



Parking Lot Availability System using a Campus-Wide Wireless Network

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ADVISOR: DR. LARRY PEARLSTEIN

ENGINEERS



Matthew Cook
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Nikita Eisenhauer
Electrical Engineer

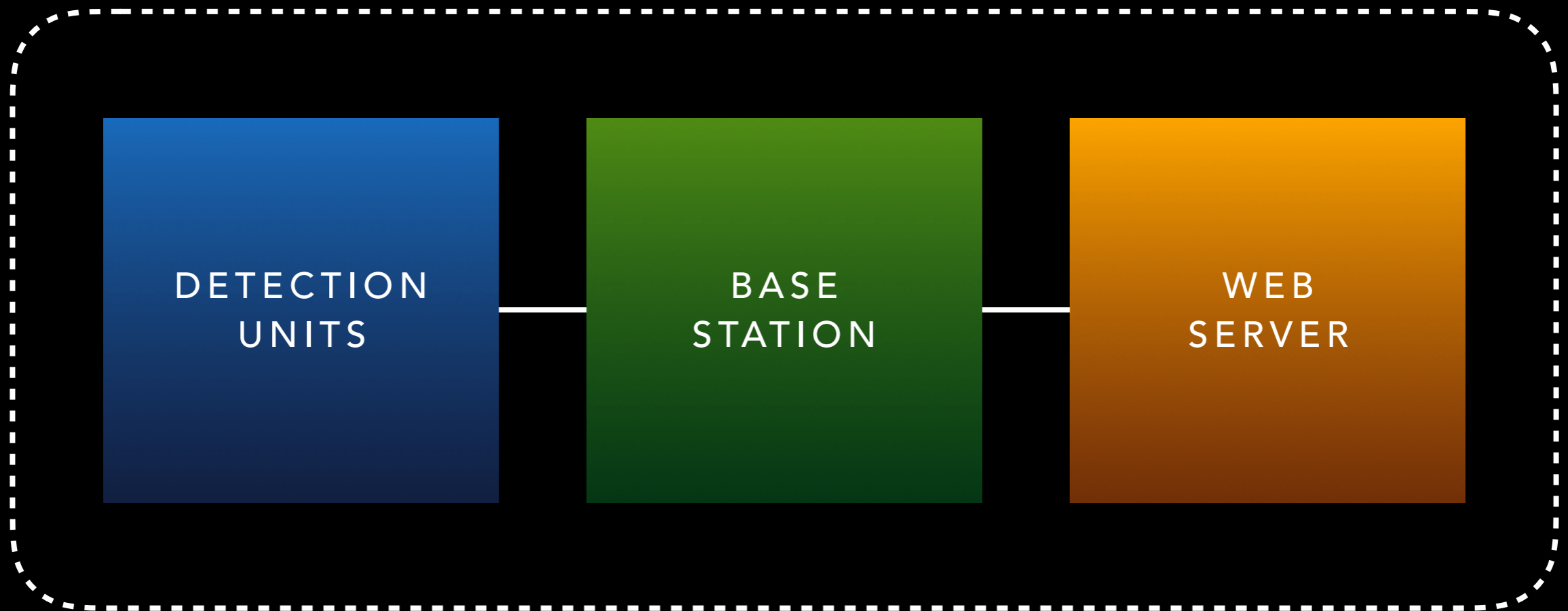


Stephanie Fournier
Electrical Engineer



Warren Seto
Computer Engineer

PARKING LOT AVAILABILITY SYSTEM



SENSING AND DETECTION

DETECTION
UNITS

- Completed Tasks
 - Two Sensors now work Simultaneously over I2C
 - All of our custom Arduino PCB's have had their components soldered to them
 - Code for one sensor and two sensor I2C tests has been ported over to the custom Arduino
- Ongoing Tasks
 - Creation of the detection algorithm
 - Integration with Nikita's Power System
 - Integration with Warren's server over Wireless LoRA

POWER SUBSYSTEM

DETECTION
UNITS

- Completed Tasks
 - Voltage Regulator Testing (under max voltage specifications)
 - Level Shifter Testing (under max voltage specifications)
 - Schottky Diode operation
 - ATMEGA328 Chip analog readout utilizing 1.1V internal AREFF
- Ongoing Tasks
 - Awaiting power resistors and additional passive components
 - Voltage Regulator Testing (under max current specifications)
 - Level Shifter Testing (under max current specifications)
 - Boost Converter Verification
 - Board integration and final testing

CUSTOM BOARD DESIGN

DETECTION
UNITS

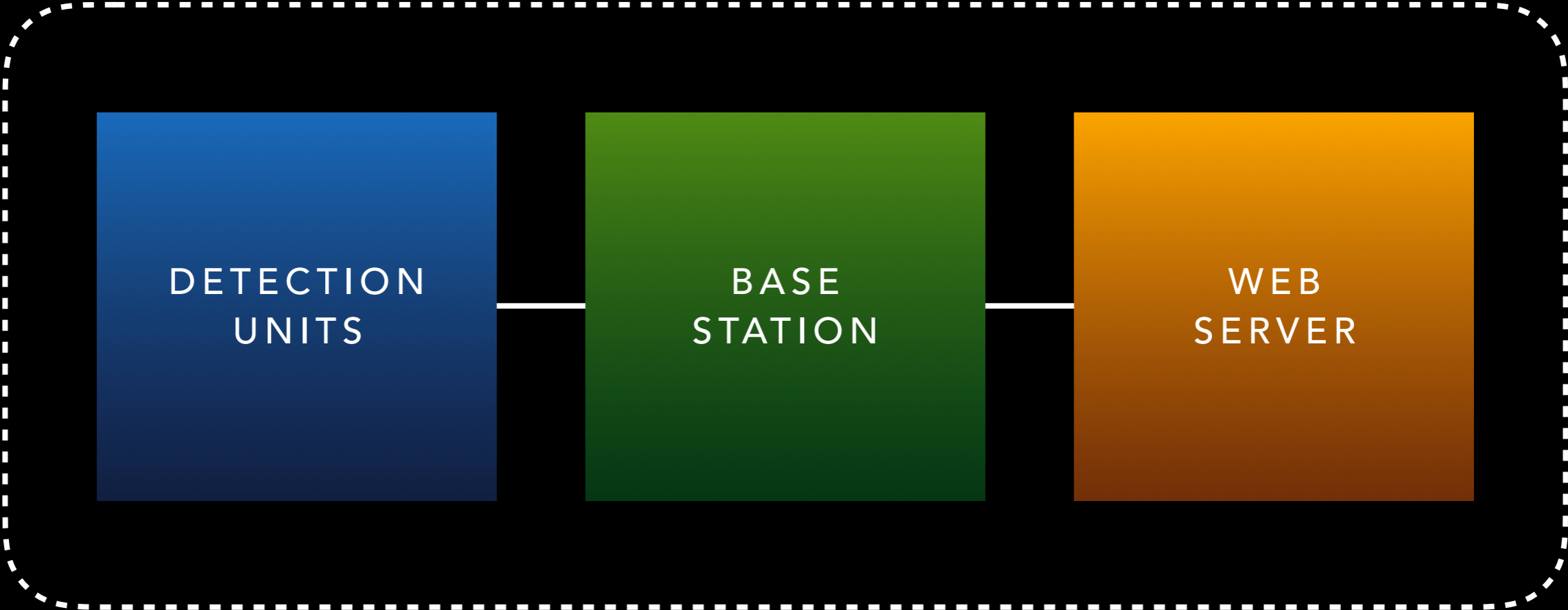
- Arduino
 - Update design based on feedback from testing
 - Integrate design with finalized power system and detection unit design
 - **Completed** board bringup with all three boards and all available ATMEL ATmega328 microcontrollers
- Power system
 - Given schematic, eagle representation of the system was created.
 - This board will connect to the ATMEGA chip on the Arduino board

ENCLOSURE

DETECTION
UNITS

- Design changes will be made based on testing.
- This next design will feature a lid and a way to mount the solar panels for the power system.
- Waterproofing will be added to final product.

PARKING LOT AVAILABILITY SYSTEM



PROTOCOL

BASE
STATION

DETECTION
UNIT



BASE
STATION

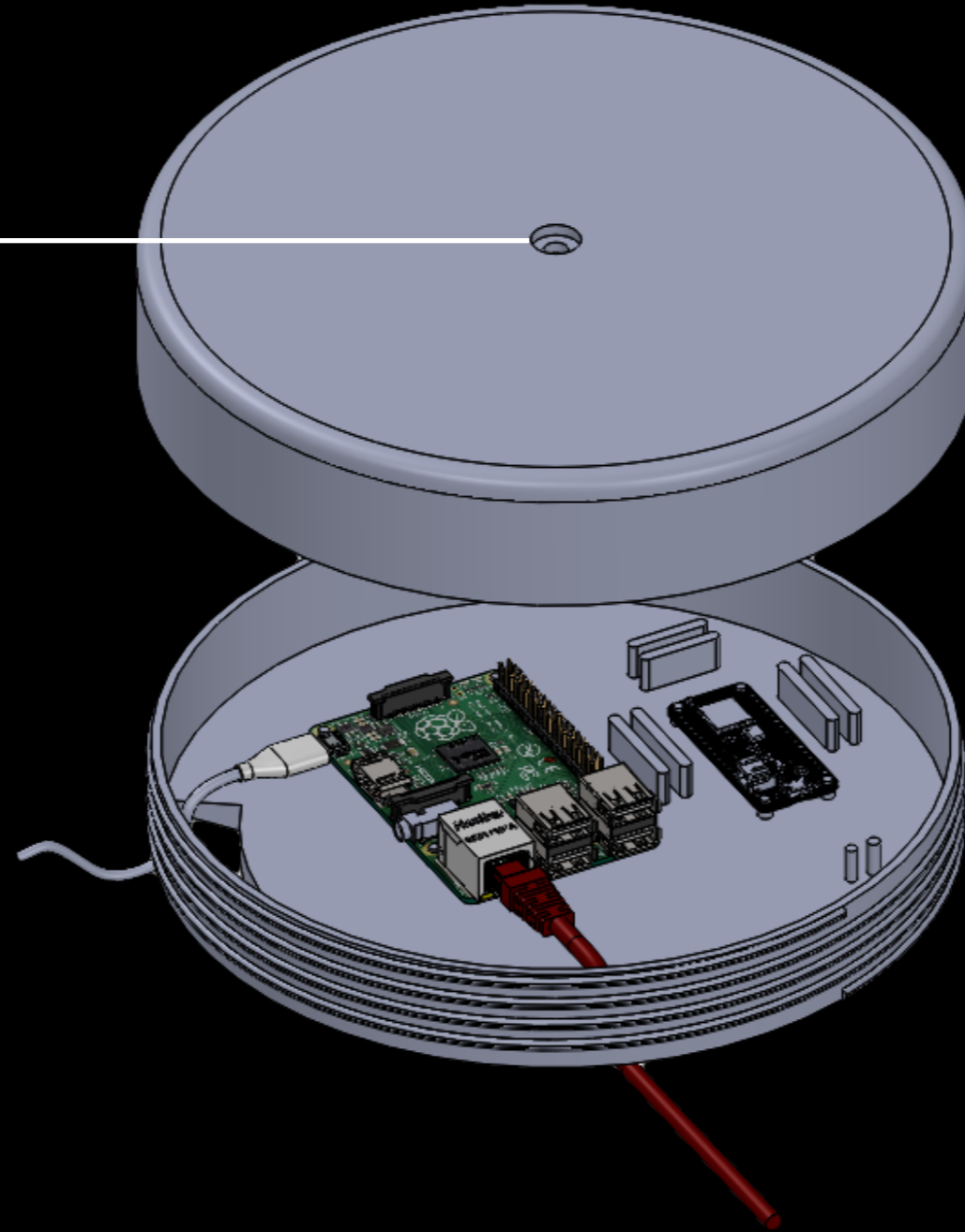
SERIAL: MNKS
BATTERY: 87



ENCLOSURE

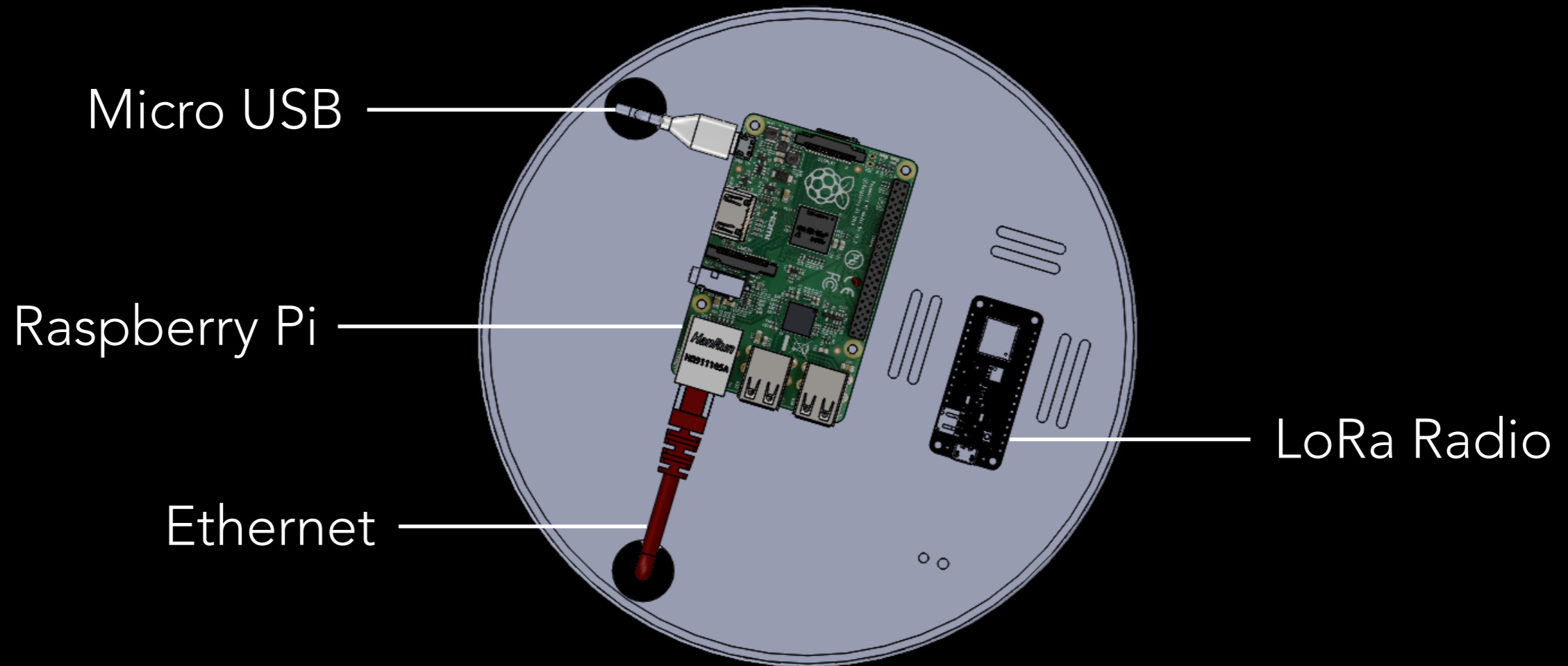
BASE
STATION

Antenna

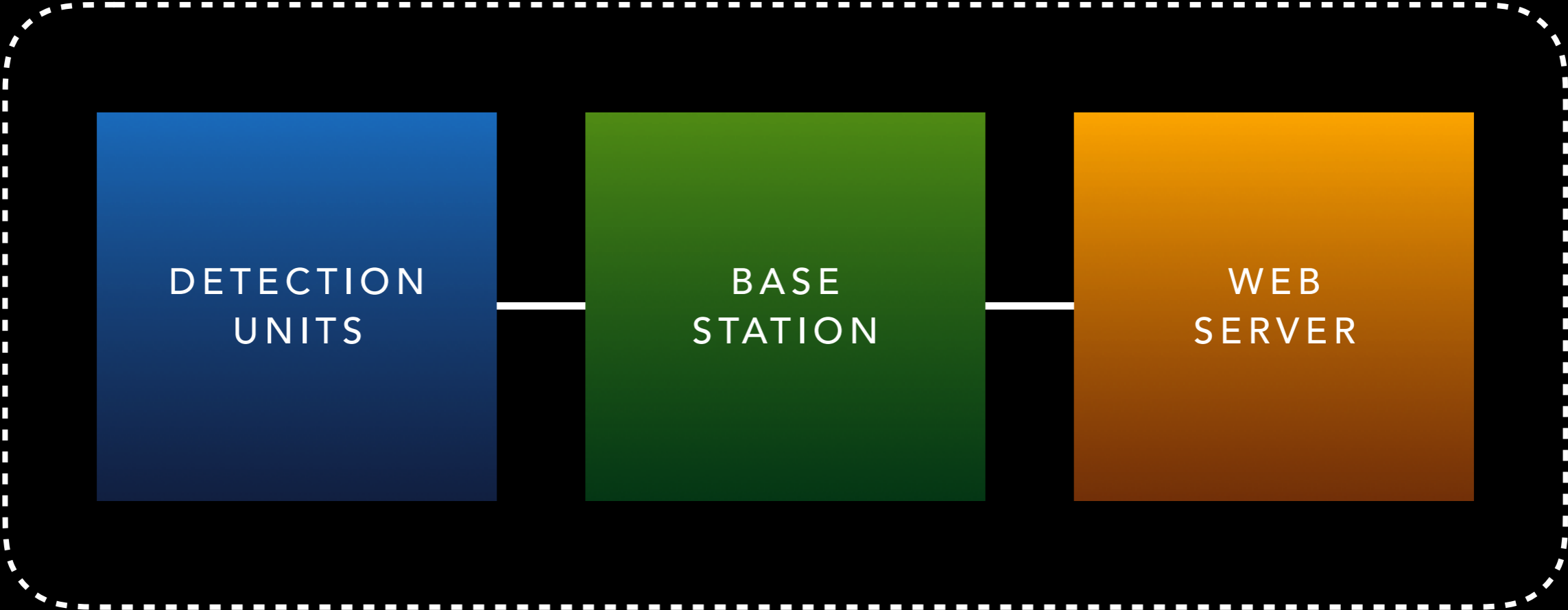


ENCLOSURE

BASE
STATION

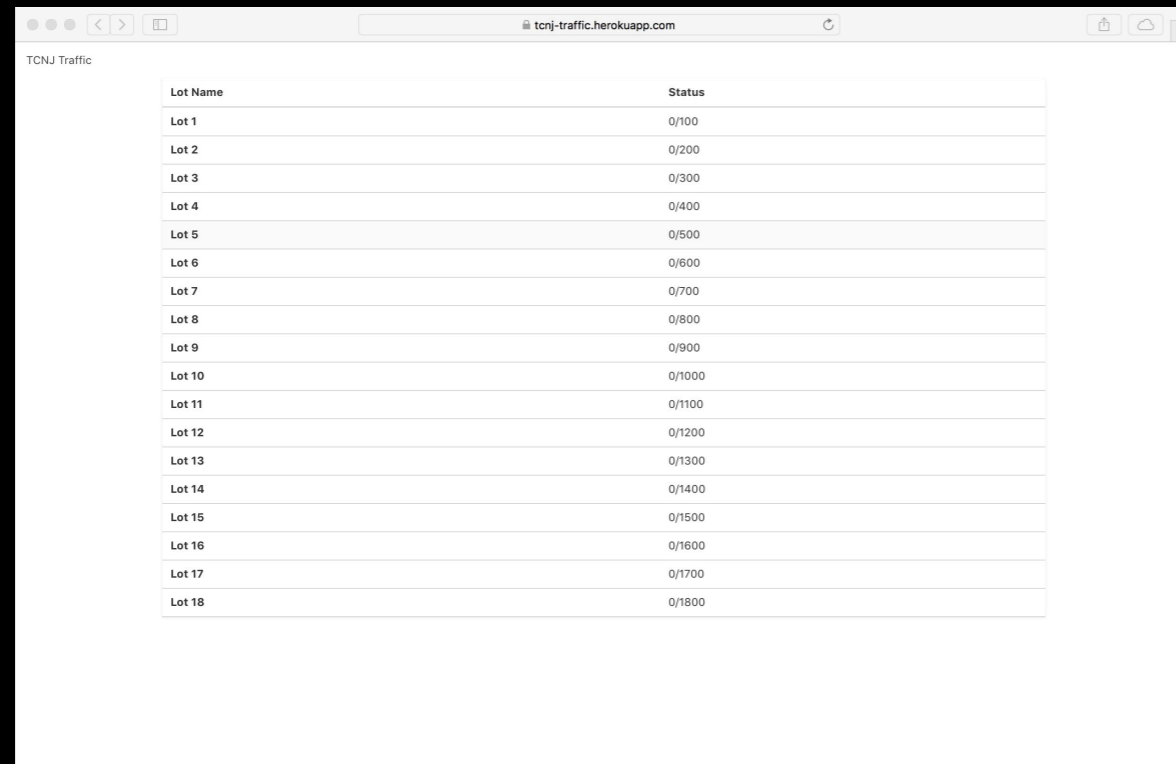


PARKING LOT AVAILABILITY SYSTEM



REST API

WEB
SERVER



Lot Name	Status
Lot 1	0/100
Lot 2	0/200
Lot 3	0/300
Lot 4	0/400
Lot 5	0/500
Lot 6	0/600
Lot 7	0/700
Lot 8	0/800
Lot 9	0/900
Lot 10	0/1000
Lot 11	0/1100
Lot 12	0/1200
Lot 13	0/1300
Lot 14	0/1400
Lot 15	0/1500
Lot 16	0/1600
Lot 17	0/1700
Lot 18	0/1800

/



/firmware

DATABASE

WEB
SERVER

detectionUnits

NAME	BATTERY	COUNT	TOTAL	SERIAL
LOT1-IN	87	15	50	MNKS

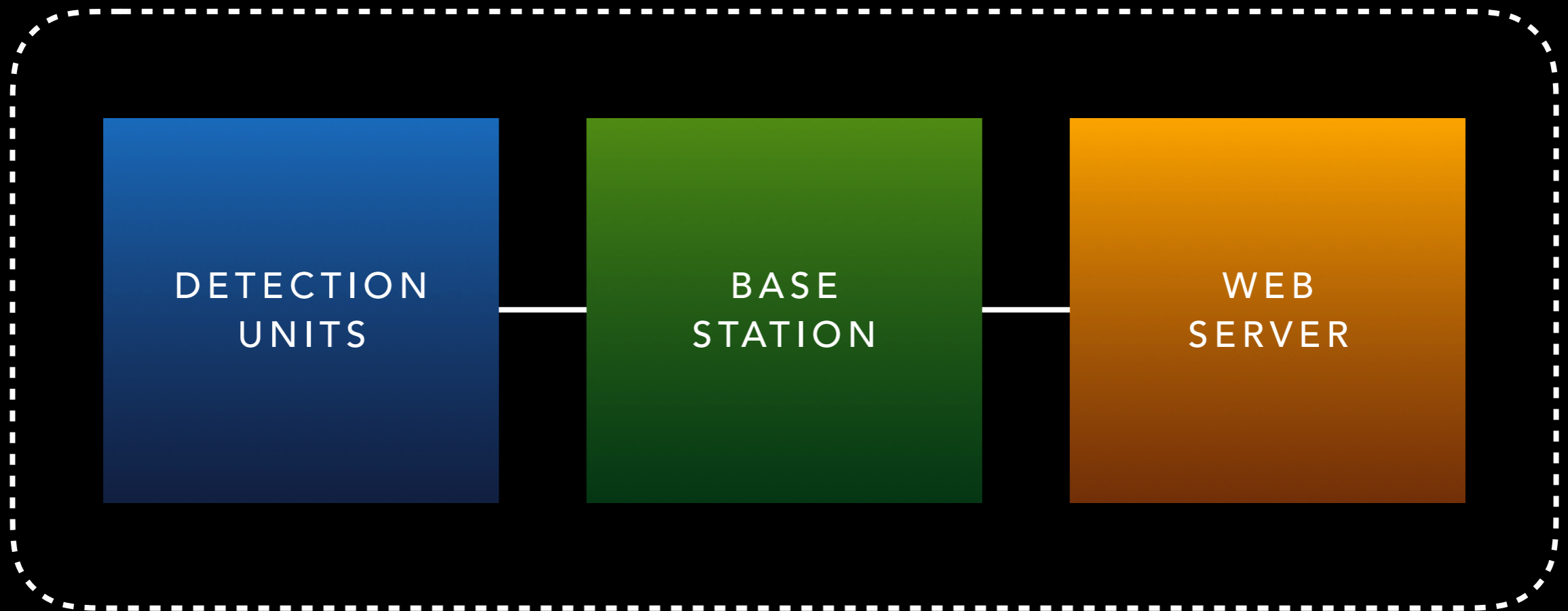
baseStations

NAME	VERSION	ISCONNECTED	ERROR_LOG	SERIAL
ROOF1	1.1	TRUE	""	HP0

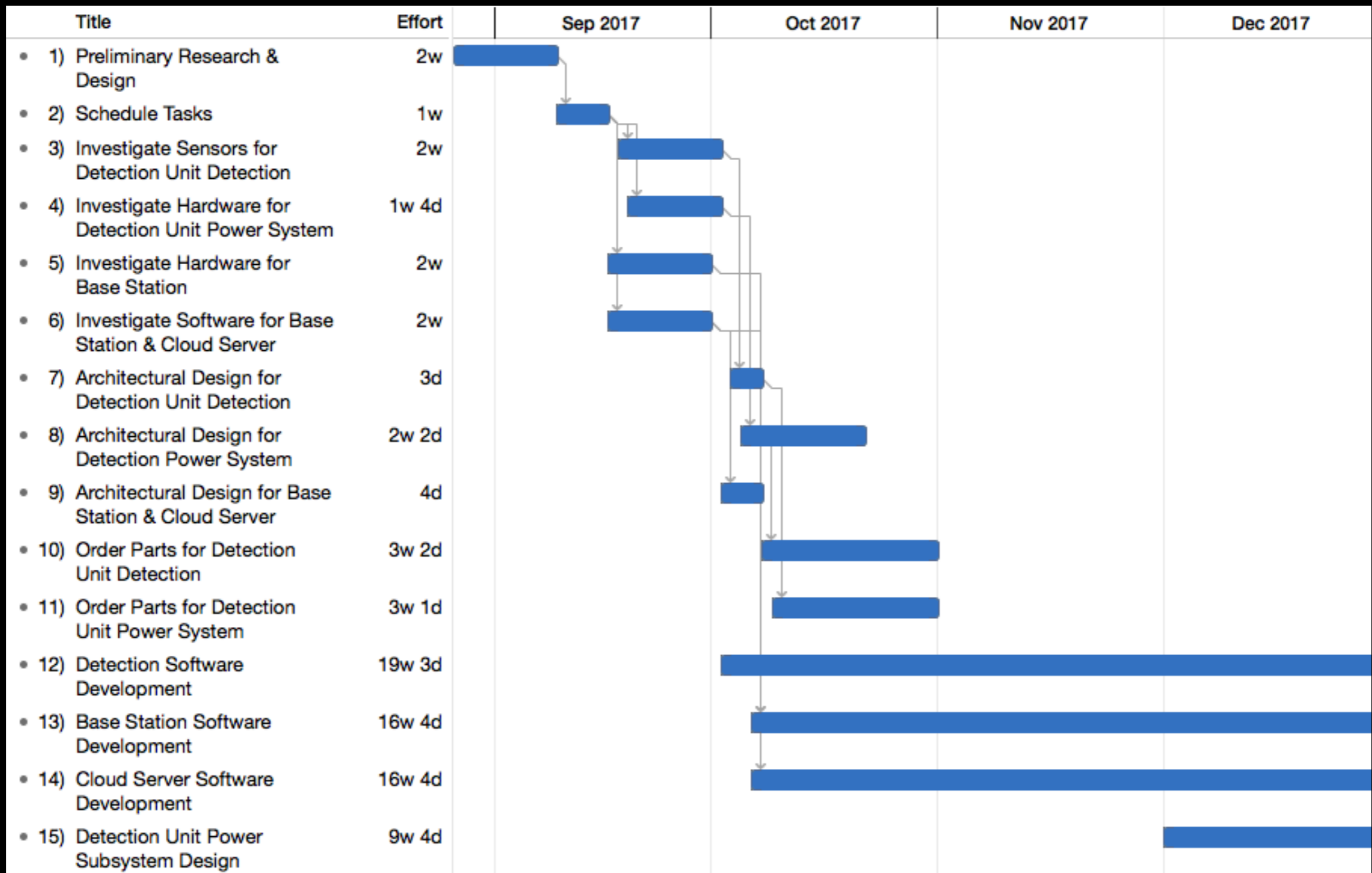
settings

NAME	FIRMWAREVERSION	FIRMWAREURL
TCNJ TRAFFIC	1.1	https://github.com/nextseto/R1-firmware/archive/master.zip

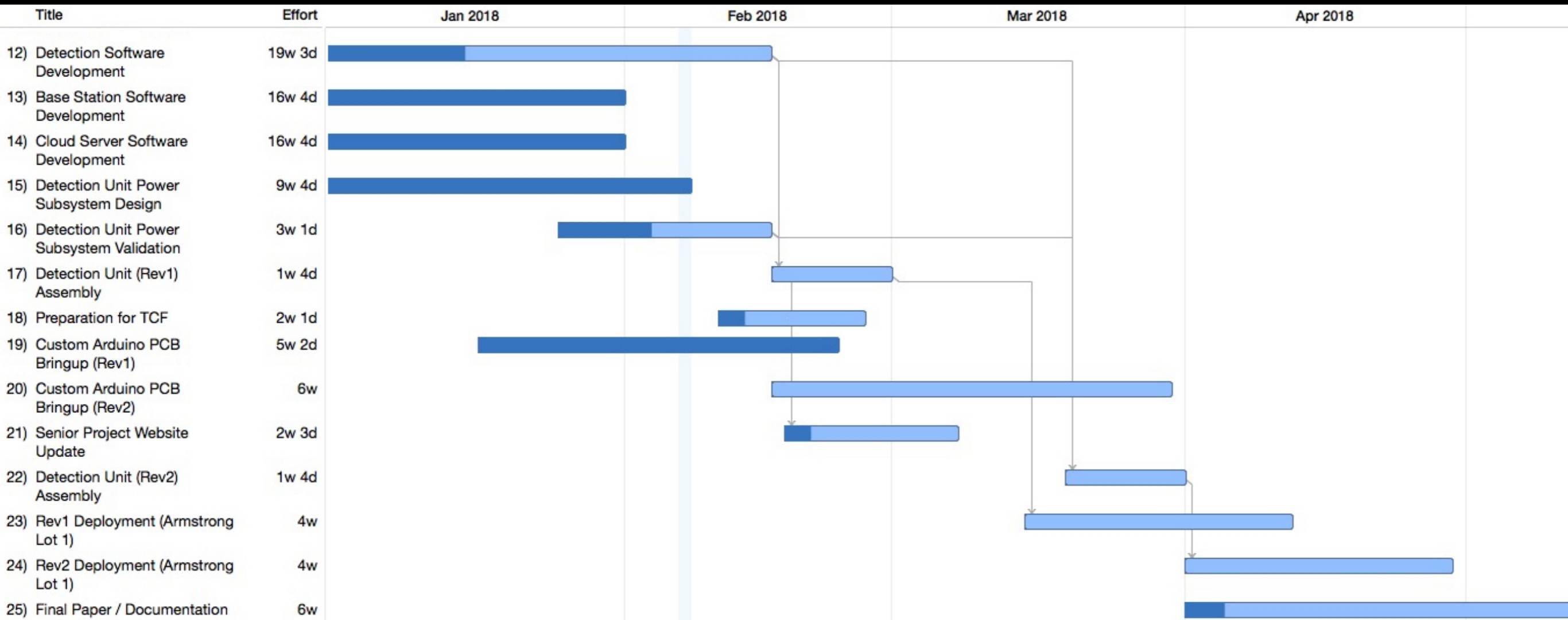
PARKING LOT AVAILABILITY SYSTEM



FALL SCHEDULE



SPRING SCHEDULE



TIME BUDGET



COST BUDGET





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