ALTERNATE FARMING SOLUTIONS

Ben Byma               Mechanical
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**Project/Problem**

In many third world countries there is a need for small, inexpensive, all-terrain vehicles. These types of vehicles are very similar to a small tractor, yet operate much like a small car. These vehicles can be used on the farms, bringing people back and forth from town, and can be adapted to many different uses. Some of these uses include; adapting a generator to run off the small engine, integrating a small plow for use in the fields, having a tilt deck for carrying produce etc., possible seeding machinery, and others that would be necessary. Price, size, weight, fueling, and usability are some of the many constraining issues which the team will face. Adequate time will need to be dedicated to keeping each constraint within our team’s bounds.

**Customer**

Our team’s goal is to have an actual customer in mind throughout the entire project. This customer can indirectly be anyone from a third world country. We will work with different missionaries to see which area has a high demand for such a vehicle. Each of us will ask different missionaries at our churches to see if anyone or anywhere would stick out as a direct customer. The team is hoping that the end user will be able to use the vehicle for many decades in a third world farming setting implemented in multiple applications.

**Problems to be solved**

The largest problem will be the economics of the build. Many of the components are quite expensive. Therefore we will need to find donors for many items including the engine, generator head, and hydraulics. We will also need to find the optimum platform that will support the tilt bed and hold the plow system. The goal of the project is to keep the vehicle to a minimum size, yet have enough
strength to withstand the typical uses. A good starting platform would be a small truck; something that there are many parts for if repairs are the future if necessary. Typically, these are small s-10’s, Toyota’s, or other vehicles. From here, the additional components will be designed and incorporated in the most ideal fashion.

**Engineering Sections**

**Hydraulics:** Understand necessary system requirements to implement a hydraulic system. Either hydraulics or a crank mechanism would be used to tilt the bed of the vehicle for easy maintenance and unloading.

**Stress and Stain:** Stress and strain will be especially important for the plowing attachments as well as all of the tilt deck components. Overall, the frame needs extensive analysis because of the uncertainty in what the farmer will actually use this vehicle for.

**Electrical:** Minor use of electrical wiring in the vehicle. Knowledge of wiring systems will be required when prototyping the design. The team would like to incorporate a generator into the design which would require some electrical work.

**Gearing:** Gearing of the generator will be necessary to run the engine at ideal rpm’s. The drive train will also need gearing design done.

**Team member Responsibilities**

All team members will be involved initially in research of vehicle applications and possible consumers. Multiple team members will dedicate time to different aspects of the project when necessary; however, each aspect will have one team member in charge of getting the appropriate work done sufficiently and on time.
Seth Weaver – Head of engine system, research power needs and other requirements, braking system

Ben Byma – Primary lift bed system, parts ordering, tires

Reuben Swinkels – Primary frame and structure analysis; help with the engine and electrical system, also suspension

Jon Goorhouse – Website lead, Research potential customers and local requirements for product; help with engine system, plow and implements.

Matthew Hoogstrate – Head generator research and analysis; help with lift bed system, steering, and braking