EEL 4914 SENIOR DESIGN I:

Initial Project and Group Identification Document Divide and Conquer

1. Project Title idea: X-Car Electrical Maintenance Tester
Group 7
Members :
Alexander Washington, Electrical engineering;
Matthew Hunt, Electrical engineering;

Potential markets:
The customers could be theme parks, gaming businesses, and the entertainment industry.

2. Project Description:

The idea is to develop a multifunctional application specific tester for the Hollywood Rip Ride Rockit roller coaster (HRRR) ride vehicles at Universal Studios Orlando. The ride vehicles at HRRR feature an electrical system tha,t when entering the load station, connects to the Ride Control System (RCS). The connection to/from the ride vehicle completes the circuit in the RCS. From there the RCS can control and monitor components of the ride vehicle. Currently, troubleshooting techniques are sparse and often resort to replacing parts until the issues go away. This proposed tester referred to as the XEM, will provide the necessary functions to properly diagnose and provide direction towards areas needing troubleshooting. The tester will use Ohm's laws, Kirchoff's Laws and transmission line theories combined with software processes in order to provide detailed information about the ride vehicle circuit to the technical user. From the standpoint of the ride vehicle, the XEM will be the RCS or in other terms, the master.

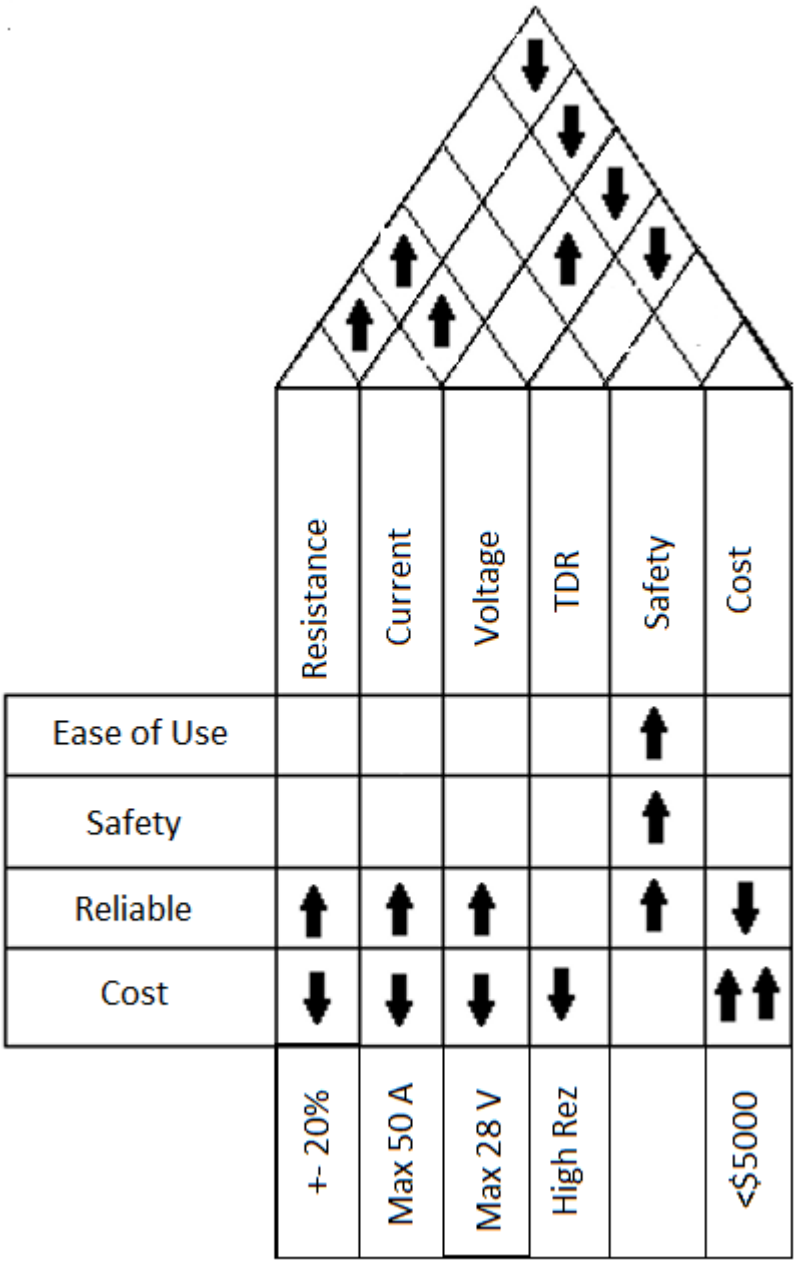
3. A list of requirements specifications for the project as a whole.

Specifications

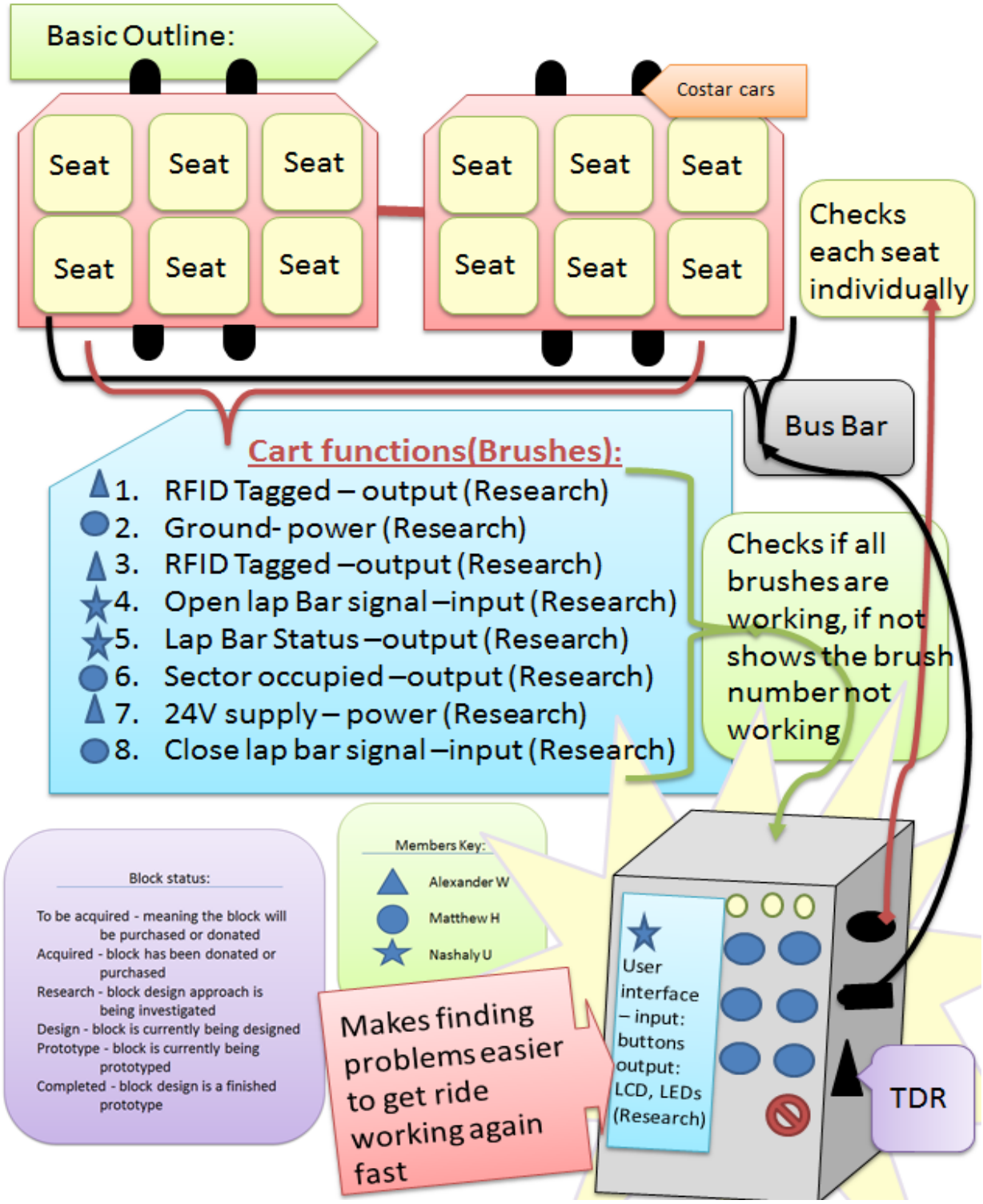
The XEM will connect to the ride vehicle through busbar/collector shoes, a 10 pin HBE connector, or through a single coaxial connection point.
The XEM will be powered by a 120V/20A socket.
The XEM will provide 1.2kW of DC power at 24V.
The XEM will detect resistances in the milliohm range.
The XEM will detect voltages in the millivolt range.
The XEM will detect voltages up to 28V.
The XEM will detect currents up to 50A.
The XEM will provide transmission line waveforms up to 100ft.
The XEM will monitor 6 different control/signal lines on the ride vehicle.
The XEM will operate the lap bar mechanism on the ride vehicle.
The XEM will be transportable.
The XEM will provide safety functions to prevent equipment damage and user injury.

The XEM will provide fault monitoring and messaging.
The XEM lap bar operation can be controlled remotely.

4. House of Quality:



5. Project Block Diagram



6. Estimated project budget and financing.

XEM:	
Materials	Estimated Cost
Circuitry	$700
LCD	$200
Power Supply	$400
Tools/Parts for assembly	$1200
Enclosure Assembly	$800
Estimated Total	$3300
Padded Estimated Total	$4000

7. Initial project milestone

SD1 Fall 2017 SD2 Spring 2018
started : August 21, 2017 started : January 8 2018
Ended: December 2, 2017 ended: (class) April 23, 2018

SD1 Fall 2017				
month/week	Week 1	Week 2	week3	week4
September	Team idea, bootcamp	Irma	DC doc 22nd	Plan and research
October	5 pages each person	5 pages each person	5 pages each person	Combine all pages and review
November	Review **60 pages due 7th (45)**	10 pages each person	Review: **100 pages due 17th (75)**	5 pages each person
December	Review: **Final paper due 4th**	Break	Break	Break

SD2 Spring 2017				
month/week	Week 1	Week 2	week3	week4
January	Break	Starts: order/make all parts	Review and get parts	Build prototype
February	Test prototype, assess	Acquire more parts, fix, review, and change	Build main project (extension of prototype)	Build main project and test
March	Build main project and test	Test, assess Acquire more parts, fix, review, and change	Build main project and test	Build main project and test *final*
April	Test, assess Acquire more parts, fix, review, and change	Test, assess fix, review, and change, (MUST work)	Test, assess fix, review, and change (MUST work)	End, final presentation