

Power Systems



Matt Holst (EE)
Mehnaz Mahbub (EE)
Mitch Hatfield (EE)

Agenda

Introduction

Team purpose and objectives

Collaboration with other teams

Project Specifications

System Design and Components

Project Details

Cost and Bill of Materials

Design Advantages



Purpose of our Team

Design a power system to run the Spartan Superway

Meet specific power requirements from the subteams

Ensure a SAFE power system



Objectives of our Team

- Design power system
 - DC-AC conversion to Utility Supply
 - DC-AC-DC conversion for auxiliary loads
- Solar array utilization
 - Maximize available solar power

Our Team: Steps towards completion

Last Semester

Rough block diagram

Rough power module


This Semester

Collecting power estimate (specific voltages and currents)

Final block diagram

Gather components

Collaborating with subteams and putting everything together



Collaboration with other Teams

Intermediate Scale Team

Motor, controller etc

Suspension Team

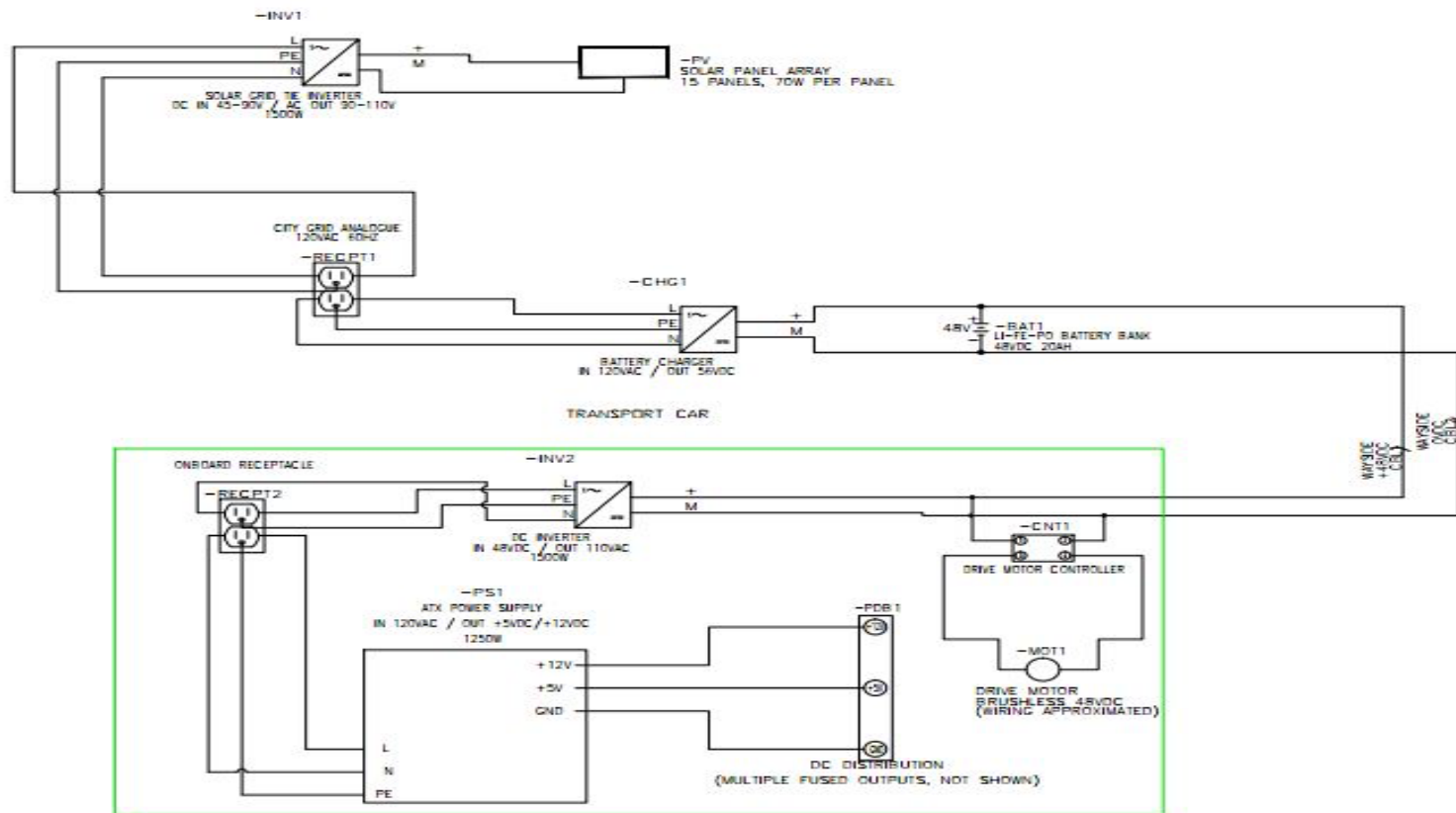
3 actuators (12V, 5A each), total max power 180W

Braking Team

Solar Team

Wayside Team

System Diagram



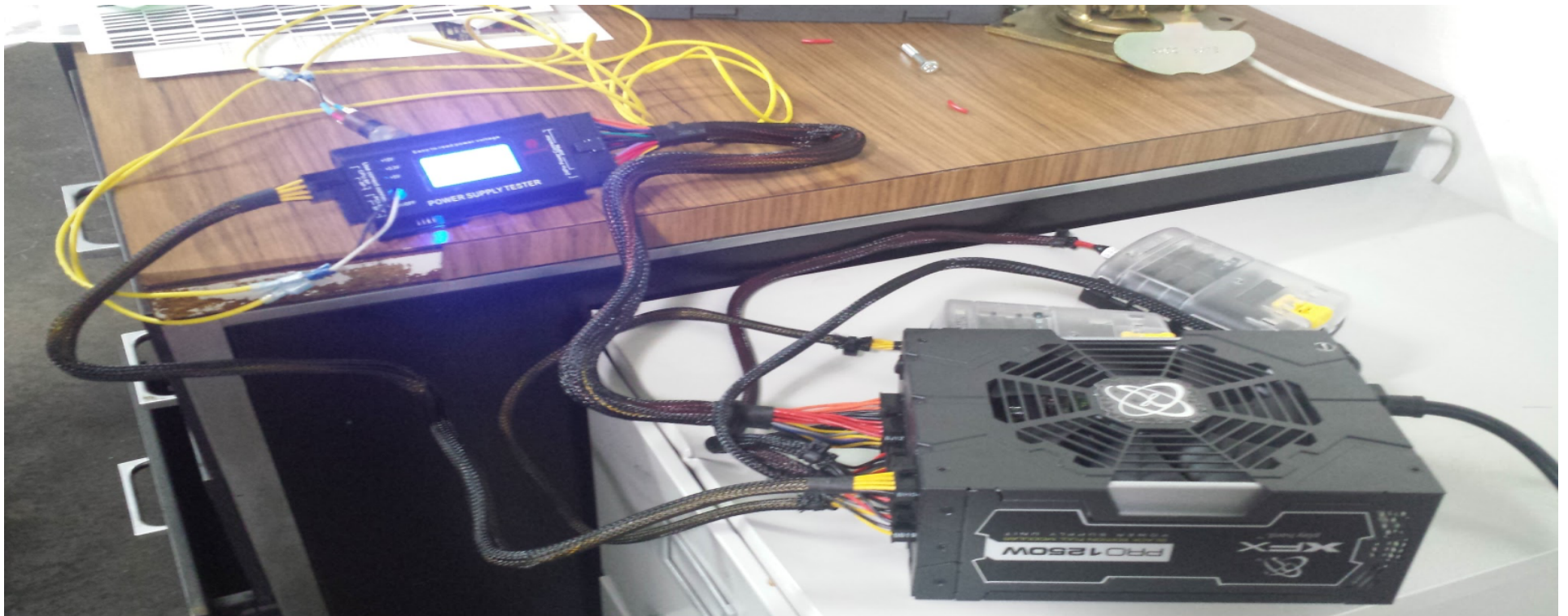
Cost Analysis

Components	Quantity	Cost Per Unit	Total Cost Per Unit
1500W Solar Grid Tie Inverter	1	\$489.99	\$489.99
1500W 48VDC to 120VAC Inverter	1	\$285.00	\$285.00
1250W Modular ATX Power Supply	1	\$215.41	\$215.41
6 Circuit Fused DC Distribution Block	2	\$33.50	\$67.00
ATO type Fuse Assortment	1	\$7.25	\$7.25
60VDC / 50ADC Power Meter	2	\$31.99	\$63.98
		Subtotal	\$1,128.63

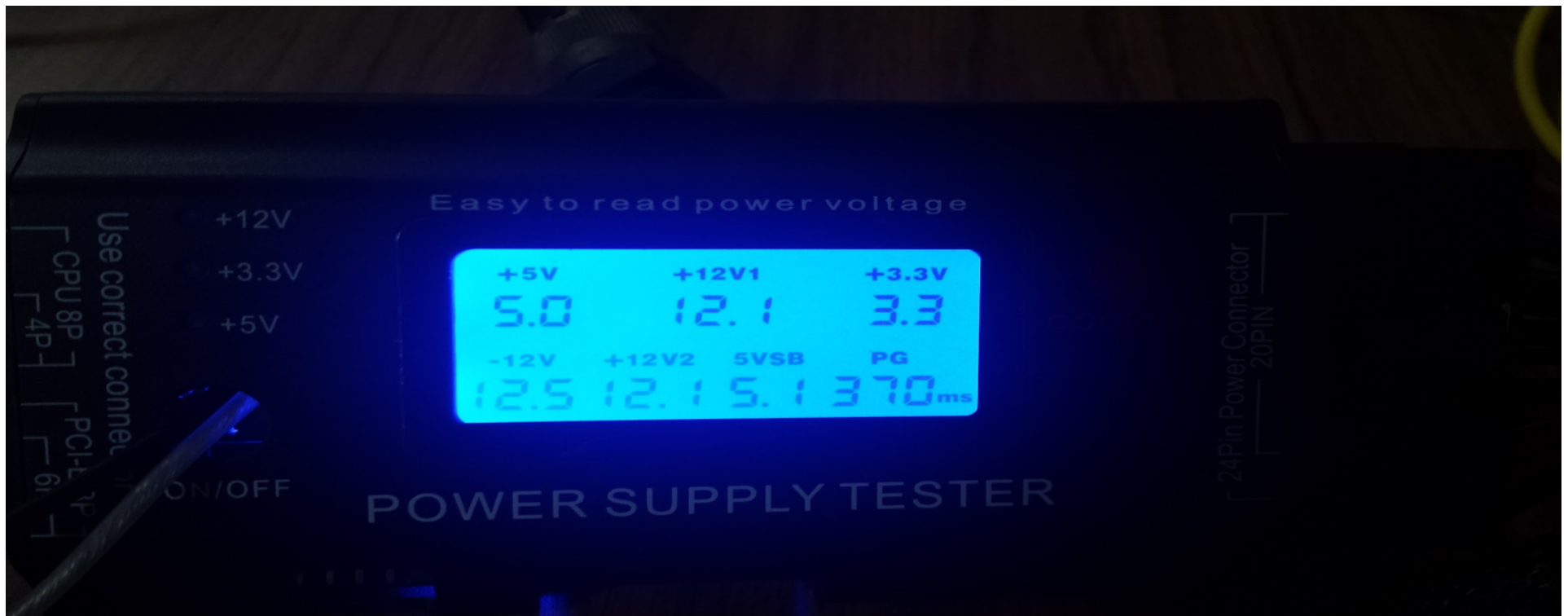
Internal Power Supply for the Cabin



Cabin Power Supply + Power Meter



Voltage Supplies Available Inside Cabin



Design Advantages

Allows for Direct Integration of Solar Power

Creates a System With Multiple Sources of Power

Provides Multiple 5 Volt and 12 Volt Sources to Bogie



Team Schedule

[illegible]

What We Learned & Suggestions for Improvement

Start early

Communication is key to success

Have well defined goals

Define - early and clearly - the necessary cross-team tasks

Be more active in cross-team efforts



Thank You! Any Questions?



SPARTAN
SUPERWAY