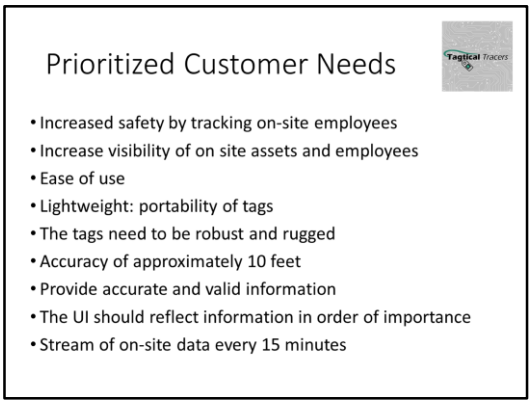
Employee location toggle: Toggling this icon will enable the user to view live indoor location data of their employees.

Building and floor selection:
Toggling these 2 icons will enable users to select to view activities on a specified floor of a specified building.

We are designing a system that will keep track of everybody who goes in and out of a building under construction and any valuable assets in that building. We are still doing research on how exactly we should be implementing the system but we are most likely using an RFID system or BLE system.

The objective of this project is to develop a prototype tracking system for Moss and Associates. The main components we will be using are as follows

- RFIDs or Bluetooth Modules
- A cloud based server
- Antennas

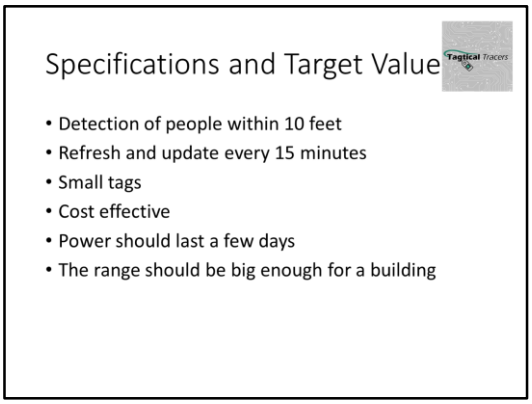


The prototype is expected to be a functional version of the complete SATS system and can be scaled to a feasible level (eg a room with multiple doors). It should be capable of handling at least 2 entry/exit points and have the following

- The ability to easily enter and update an employee's tag number
- Maintain a log of all site activity throughout the course of the project
- Live-update on site conditions for up-to-the minute monitoring
- Not offer any burden or inconvenience to the employee through maintenance or application of the tags

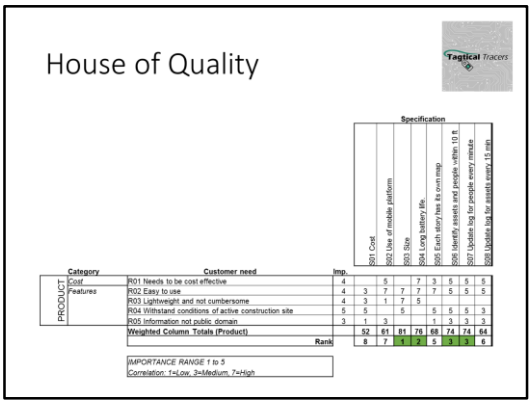
Prioritized customer needs

- Increased safety by tracking on-site employees
- Increase visibility of on site assets and employees
- Increase accessibility of on-site log info (example: numbers of employees/assets)
- Lightweight: portability of tags
- The tags need to be robust and rugged
- Accuracy of approximately 10 feet
- Provide accurate and valid information
- The UI should reflect information in order of importance
- Stream of on-site data every 15 minutes



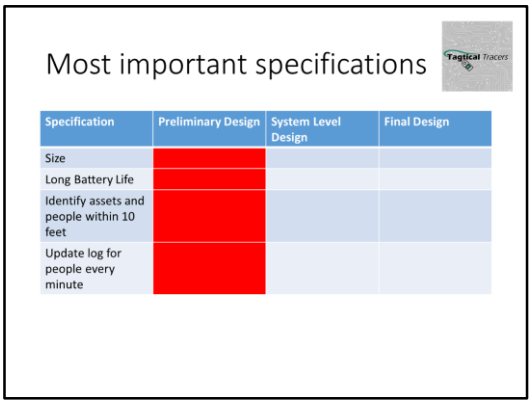
We have to modify our background information and once we have the information, we will have to discuss with the liaison engineer to decide which solution to go with and the parameters that are going to be in effect for our product.

- As small as possible
- As cost effective as possible



As seen in the house of quality, the highest priority in the design of this product is the size, a long battery life, updating the log for people and assets within 10 feet, and updating the log for the location of each person every minute. For this house, the importance was ranked from 1 to 5, with 1 having the least priority and 5 having the most priority.

The highest priority was given to the size of the product because it is ideal that the smaller the product is, the less likely it is to impede the job of each person and worker within the building. A long battery life was also important, as it is ideal that each person take the tag home and wear it every day without having them charge it every night or collecting the tag at the end of the work day. Ranked third in priority are the logs of people and assets. Ideally, the company would like the accuracy of each tag to be able to identify where people and assets are within 10 feet of their actual location. In addition, the location of each person must be logged every minute, as to ensure the safety and location of each worker.



This chart is split into different sections. Each specification has deadlines of the preliminary design, system level design, and final design. Each specification will be either be in the red, yellow, or green zone. The red zone will be defined as a “no-go” where each system is said to fail, where the specifications were not met. It will move into the yellow zone once a design is complete and does not fail. The green zone is defined as a “go” where the specification is met and compliant with all other systems in the product and will be incorporated into the final design.

Currently, all zones are red as there is no design and research is completed.