UNITED STATES COAST GUARD ACADEMY

ELECTRIC VEHICLE

1/c Bogdan, 1/c Burns, 1/c Kotchman, 1/c Hughes
Project Advisor LCDR Rodzewicz

MECHANICAL ENGINEERING 1993 U.S. COAST GUARD ACADEMY

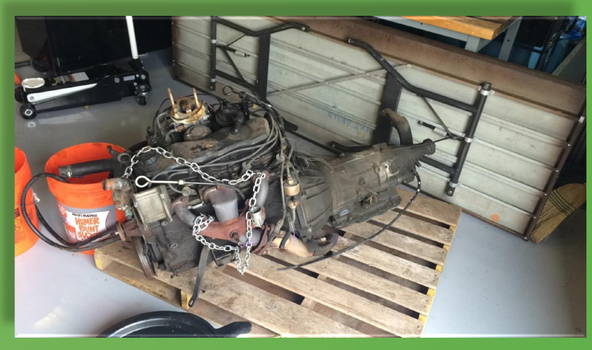
PROBLEM STATEMENT

At this time, the Coast Guard Academy does not have any means of conveniently selling concessions at different venues around the Academy. There is a demand for an environmentally friendly vehicle that has the ability to sell concessions at the many locations around base that host athletic sporting events.

CONSTRAINTS

1.	Produces zero emissions
2.	Operates in forward and reverse
3.	Has functional brakes
4.	Has the ability to access all Academy sporting venues
5.	Has a safe and viable means of charging
6.	Is able to withstand the elements associated with outdoor venues (i.e. wind, rain, etc.)

CURRENT DESIGN



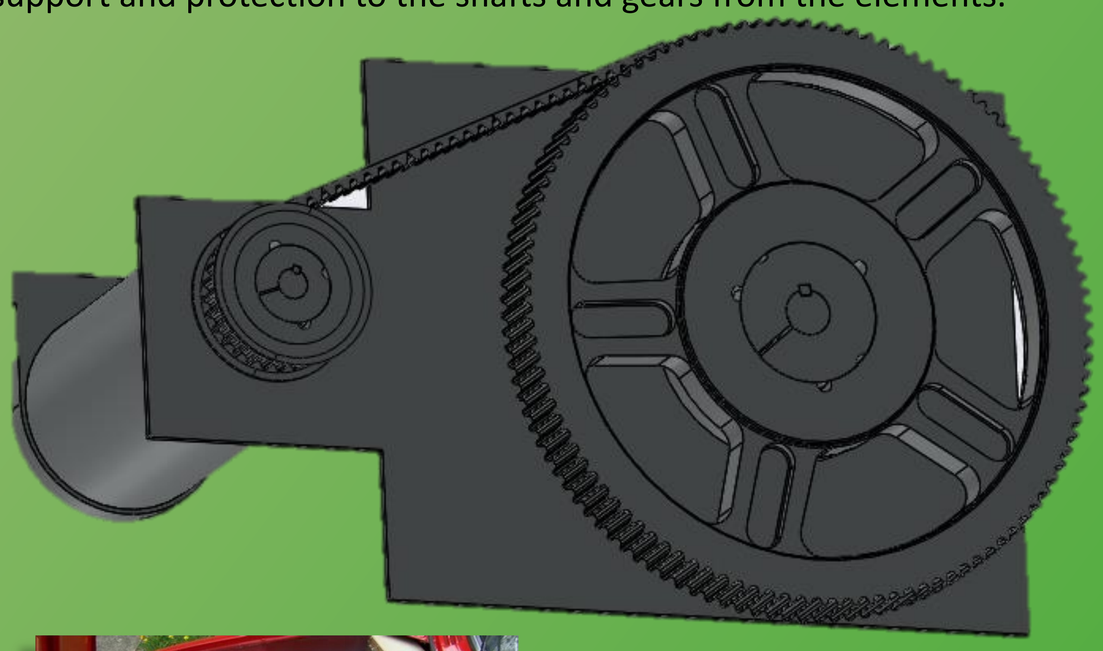
The Grumman LLV currently has a Iron Duke engine made by Pontiac. This internal combustion engine is inefficient and has more power than is required for use on the Coast Guard Academy's campus.

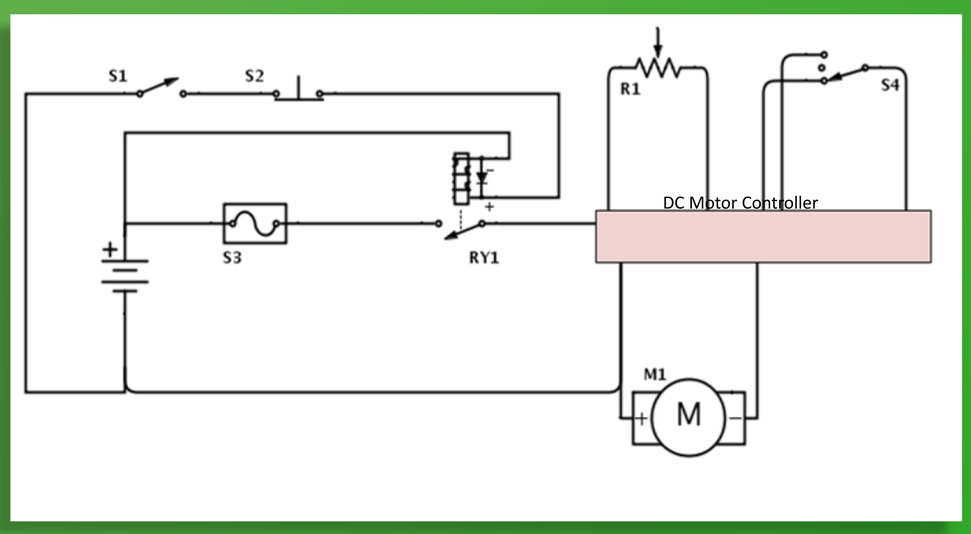
TESTING

The rolling resistance of the vehicle was experimentally determined using a dynamometer. The resistance of the vehicle was taken into account in determining the required power and torque of DC electric motor.

PROPOSED DESIGN

The system that we are using to drive the truck requires that the gear on the motor and the gear on the drive shaft be parallel and a distance apart to keep a specified tension in the belt. The drive shaft will be supported by a journal bearing mounted to the plate as shown below. This plate bolt to the motor as well as the frame of the truck offering support and protection to the shafts and gears from the elements.





S1	On/Off Switch
S2	Emergency NC Switch
S3	450 Amp Fuse
S4	Forward/Reverse Switch
R1	Throttle
RY1	Contactor Switch
M1	Electric Motor

The batteries chosen for our project are deep-cycle lead-acid batteries due to their cheap cost. To power the 48 volt DC motor, eight 6-volt batteries will be wired in series to give the mail truck an estimated 10 mile range.

This wiring schematic of our vehicle illustrates the major components that control the power supplied to the DC electric motor.