

MOBILE MEDICAL CLINIC

Bringing medical services to western Kenya

Aaron Black, Luke Murrill, Ben Richter, Joel Zeigler

The Trailer

The MMC began in Fall 2013 with a few base components at its expenditure, one of which being the opportunity to use a trailer from a previous project. The Biodiesel Project (in the Energy Group) had a Haulmark® 6ft x 12ft auto trailer that had been in disuse for multiple years. After much deliberation and calculation pertaining to the dimensions of the trailer and the ability to fit all necessary components of the clinic into it, the team accepted the offer. The tight space proves to be a slight hindrance, but obtaining a trailer for free greatly improved the project's initial budget.

The stripped, componentless trailer weighs 920 lbs, having a gross axle weight limit of 3500 lbs and a gross vehicle weight limit of 2990 lbs.



The MMC trailer. — Photo by Joel Zeigler

Before it is fully ready for use in the field on unimproved roads, the trailer will need an improvement to the suspension, better tread and rubber strength in its tires, and a new jack. The interior has been completely removed and requires a full redesign for inclusion of all necessary medical components. These include a new floor, an examination bed with stirrups, CO₂ tanks, an ultrasound machine, a mini-refrigerator, cabinets, a sink, curtains and a fan.

Who We Are

The Mobile Medical Clinic is one of four projects in the IPC Transportation Group. Beginning in the Fall semester of 2013 with four IPC students, the project is currently made up of six members: three Project IV members, one Project II member and two Group Orientation students. The MMC project works with Dala Development, explained at lower left.

Why a Mobile Medical Clinic?

There is an immediate need for medical services in rural areas of Africa. The continent is particularly experiencing an immense increase in cancer cases. Specifically in rural Kenya, cancer information, screening, and treatment services are lacking. Currently, cancer ranks third among the main causes of death in Kenya, after infectious and cardiovascular diseases. The Nairobi Cancer Registry and GLOBOCAN both list breast cancer and cervical cancer as the top two types in Kenya based on incident and mortality rates.²

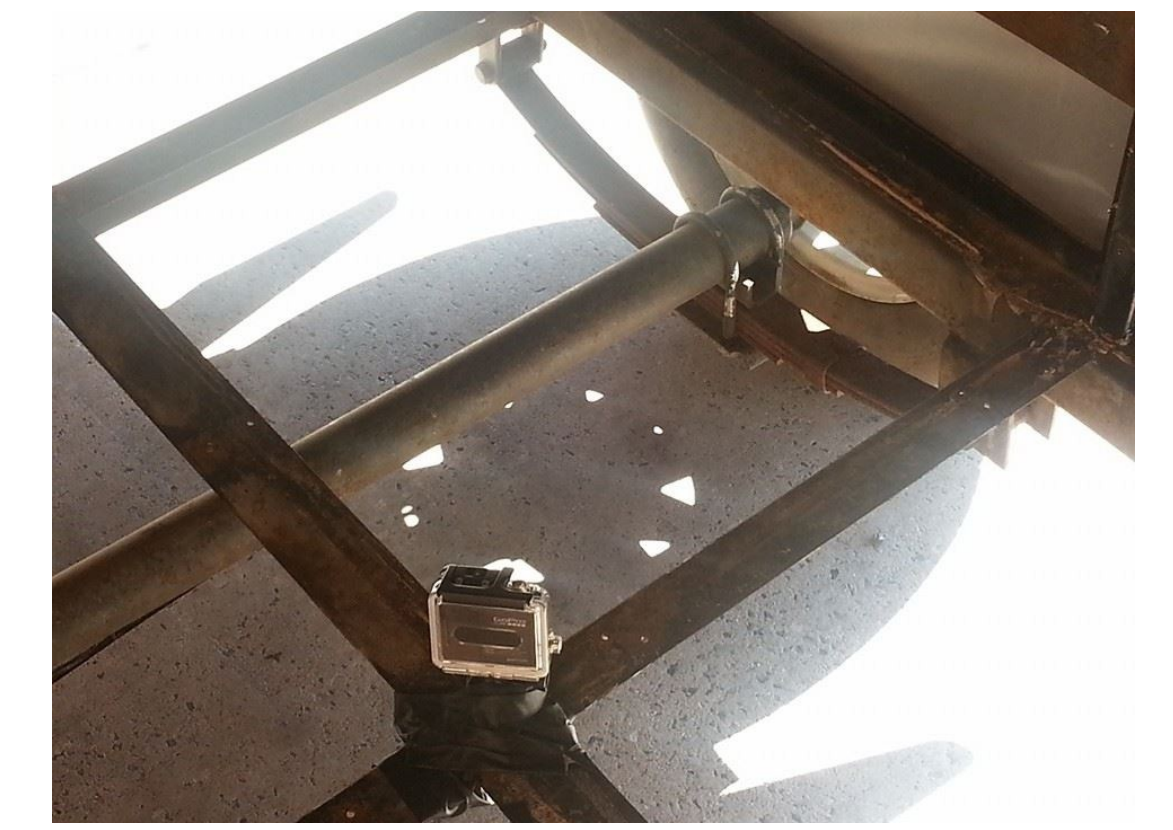
Any treatment outside of major population centers is greatly hindered by the “deficiency of resources, infrastructure, and trained personnel; the entire lack of, or prohibitive cost of chemotherapy drugs; and the advanced stage of the majority of cancers at the time of presentation.”² The Mobile Medical Clinic project aims to assist with resources and infrastructure, as well as dealing with the ever-important latter notion that if patients were tested and screened more frequently and thoroughly, their cancer could be discovered at an earlier, more treatable stage. Our clinic will equip Dala's medical teams with a place to perform cancer screenings in the field, bringing the clinic to the village, thus reaching more people.



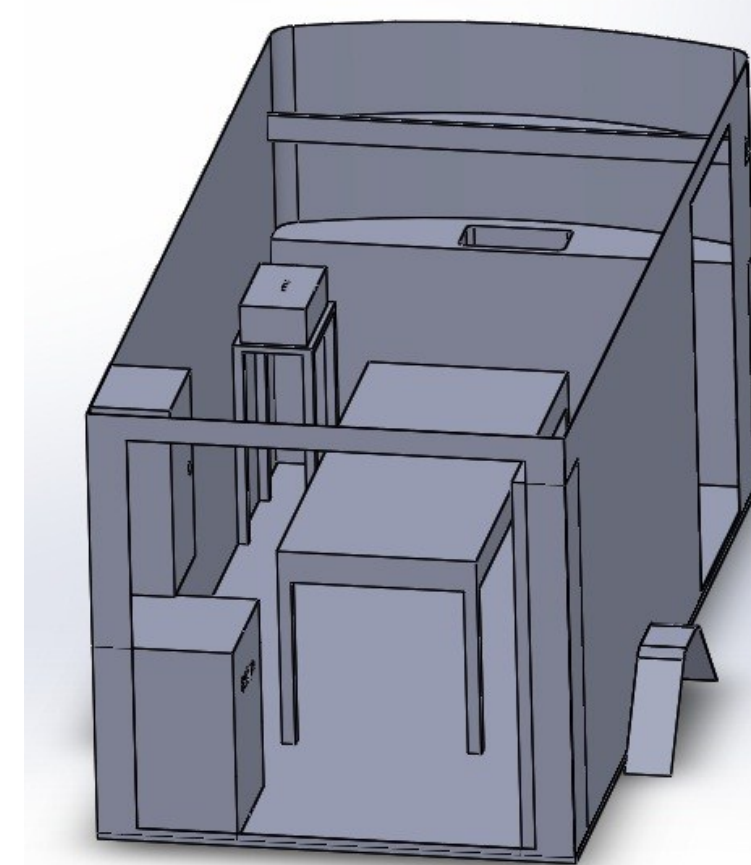
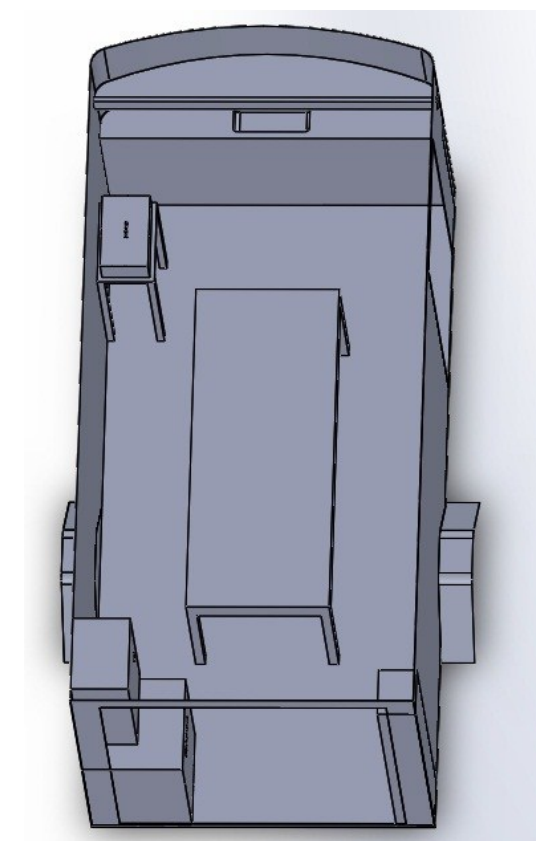
Dala Development is working to bring medical services to resource-depleted areas needing cancer screenings and treatment. — Photo from <http://www.daladevelopment.org>

Current Work

The MMC project's first course of action was to remove all old parts of the trailer which would eventually be replaced. The most important of these was the floor; once the entire floor was removed, the frame could be accurately modeled and analyzed. The team eventually found the frame to be in good enough shape to support the new components of the clinic. Removal of the floor allowed greater accessibility to the axle and suspension. The team conducted both visual and graphical accelerometer testing on the existing suspension (seen at upper and lower right). Currently, the team is working on obtaining and installing a new suspension as well as working on analyzing weight distribution. They are also finalizing details of necessary components to be included and the floor plan logistics (below left). After researching flooring options, the project has recently decided to coat the floor of the clinic with Mondo™ Rubber on top of plywood for its durability, waterproof qualities, and ease of cleaning.



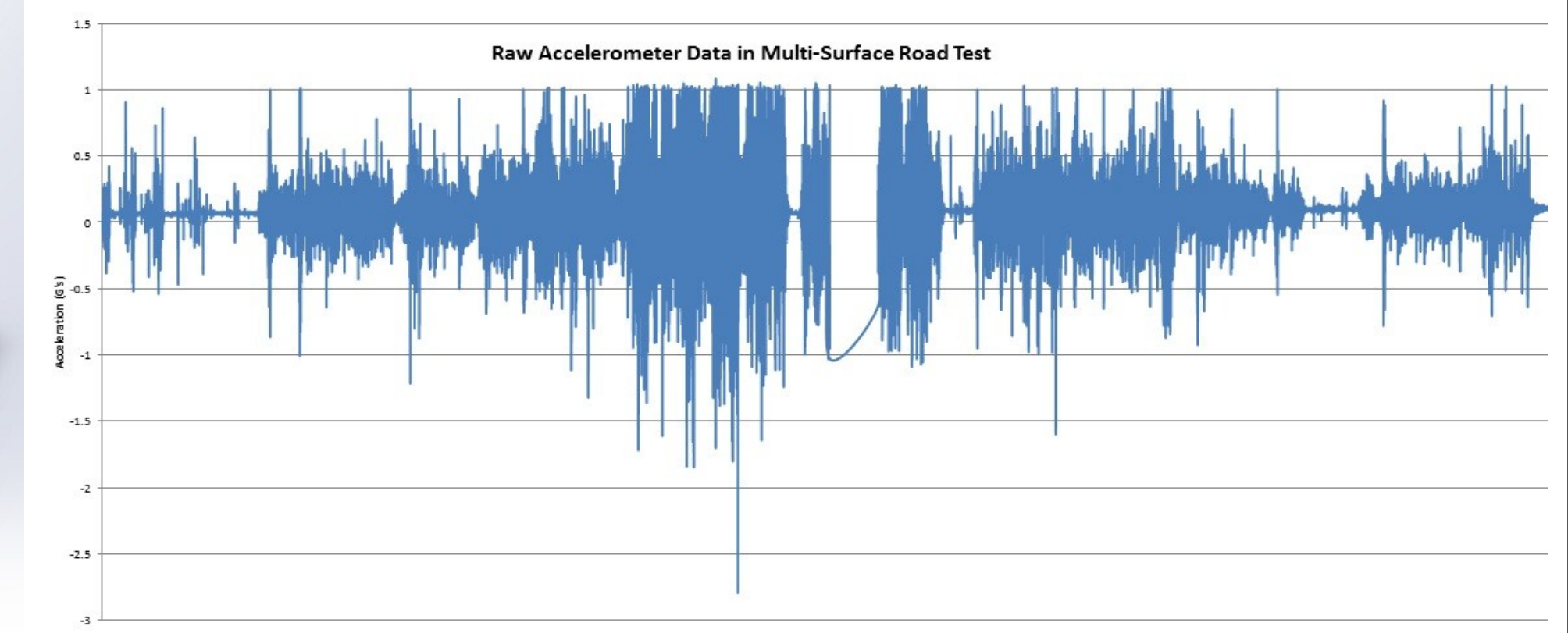
Filming suspension performance with a mounted GoPro® — Photo by Luke Murrill



Two views of initial floor-plan designs. Made to better visualize spatial concerns in the trailer.

Future Work

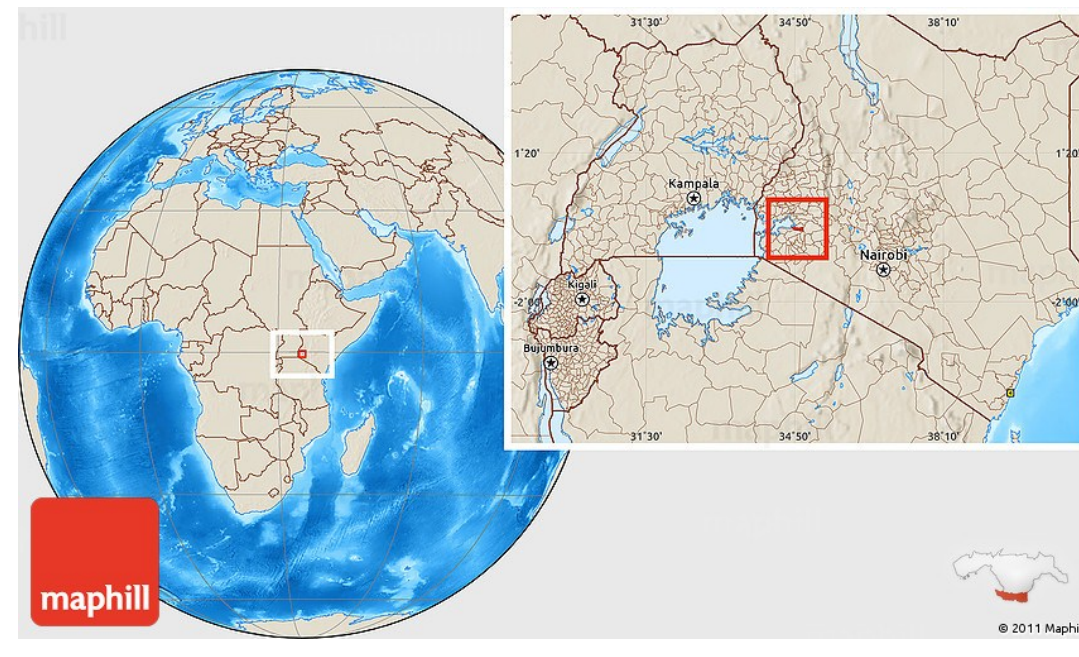
In the future, the MMC will research and design the mounting interface for all interior components. They will also look into the practicality of installing a simple running water system to operate a spigot/sink, as well as utilizing the roof as space for solar panels. This will allow the trailer to refrain from using a bulky generator for its electrical needs. Another topic of research and development is the type of tire suitable for use on unimproved roads.



A graphical representation of the resolved acceleration experienced by the frame during the MMC current suspension test. — Graph provided by Luke Murrill

Our Client

The MMC works in collaboration with **Dala Development**, who provides services to western Kenya. From their website: “Dala Development Program is a faith-based, grassroots development organization working to improve livelihoods in Upper Nyakach, Kenya. Our strategy is to organize and mobilize the community's own creativity in order to overcome the challenges they face, using the resources available to them.”¹



<http://www.maphill.com/kenya/nyanza/nyanza/upper-nyakach/location-maps/shaded-relief-map/>

Further Information / Reference List

You can learn more and stay updated on the progress of the Mobile Medical Clinic by checking its page on the Collaboratory Wiki, at: http://www.thecollaboratoryonline.org/wiki/Mobile_Medical_Clinic
Learn more about Dala Development's work and medical conditions in Kenya at: <http://www.daladevelopment.org/preventive-health.html>



Reference List

- Okall, Dan (2013). *Dala Development—About Us*. Retrieved from <http://www.daladevelopment.org/about-us.html>
- Okall, Dan (2013). *Preventive Health: Dala Development Programs*. Retrieved from <http://www.daladevelopment.org/preventive-health.html>

Acknowledgements

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