TerraSync

Using the earth to manage thermals

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“Texas is too hot and where is my internet?”

- The people of Texas

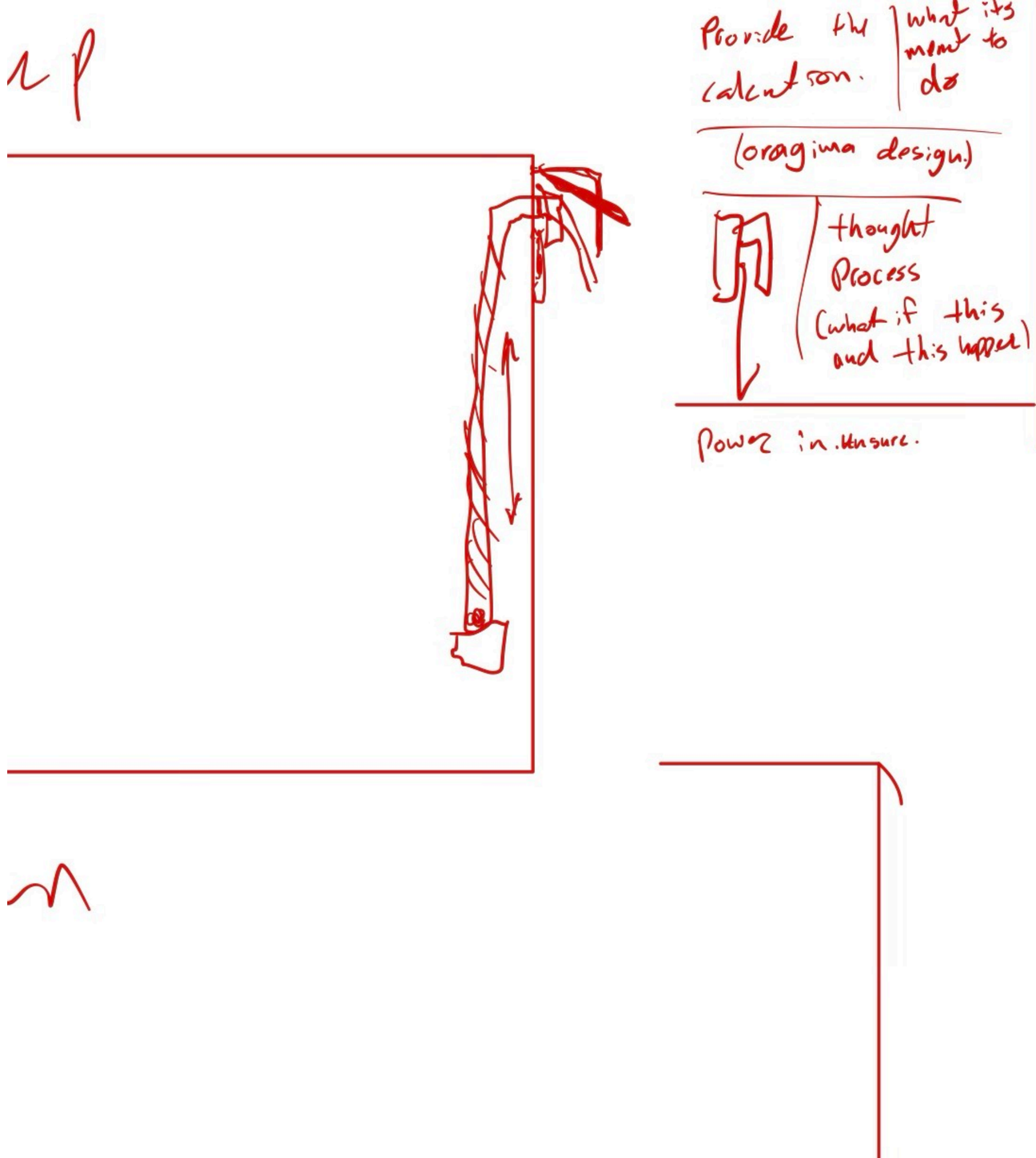
Environmental Considerations:

- Direct sunlight (UV and non-UV radiation)
- High ambient temperatures (up to 140°F)
- Low ambient temperatures (down to -40°F)
- Significant temperature swings (from morning to evening)
- Rain, snow, sleet, hail, fog
- Rodents and insects
- Physical damage (gardeners, construction, etc.)

Attempt 1

Thermal expansion

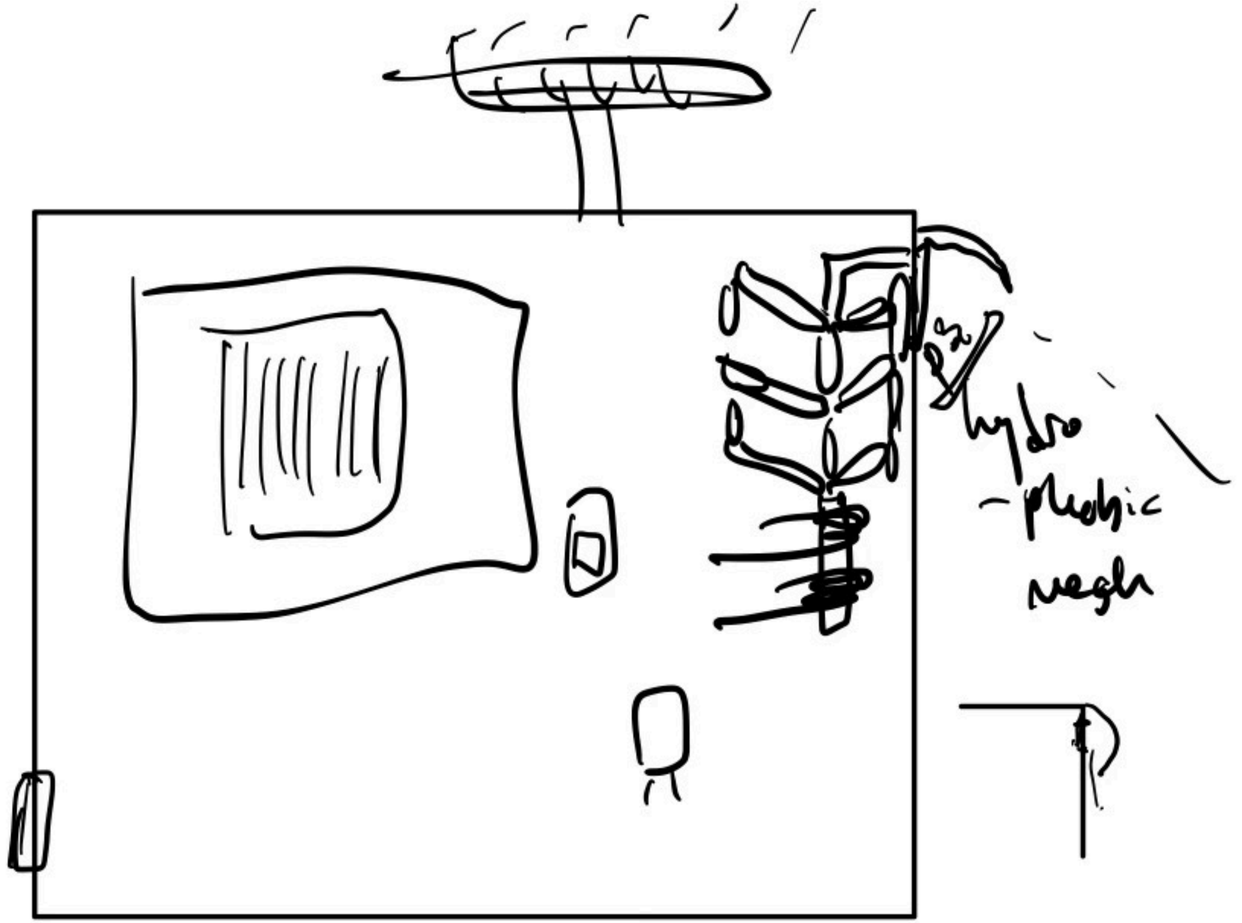
- Tolerances were to high for a reasonable production



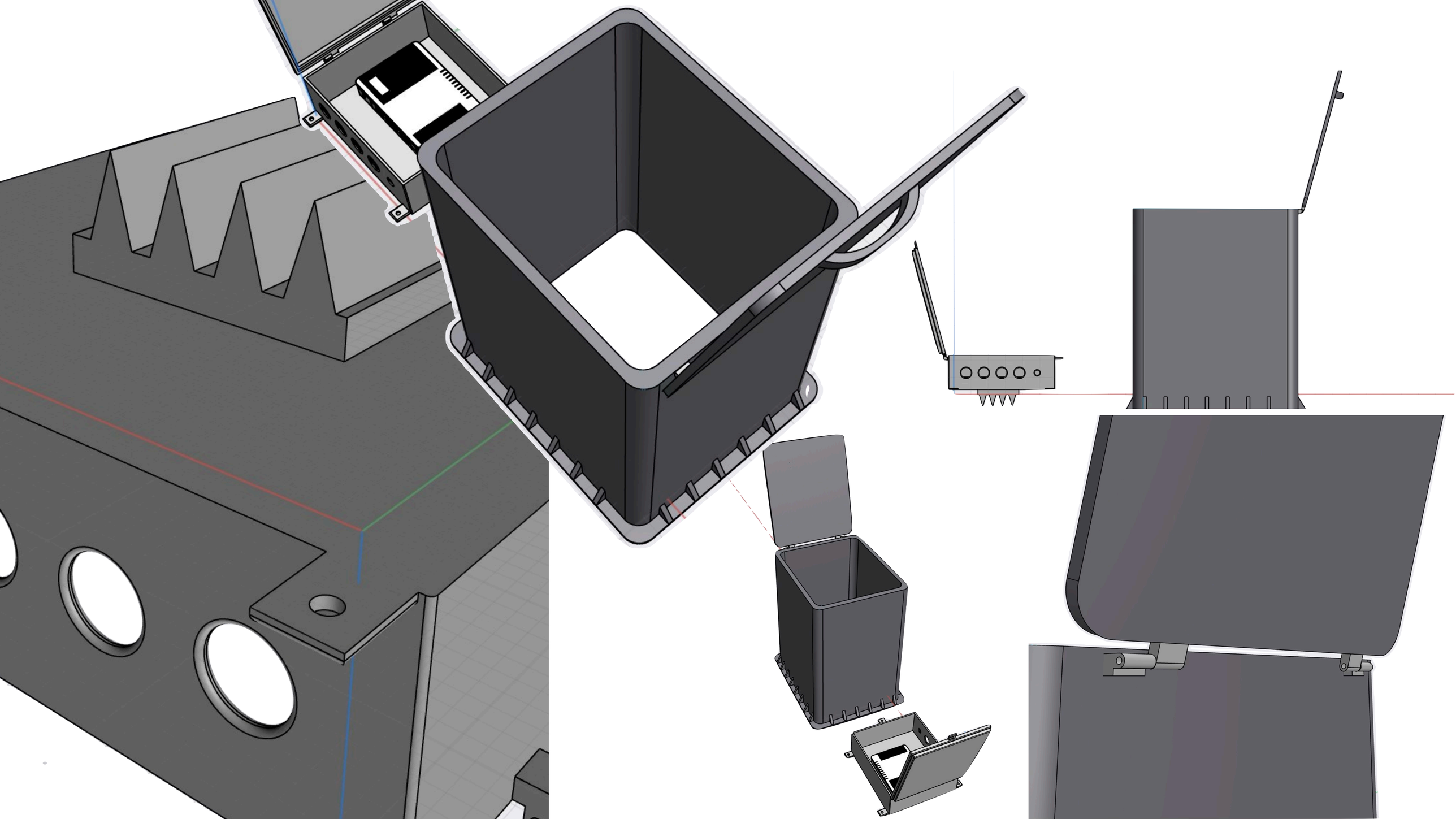
Attempt 2

Electronic solution

- To many moving parts
- Didn’t solve much of the heat problem
- Complicated design



Introducing TerraSync



Heatsink area: $89.25cm^2$

$$Q = kA\frac{\Delta T}{d}$$

19W TDP

4°C

Difference from ground temperature

Ground temp @ 1m: 30°C

$$19 = 237 * 0.00068925\frac{\Delta T}{0.05}$$

Resources for temp

- https://www.tandfonline.com/doi/epdf/10.1080/01430750.2000.9675374?needAccess=true