University of Houston

College of Technology

Computer Engineering Technology Department

Solar Voltaic Function Generator

ELET 4308/4108

Senior Project

Team 7
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Project Requirements

- Provides a reliable source of renewable power/energy.
- Mobility.
- Inexpensive.

Introduction

- Solar voltaic function generators can be used to power a wide variety of portable devices.
- This prototype will serve as a model for further improvement.

Background

- Provides both DC load and AC load for multi-functional power usage by portable devices.
- Uses the sun as an alternate power source.
- The generator is compact, and highly mobile.
- The generator's power is safe for the environment.

Design Alternatives

- Better quality solar panels.
- Stronger motor for better motion.
- Multiple axes of motion.
- Less power for lighter weight.
- Smaller model for mobility and practicality.

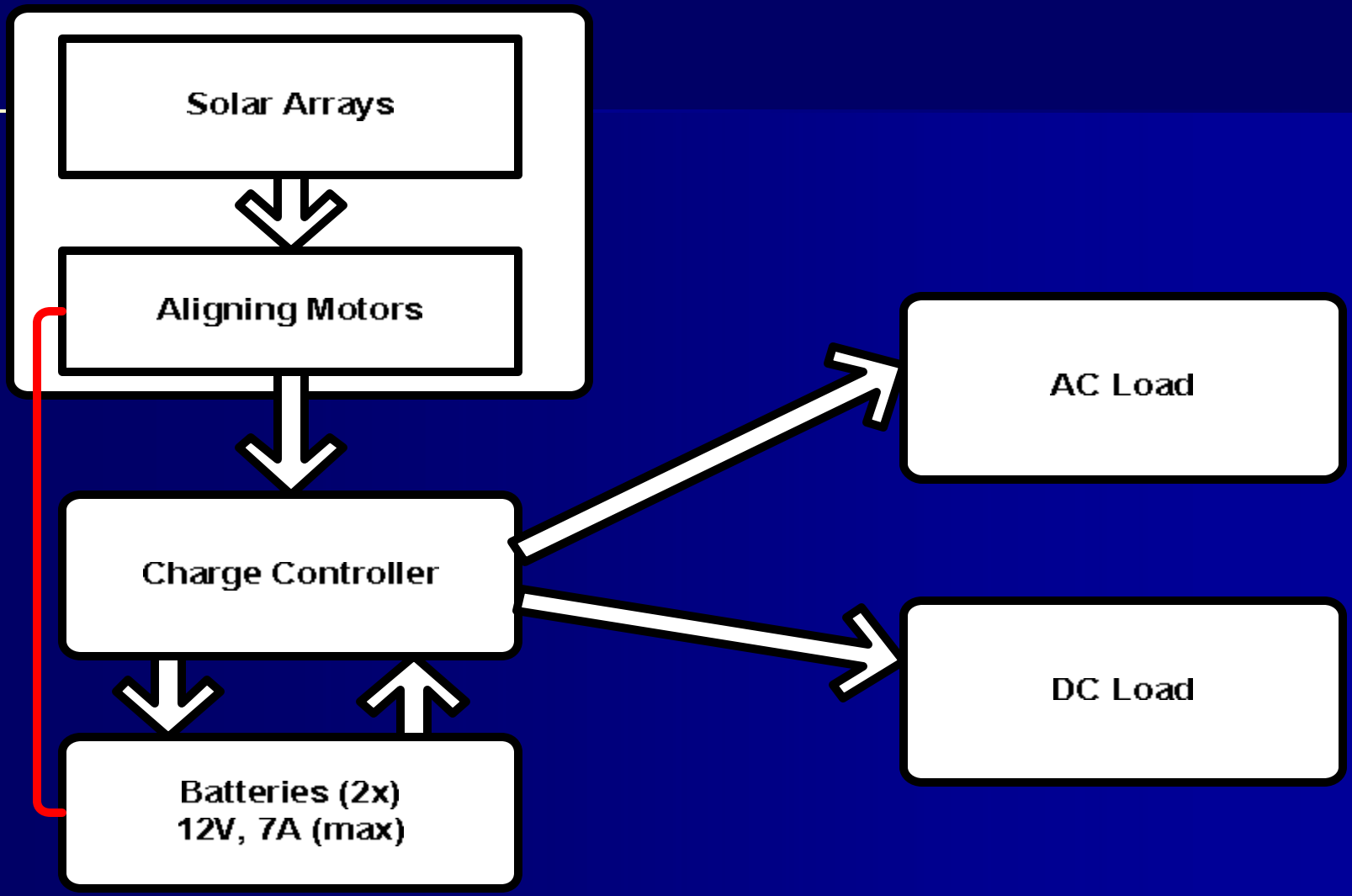
Project Specification

- Solar panel array: arrange in parallel for maximum voltage and current.
- Aligning motor/microcontroller: the ATMEL AT89C2051 microcontroller controls the gear motor, tilting the top solar panel array.
- Charge controller: controls voltage level in the batteries.
- Batteries: stores solar energy.
- DC/AC load: powers multiple devices.

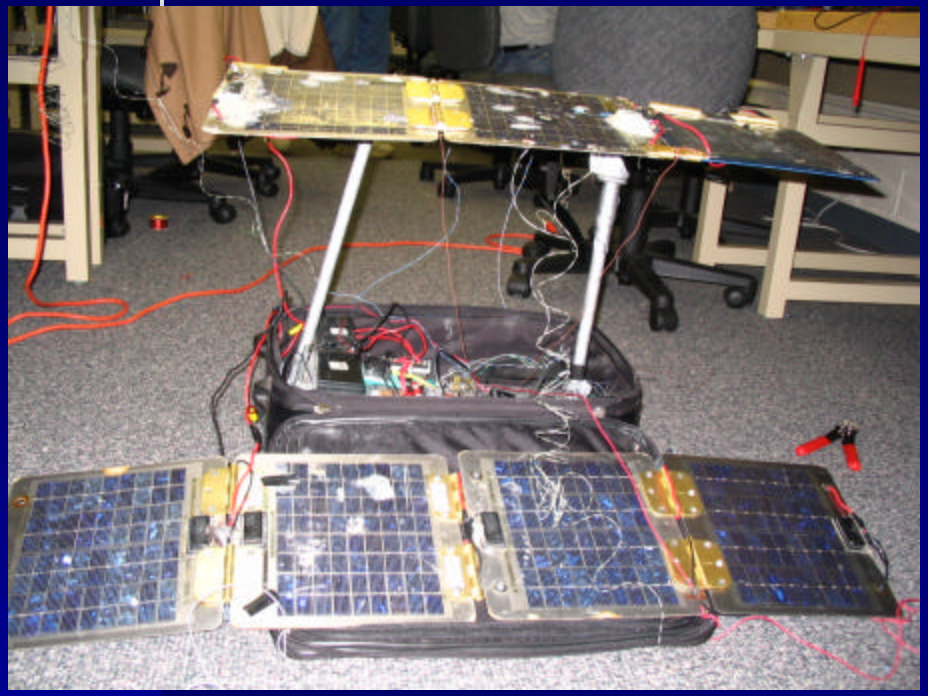
Design Description

- The solar panels collect the sun's energy.
- Batteries store the solar energy
- The charge controller controls the voltage level.
- The motor tilts part of the solar panels to an angle of 45° to the sun.
- An inverter converts the battery power into an AC/DC source for powering any power device.

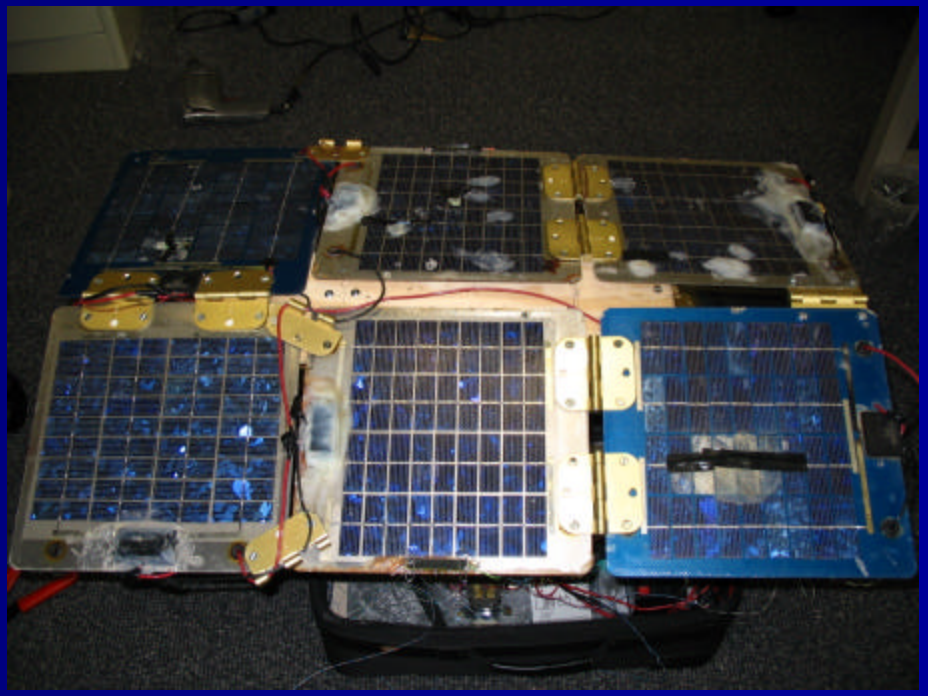
Project layout



Construction details

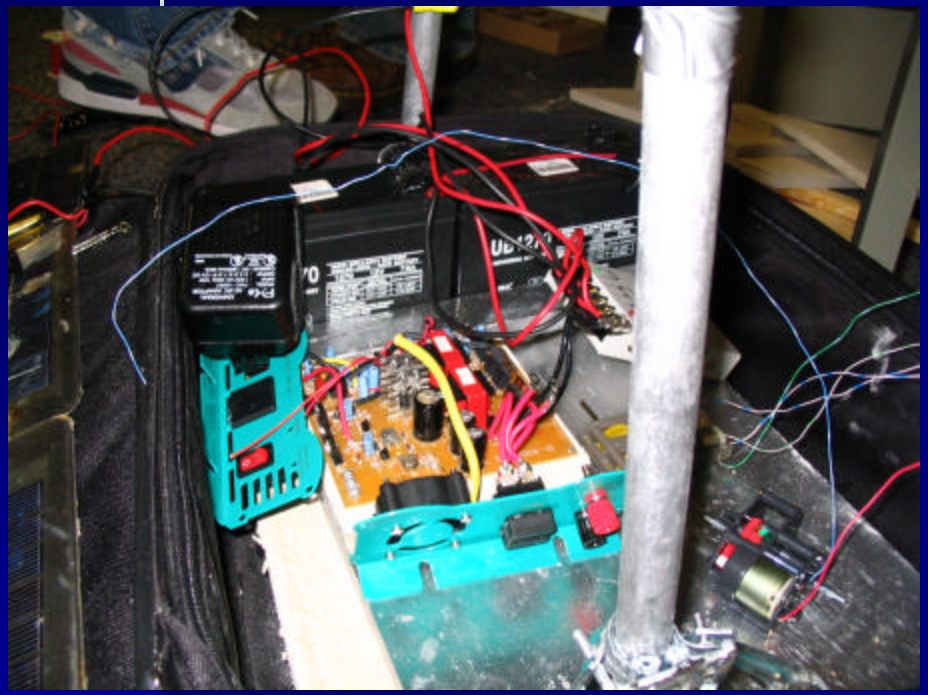


Solar panels layout

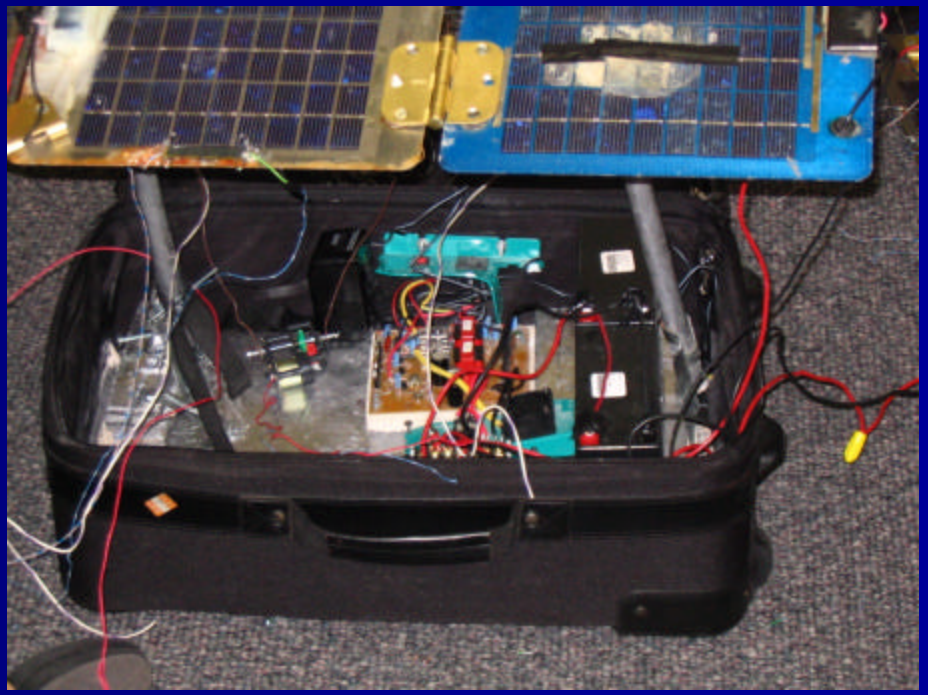


Solar panels top view

Construction details



Circuit set up



Finish circuit in the case

Cost Analysis

- Electronic Component

– Battery	2 @ $16.50 = $33.00
– Charge controller	1 @ $29.95 = $29.95
– ATMEL AT89C2051	1 @ $ 2.00 = $ 2.00
– PCB Board	2 @ $ 6.95 = $13.90
– AC adapter	1 @ $10.95 = $10.95
– Micro solar panel	8 @ $ 0. 25 = $ 2.00
Total cost	$91.80

Cost Analysis (cont'd)

- Mechanical Parts:
  - Gear Motor 2 @$12.00 = $24.00
  - Wood (various prices) = $ 7.18
  - Hinges (90° and 180°) 15 @$ 0.99 = $14.85

Total cost	$46.03

Cost Analysis (cont'd)

- Labor
  - 250 hrs x 2.5 x $25/hr = $12,500
- Engineering and Design:
  - 250 hrs x 2.5 x $35/hr = $21,875
- Testing:
  - 100 hrs x 2.5 x $20/hr = $ 5,000

Total cost	$39,375

Questions?

Thank you for your time.