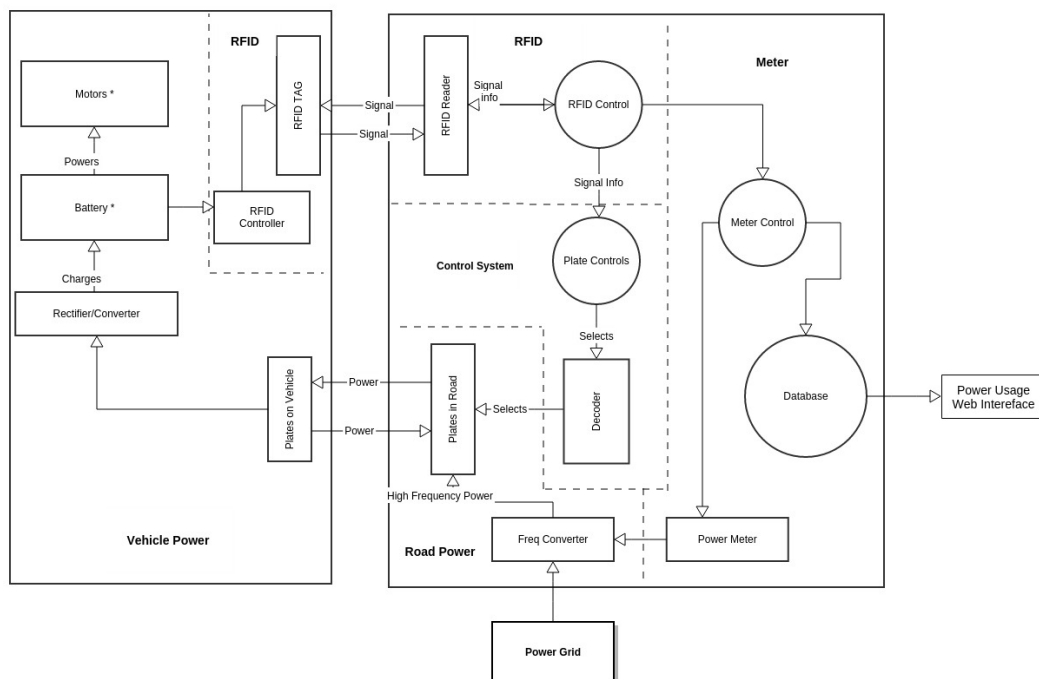


The League of Extraordinary Engineers Team
Responsibilities and System Diagram

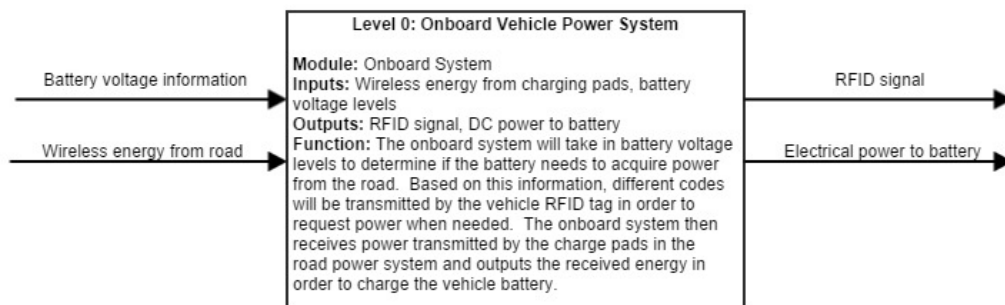
Responsibilities	Roles	Hardware	Software
Trigger Capacitor Plates When Car is Above	MotherBrain	Decoder and control bus	Plate Control Logic
Sense Car	RFID	RFID transmitter and receiver	RFID Controls on Vehicle
Transmit Power	Road Power	Freq Converter, plates, and connection to power grid	-
Receive Power	Vehicle Power	Rectifier/Converter, battery, plates, and motors	-



The League of Extraordinary Engineers Team
Functional Decomposition

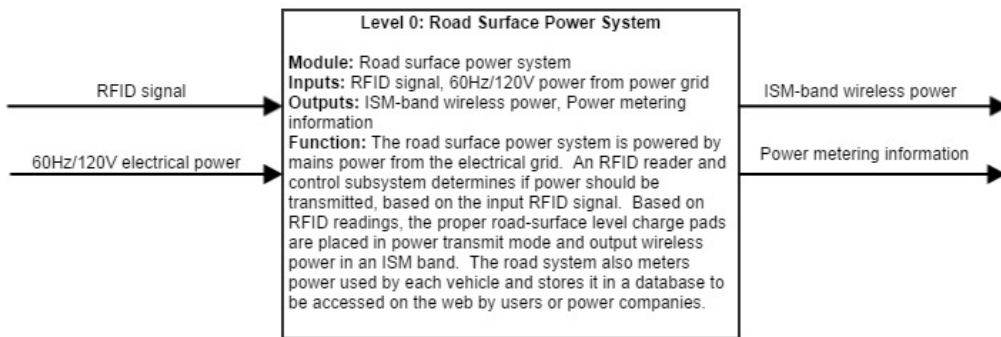
1 Function Decomposition Level 0 - Part 1

Module	Onboard Vehicle Power System
Inputs	Wireless energy from charging pads Battery Voltage Levels
Outputs	RFID Signal DC power to battery
Functionality	The onboard system will take in battery voltage levels to determine if the battery needs to acquire power from the road. Based on this information, different codes will be transmitted by the vehicle RFID tag in order to request power when needed. The onboard system then receives power transmitted by the charge pads in the road power system and outputs the received energy in order to charge the vehicle battery.



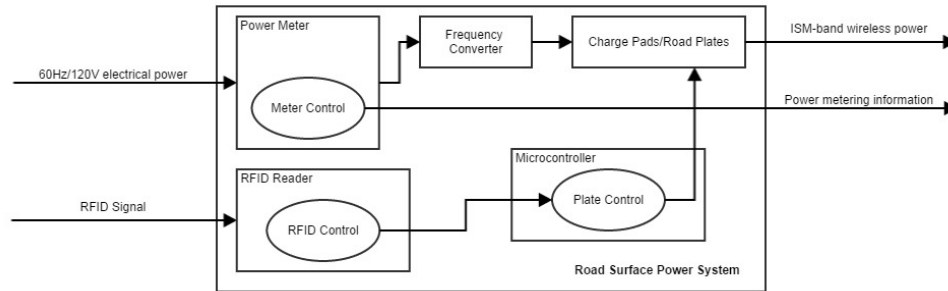
2 Functional Decomposition Level 0 - Part 2

Module	Road Surface Power System
Inputs	RFID signal 120V/60Hz Electrical Power
Outputs	ISM-Band Wireless Power Power Metering Information
Functionality	The road surface power system is powered by mains power from the electrical grid. An RFID reader and control subsystem determines if power should be transmitted, based on the input RFID signal. Based on RFID readings the proper road-surface level charge pads are place in power transmit mode and output wireless power in an ISM band. The road system also meters power used by each vehicle and stores it in a database to be accessed on the web by users or power companies



3 Function Decomposition Level 1 - Part 1

3.1 Road Modules



Module	Power Meter
Inputs	Power from the Power Grid
Output	Electricity to the Frequency Converter and meter information to the meter controller
Functionality	Reads the amount of power going into the system from the power grid

Module	Frequency Converter
Inputs	120V 60Hz AC power from power meter
Output	Frequency Converted Signal to Capacitive Plates
Functionality	Changes the frequency from that of the power grid

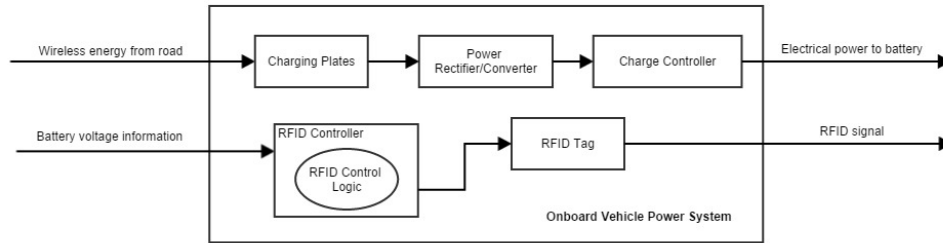
Module	Capacitive Road Plates
Inputs	Frequency Converted Signal, Control Algorithm
Output	Wireless Frequency Converted Signal, Metering Information
Functionality	Enables conversion from normal signal over a wire to a wireless signal. There will be many of these that are turned on and off by the control algorithm from the control module. Outputs its on/off state to determine power usage.

Module	RFID Reader
Inputs	RFID Signal from RFID Tag in Vehicle
Output	Data to Control Module in Road and Metering Module
Functionality	Reads the RFID tag in the vehicle to send data to the control and metering modules

Module	Control Module
Inputs	RFID Reader Data
Output	On/Off signal to Control the different road plates
Functionality	This controls the Capacitive Road Plates. It determines if the capacitive plates need to be turned on based on the RFID data from the RFID Reader and turns them on and off

Module	Metering Module
Inputs	Takes in data from the Power Meter and RFID Reader
Output	Outputs data on power usage to a database
Functionality	Is used to charge users for their power usage, by determining which vehicle is being charged through RFID data and how much power is being used from the power meter.

3.2 Vehicle Modules



Module	Vehicle Capacitive Plate Module
Inputs	Wireless Power from the Road Capacitive Plates
Output	Power over a wire to the Rectifier-Converter Module
Functionality	Receives power capacitively from the roads Capacitive Plates Module and converts it to standard electricity over a wire

Module	Rectifier-Converter Module
Inputs	Electricity from Vehicle Capacitive Plate Module
Output	Rectified Electricity to Vehicle Charge Controller
Functionality	Converts the electricity from the capacitive plates to a current and voltage that can be used by the charge controller.

Module	RFID Controller
Inputs	Data regarding the batteries state
Output	Control to the Active RFID Tag in the vehicle
Functionality	Sends data to the RFID Tag in the vehicle. This data determines if the vehicle needs power from the Road.

Module	Vehicle RFID Tag
Inputs	Data from RFID Controller
Output	Wireless signal to the Road RFID Reader
Functionality	Transmits the data from the RFID Controller to the RFID Reader in the Road.

Module	Charge Controller
Inputs	Electricity from power rectifier controller
Output	Electricity to the battery
Functionality	Charge the battery