POLARBOT

Project PolarBot

Stanford Space Systems Development Laboratory

San Jose State University

POLARBOT

History

- The project was started in 2004
- Initial funding came from variety of sources including UW Madison
- Multiple teams
- SI project using off the shelf parts
- Meant to study icebergs

POLARBOT

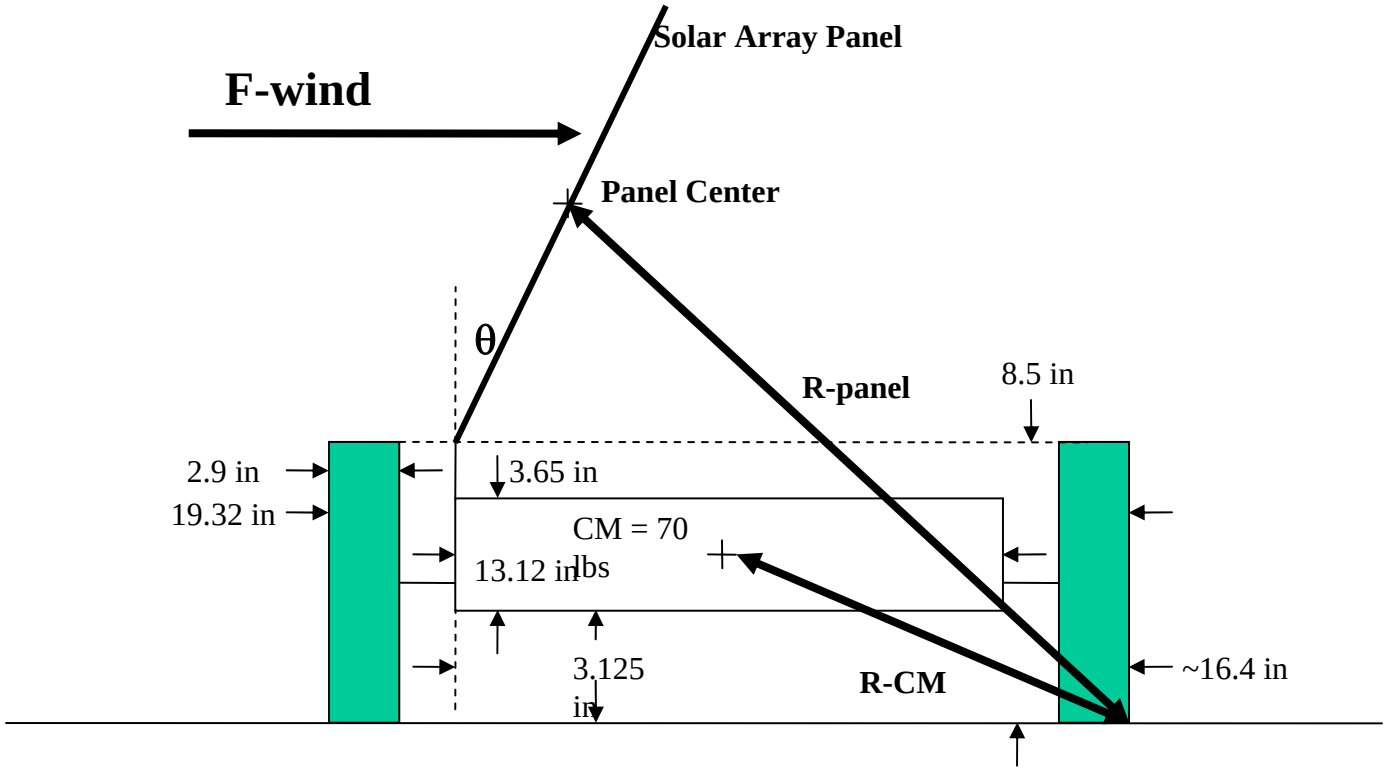
Subsystems

- Electrical Power System
- Command & Data Handling
- Sensors & Global Positioning Systems (GPS)
- Communications
- Camera
- Weather Station
- Structures

Mission Requirements

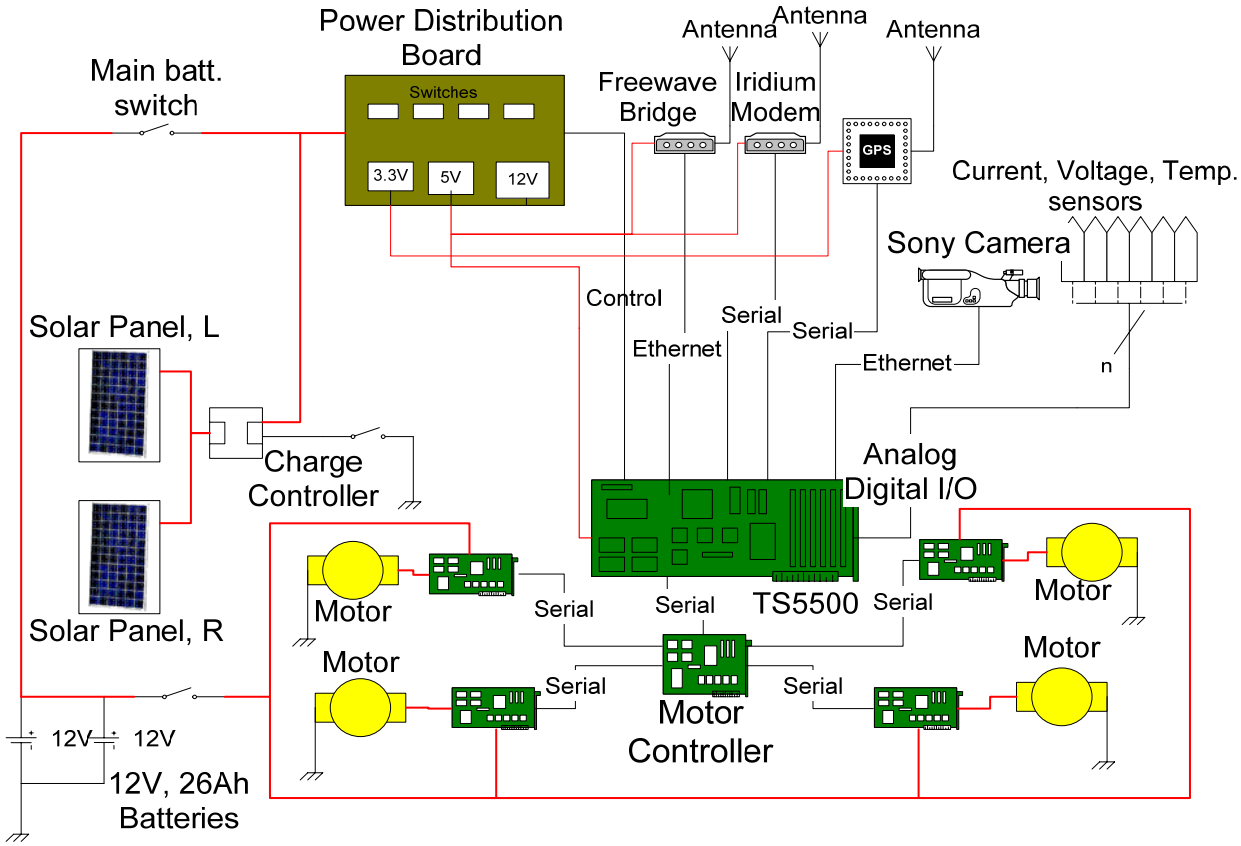
PolarBot shall:

- Withstand minimum operating temperature of -20°C (14°F) to max of 9°C (48°F)
- Be capable of long distance commanding, controlling and communicating through Iridium and local comm through Freewave
- Provide digital images of the surrounding terrain



R-CM = (25 + 93.3)^0.5 = 10.88 in

Subsystems Interface Diagram



C&DH
Picture of Command Unit

TS-5500

TS-SER4

Communications
Iridium (Long distance)

9505 Iridium Modem and Mast Mount Antenna

- Key Features
  - 1616 - 1626.5 MHz
  - Modulation: TDMA/FDMA 2400 bps
  - Serial RS-232 I/F
  - Link Margin w/Antenna: 12.5 dB average
  - Op. Temp: -30°C - +60°C
- Primary Uses
  - Command and control from PolarBot Ground Station, Moffett SSDL
  - Transmit data: mission telemetry, H&S, camera images
  - 10 to 20s to receive an image

Communications
FreeWave (Local)

FreeWave FGR Series Radio and MAXRAD Antenna

- Key Features
  - 902 - 928 MHz
  - Freq. hopping spread spectrum
  - Modulation: GFSK 120 ~ 170 Kbps
  - Ethernet 10 Base-T I/F
  - Up to 40 miles effective range
  - Op. Temp: -40°C - +75°C
- Primary Uses
  - Local PolarBot command and control and H&S check-out at local ground stations

Sony Camera

SNC-RZ30N Sony Network Camera

- Key Features
  - Field tested in Antarctica for 4 years
  - Operating. Temp: 0°C to +40°C
  - Still image capture resolution 640 x 480 – 320 x 240 – 160 x 120
  - Power Supply 12 Volts DC
  - Current Consumption 1.8 A max
- Primary Uses
  - Provide digital images of the surrounding terrain

Davis Weather Station

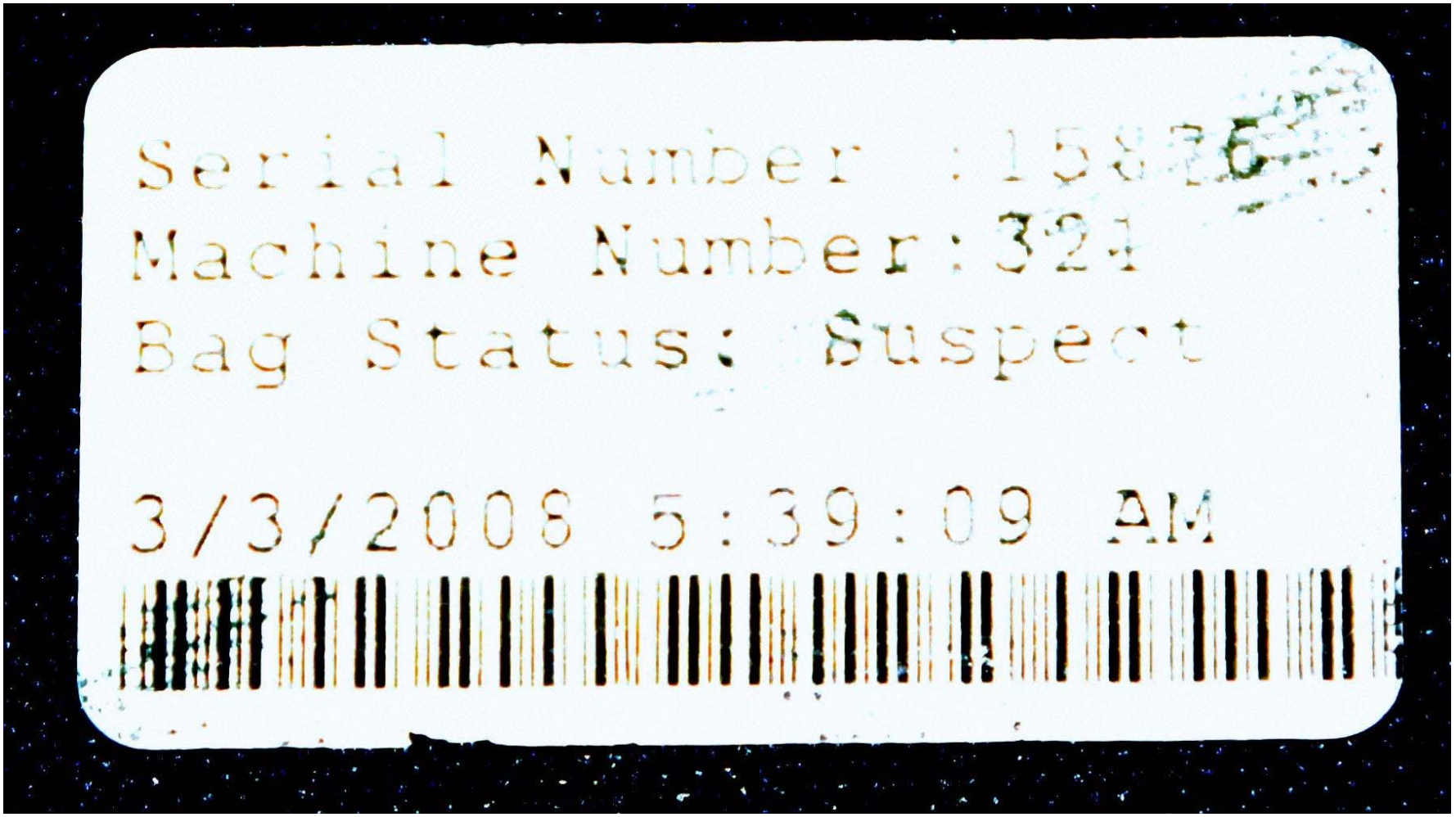
DW-S130 Davis Weather Station – Wind Speed and Direction

POLARBOT

POLARBOT

POLARBOT

POLARBOT


Serial Number : 1586
Machine Number: 321
Bag Status: Suspect
3/3/2008 5:39:09 AM

POLARBOT

POLARBOT

POLARBOT

POLARBOT

What next?

- Donkey/Mule
- Semi Autonomous
- Mesh
- Rocker Boogie
- Lightweight
- Pull along
- Atom processor?
- Linux 2.6