# PROJECT BRIEFING

OVERVIEW

The power plant wants to implement a new safety system for their technicians, and has issued a contest for the development contract to several agile teams. The contest involves developing a prototype that can simulate real conditions at the power plant. The power plant technicians should be able to "clock in" when they arrive at the power plant, and "clock out" when they leave. Each technician uses a mobile application that communicates with the safety console to monitor their radiation exposure for the day. The mobile application displays how long a technician can stay at the power plant before having to clock out, and sends warnings if they are exposed to too much radiation. For this purpose, a prototype of a "safety console" will be built. A console operator will be able to simulate radiation level changes, as well as what room the clocked in nuclear technician is in, and whether the nuclear technician has a hazmat suit equipped or not. The prototype is meant to simulate real world conditions to represent the actual systems.
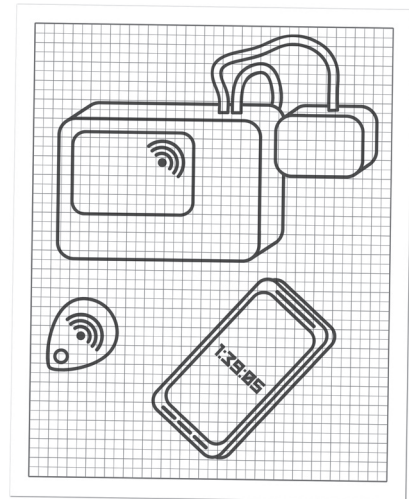
REQUIREMENTS AND LIMITATIONS

Below are the minimum requirements for the prototype:

- An online database is used to store information from the prototype.
- An app for either an Android or iOS mobile device.
- A microcontroller to interface with.
- The connection between the devices has to be wireless.

Because this is a proposition of a solution, the prototype will use an RFID-tag to represent the automatic system that tracks if a user has "clocked in/out" and bluetooth communication to represent the connection between the mobile device and the safety system.

RADIATION PER SECOND FORMULA

$$E = \frac{R \cdot rc}{pc}$$

where:

E = human radiation unit exposure per second

R = reactor radiation units output per second

rc = room coefficients:
- break room = 0.1
- control room = 0.5
- reactor room = 1.6

pc = protective coefficient:
- hazmat suit = 5
- normal clothes = 1

The standard reactor produced radiation per second is 30. Once the safety console has a potentiometer to simulate different radiation levels, the value should be adjustable between 1 and 100.

The human radiation safety limit is at 500 000 radiation units per working day.

SUGGESTED TOOLS

Languages and tools can be chosen freely by the development team. Below are some suggested tools.

Mobile app:
- iOS with Swift using Xcode
    - or -
- Android with Kotlin using Android Studio

Storage:
- NoSQL with Firebase or free AWS DynamoDB trial
    - or -
- SQL with free AWS RDS trial

Hardware:
- The arduino IDE, C++ (https://www.arduino.cc/)
- Module libraries and tutorials from Freenove website (http://www.freenove.com/tutorial.html)

MEETINGS WITH PRODUCT OWNERS

If you want to book meetings:

Book a 30 minute slot with product owner between 15.00 and 17.00 on Mondays for sprint planning/backlog grooming.

Book a 30 minute slot with product owner between 10.00 and 12.00 on Fridays to demonstrate your progress.

DICTIONARY

- **Prototype safety system** - The whole system under development
- **Clock-in/out** - When a power-plant employee tells the prototype safety system that they have entered/left the work area and is active/inactive in the system.
- **Safety console** - The hardware, including but not limited to; arduino, bluetooth module, RFID reader etc.
- **Mobile device** - The device that the technician uses which is connected to the prototype safety system.
- **Database** - The database where data from the prototype safety system should be stored.
- **Radiation unit** - The amount of radiation in an area
- **Radiation safety limit** - The total amount of radiation a power-plant employee can absorb before having to leave the work area.
- **Radiation time limit** - The amount of time a worker can stay in a radiated room before having to leave.

ROLES

- **Nuclear technician** - A power plant employee that uses the mobile device and can clock-in/out of the powerplant work area.
- **Power plant manager** - Manages the other power plant employees.
- **Console operator** - A technician with authority over the safety console. (The person that uses and monitors the safety console.)

USER STORIES AND USE CASES

Master backlog can be found on the provided GitHub repositories. We suggest you copy these manually into your own system of choice.

User stories: https://github.com/zimonitrome/SEPM/projects/1

Use cases: https://github.com/zimonitrome/SEPM/projects/3

Signed.

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On the behalf of ▮▮▮▮▮▮▮

Directive In Malört Power

Issued by ▮▮▮▮▮▮▮