

# Parabolic Trough Updated System

Saad Almonnieay, Robert Blaskey, Daniel Chief, Christopher Mesko, Jairo  
Rivera, and Jacob Seitzer

January 21, 2015

NORTHERN  
ARIZONA  
UNIVERSITY



# Overview

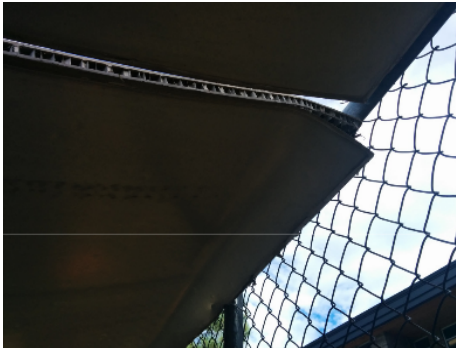
- Introduction
- Tracking System
- Trimming
- Reflective Surface
- Motor and Control Box
- Solar Collection
- Conclusion

# Introduction

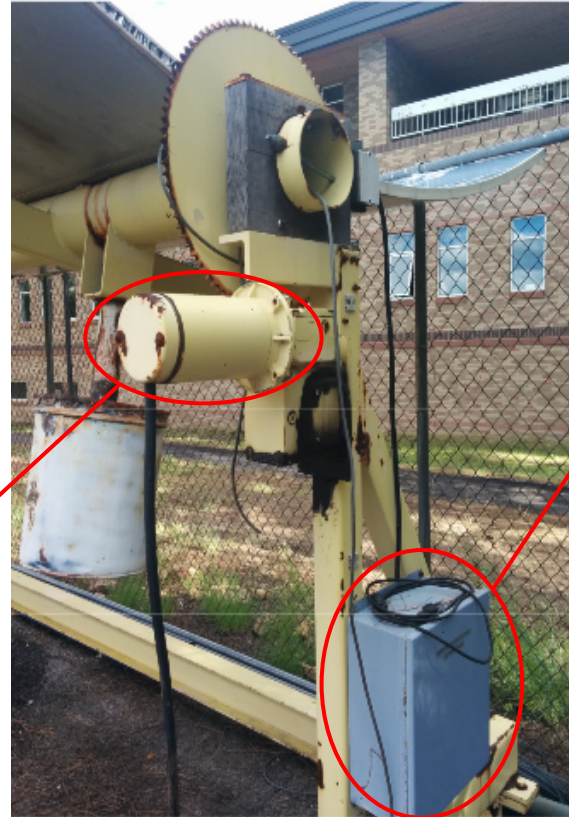
- Finishing Tracking System
  - Order Motor and Control Box
  - Finish Trim and Mylar installation
- Design Energy Extraction System



Overall Picture of the System



Crack in the Panel

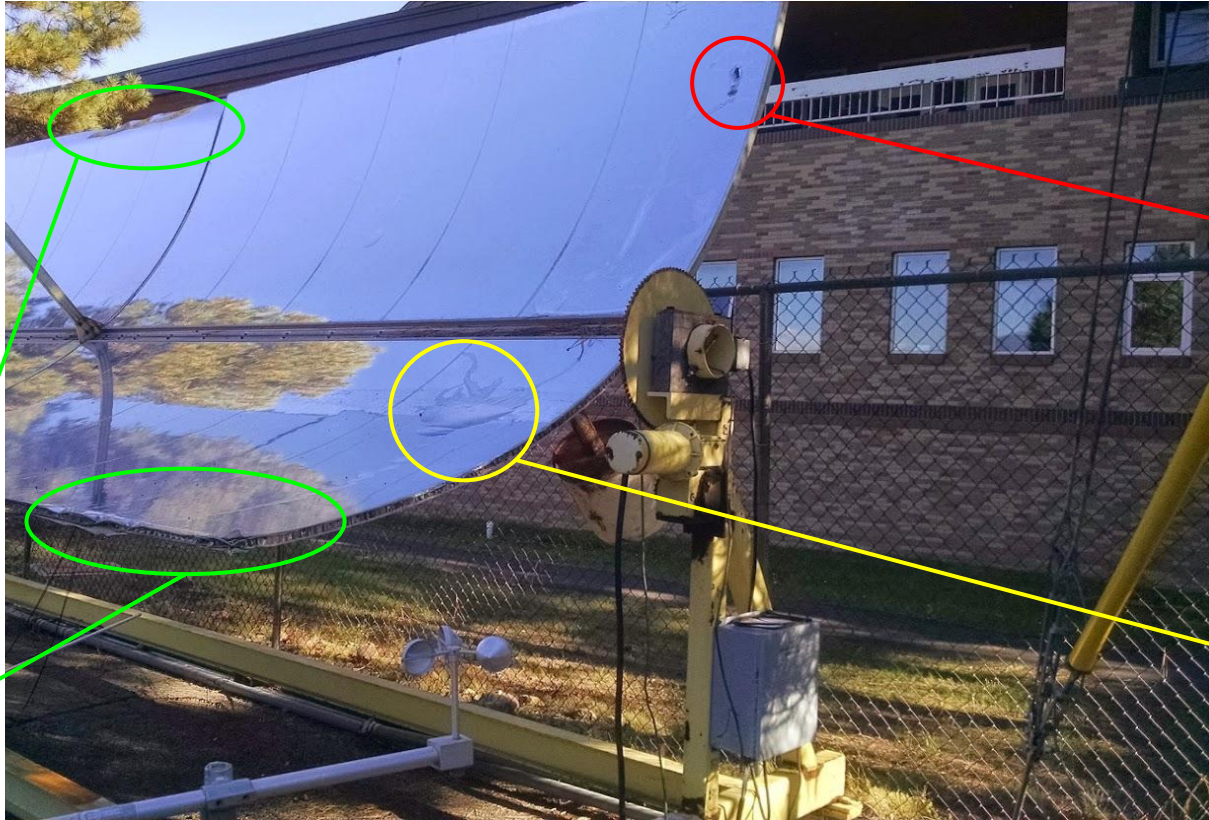


Motor

Control  
Box

Motor and Control Box  
Location Picture

# Initial Condition of Parabolic Trough



Holes on Surface

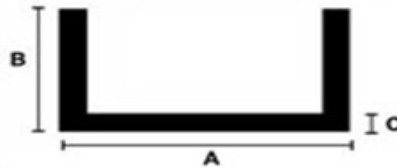
Water Damage

Frayed Edges

Parabolic Trough Initial Condition  
Picture

# Edge Trimming

- 6063-T52 Aluminum Channel (Sharp Corners)
  - Cheaper than plastic
- Dimensions:
  - Width(A) = 1.25"
  - Legs(B) = 1.25"
  - Web Thickness(C) = .125"
  - Leaves 1" as the inner width.
- For curved edges, aluminum was cut into 2" sections for assembly
- Adhesive: Loctite PL375 Heavy Duty



U Trim Picture (Source: Metals Depot)

# Installed Trim



Picture1: Installed Trim



Picture3: Installed Trim



Picture2: Installed Trim



Picture4: Installed Trim



Picture5: Installed Trim

# Repaired Surface

## Mylar

- Covered damaged surface
  - Holes in parabolic trough
  - Bubbles in film

Pictures of the Surface of the Trough





# Motor

## Specs

- 1 HP
- 90 V
- 56 C Face
- 1750 RPM
- Shaft size-  $\frac{5}{8}$ "

Motor from Baldor found

- AC Motor
- Model VM3546
- Price: \$453



Motor Picture(Source: Baldor )

# Control Box

## Specs

- AC Micro Drive
- 1 HP
- 230 Volts
- Price: \$312.62

Control Box from Baldor



Control Box Picture(**Source:** Baldor)

# Solar extraction

Two Designs:

- Closed Recirculating System
  - Will run water through stainless steel piping.
  - The water will absorb the solar heat, thus turning to steam.
  - The steam could be used to rotate a turbine.
  - A condenser will be needed to condense the water vapor into liquid.
  - A pump will be needed to recirculate the water.
- Photovoltaic Energy Extraction
  - Photovoltaic material will be used to absorb heat.
  - The energy will be converted to electricity.
  - After calculations, we will decide how to use or store the energy.

# Conclusion

- Tasks completed
  - Trough damage repaired
    - Inside Trim finished
    - Mylar installed
- To be completed
  - Order motor and control box replacement
    - Install new components
  - Components of solar collector

# References

McMaster-Carr." *McMaster-Carr*. N.p., n.d. Web. 15 Oct. 2014.

Metals Depot <http://www.metalsdepot.com/products/alum2.phtml?page=6063%20aluminum%20channel&LimAcc=%20&aident>

<http://store.kgpowersystems.com/acb330-03u-04a7-2-baldor-acb330---230v-1-heavy-duty-hp-4-7-heavy-duty-cont-amps-acb330--230v-series.aspx>

Questions?